PROPOSAL
SPECIFICATIONS

AND

CONTRACT AGREEMENT

FOR

COLD IN PLACE RECYCLING
FY20-500-31

CITY OF MANCHESTER
DEPARTMENT OF PUBLIC WORKS
HIGHWAY COMMISSION

Toni Pappas  Chairman
Patrick Robinson  Vice-Chairman
James Burkush  Clerk
Trixie Vazquez  Commissioner
Armand Forest  Commissioner

______________________________________________
Kevin A. Sheppard, P.E.  Public Works Director

CITY OF MANCHESTER

New Hampshire

PROPOSAL

SPECIFICATIONS

and

CONTRACT AGREEMENT

for

FY20-500-31
COLD IN PLACE RECYCLING

Prepared by

CITY OF MANCHESTER, NEW HAMPSHIRE

DEPARTMENT OF PUBLIC WORKS
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INVITATION FOR BIDS

Sealed bids from prequalified contractors will be received at the office of the Department of Public Works of the City of Manchester, New Hampshire before or at 2:15 P.M., prevailing time on Thursday, February 27, 2020 for the following described services.

COLD IN PLACE RECYCLING
FY20-500-31

Contract consists of approximately cold in place recycling treatment of various City roadways. Work shall include cold in place recycling of existing pavement including removal reinstallation and adjustment utility structure castings to support the work.

Certified Check/Bid Bond $30,000.00

Specifications may be seen at the office of the Department of Public Works, 475 Valley Street or viewed or at the following website:

http://www.manchesternh.gov/Departments/Purchasing/Bid-Opportunities-and-Results

All individuals, firms, partnerships or corporations intending to bid, must be prequalified for the project. Prequalification forms may be obtained from the following website:

http://www.manchesternh.gov/purchasing.

Sealed Prequalification Statements will be received at the Office of the Department of Public Works until 5:00 P.M. prevailing time on February 7, 2020.

Specifications and proposal forms may be obtained on the City’s website at www.manchesternh.gov.

Bids must be completed in both words and numerals on regular proposal forms, which shall be submitted in a sealed envelope marked: “Proposal for COLD IN PLACE RECYCLING”, addressed and delivered to the Department of Public Works not later than the date and time mentioned above, at which time they will be publicly opened and read aloud.

Bids must be accompanied by a Certified Check or Bid Bond in the amount listed above, payable to: "Department of Public Works, City of Manchester, N.H.", as security for the execution of the contract.
A Performance and Payment Bond each in the amount of 100 percent of the contract price will be required of the successful bidder.

The City of Manchester is an equal opportunity/affirmative action agency. All qualified bidders will receive consideration without regard to race, color, religion, creed, age, sex, or national origin. The City hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, sex, age, or disability in consideration for an award.

The right is reserved to waive any informalities in or reject any or all proposals and to accept the bid that is deemed most favorable to the interest of the City of Manchester.

Questions may be directed to David Winslow or Owen Friend-Gray or at 624-6444.

Department of Public Works, City of Manchester, N.H.

By: HIGHWAY COMMISSION

Toni Papas, Chairman

Patrick Robinson, Vice-Chairman   James Burkush, Clerk
Trixie Vasquez, Commissioner     Armand Forest, Commissioner

Kevin A. Sheppard, P.E.
Public Works Director
INSTRUCTIONS TO BIDDERS

GENERAL:

1. Bids will be received by the City of Manchester, New Hampshire at the place and until the time specified in the Invitation to Bid and then publicly read aloud for the information of bidders and others properly interested who may be present either in person or by representative. **NO PROPOSALS WILL BE ACCEPTED AFTER TIME AND DATE SPECIFIED.**

2. The following meanings are attached to the defined works when used in this document:
   
   a. The word "City" means City of Manchester, New Hampshire.
   b. The word "Bidder" means the person, firm, or corporation submitting a proposal on these specifications or any part thereof.
   c. The word "Contractor" means the person, firm, or corporation with whom the Contract is being made by carrying out the provisions of this Sealed Bid Invitation and the Contract.
   d. The words "firm price" shall mean a guarantee against price increase during the life of the Contract.

3. Strict compliance with the requirements of the Invitation to Proposal, terms and conditions, and the instructions printed is necessary. All blank spaces must be filled in. Signatures of the responsible owner/representative of the firm must be in ink. No reproductions/duplications/copies will be accepted.

4. Each proposal must give the full business address of Bidder and be signed by him with his usual signature. Proposals by partnerships must furnish the full names of all partners and must be signed with the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and title of the person signing. Proposals by corporations must be signed with the legal name of the corporation, followed by the state of incorporation and by the signature and title of president, secretary, or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below the signature. A bid by a person who affixes to his signature the word "president", "secretary", "agent", or other title without disclosing his principal may be held to be the bid of the individual signing. When requested by the City, satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished. All Bids must be signed by an authorized, responsible officer or employee having the capacity to enter into contracts.
5. Proposals must be securely sealed in a suitable envelope, (facsimile or electronic submissions will not be accepted) addressed and marked on the outside as follows:

Cold in Place Recycling
FY20-500-31

6. Bidders’ names and address must appear on the upper left hand corner of the sealed envelope.

7. The entire solicitation document is to be returned when submitting a Proposal, unless otherwise directed by the solicitation document. Failure to return all pages may result in a determination that the submittal is non-responsive.

PLEASE NOTE: THE CITY OF MANCHESTER IS NOT RESPONSIBLE FOR PROPOSALS NOT PROPERLY MARKED.

8. It will be the responsibility of the Bidder to see that their bid is received by the Department of Public Works, Parks, Recreation and Cemeteries Division as specified.

9. Each Proposal is received with the understanding that the acceptance in writing by the City of the Bidder to furnish any or all of the services described therein or as otherwise negotiated shall constitute a contract between the Bidder and the City.

10. A contract agreement that is customarily employed by the City will be used and will incorporate the original solicitation with all terms, condition and specifications of the sealed Proposal. A copy of the contract agreement is attached hereto.

11. Proposals may be withdrawn upon written or electronic request received from Bidders prior to the time affixed for opening. Negligence on the part of the Bidder in preparing the bid confers no right for the withdrawal of the Proposal after it has been opened.

12. The solicitation document maintained by the Department of Public Works, in the bid file folder, shall be considered the official copy. In the case of any inconsistency between Proposal documents submitted to the City, but not clearly listed on the exception page of the document or as an exception by the Bidder, the language of the official copy shall prevail. Furthermore, any exception or changes to the specifications made by the Bidder may be cause to disqualify your Proposal.

13. Award will be made in the best interest of the City taking into consideration factors set forth in the City of Manchester Procurement Code. Upon making an award, or giving notice of intent to award, the City will place appropriate notice on the Purchasing Website: www.manchesternh.gov/bids.
14. No oral interpretations will be made to any Bidder as to the meaning of the specifications or terms and conditions of this sealed Proposal. Every request for such interpretation or request for a change in the specifications or terms and conditions shall be made in writing, addressed and forwarded to:

Mr. David Winslow  
Email: dwinslow@manchesternh.gov  
Subject: Cold in Place Recycling

All questions must be received no later than 12:00 pm, Tuesday, February 18, 2020. Any questions received after that date will not be answered. Every interpretation made to a Bidder will be in the form of an addendum to the Sealed Proposal Invitation which, if issued, will then be posted on the website: www.manchesternh.gov/bids. All such addenda shall become part of the complete Sealed Proposal Invitation. It is the Bidder’s responsibility to check the website prior to the submittal deadline to ensure that the Bidder has a complete, up-to-date Proposal package.

15. If issued, addenda to this solicitation will be posted in the Purchasing Department’s website: www.manchesternh.gov/bids. It is the Bidders responsibility to check the website prior to the submittal deadline to ensure that the Bidder has a complete, up-to-date package.

16. Proposals that are incomplete, not properly endorsed or signed, or otherwise contrary to these instructions may be rejected as informal by the City. The Proposal must be filled out completely and accurately.

17. Any changes and/or corrections shall be marked in red and initialed by the person making such corrections. Signatures of the responsible owner of the firm must be in ink.

18. Unless otherwise negotiated, no additional charges shall be passed to the City, including any applicable taxes, delivery or surcharges.

19. As the City is exempt from the payment of federal excise taxes, all prices quoted herein are not to include these taxes.

20. The services on which Proposals are submitted must be of such character, quality and/or performance equivalence that it will serve as that specified. In submitted Proposals on services other than as specified, Bidder shall furnish complete data and identification with respect to the alternate services they propose to furnish.

21. Consideration will be given to Proposals submitted on alternate services to the extent that such action is deemed to serve the best interests of the City. The Bidder must furnish any information (specifications or test results) which will help in determining whether an item is equal or superior to our bid standards. If the Bidder does not
indicate that the services he proposes to furnish is other than specified, it will be
construed to mean that the Bidder will furnish the exact services described.

22. Should the Contractor fail to meet the deadline set forth in specifications the City
reserves the right to procure services from other sources and hold Contractor liable for
any excess costs.

23. The apparent silence of these specifications and any supplemental specifications as to
any detail or the omission from the specifications of a detailed description concerning
any point shall be regarded as meaning that only the best commercial practices are to
prevail and correct type, size and design are to be used. All interpretations of these
specifications shall be made on the basis of this statement.

24. The Bidder certifies that no official or employee of the City or State of New
Hampshire has a pecuniary interest in the bid or in the Contract that the Bidder offers
to execute or in the expected profits to arise there from, and that this bid is made in
good faith without fraud or collusion or connection with any other person submitting
a bid.

25. The City reserves the right to waive any informality in any Proposal, to reject any and
all Proposals wholly or in part, and to make awards in a manner deemed in the best
interest of the City, including issuing multiple awards.

26. Bid security, in the form of a bid bond, deposit of cash, or certified check, bank
cashier’s or bank official’s check drawn on a solvent bank, payable to the “City of
Manchester” in the required amount (see specifications) must accompany each
Proposal as a guarantee that if the Proposal is accepted a contract will be entered into.
Such deposits of all Bidders will be held by the City until all Proposals submitted
shall have been canvassed and the Proposals have either been rejected in whole or in
part or the award of the contract has been made. The bid deposit of the successful
Bidder will be held until a contract is duly executed. Bid deposits will be returned to
unsuccessful bidders within two (2) weeks after execution of the contract. If the
successful Bidder to whom a contract shall have been awarded refuses to execute the
Contract and to furnish the insurance certificate and performance and/or payment
bonds herein described within the ten (10) business days after award of the Contract,
the amount of the bid deposit shall be forfeited to and retained by the City as
liquidated damages for such neglect or refusal.

27. The successful Bidder will be required to furnish a bond or certified check on a
solvent bank payable to the: “City of Manchester” in the required amount (see
specifications) as a guarantee of the faithful performance thereof. The Bonding
Company shall be authorized to conduct business in the State of New Hampshire by
the State of New Hampshire’s Insurance Commissioner.
28. The successful Bidder will be required to furnish a payment bond or a certified check on a solvent bank payable to the “City of Manchester” in the required amount (see specification) as security for the payment of all labor performed or furnished, and for all materials used in the fulfillment of said contract. The bonding company shall be authorized to conduct business in the State of New Hampshire by the State of New Hampshire.

29. The Bidder, if awarded an order or contract, agrees to defend, indemnify, and hold harmless the City from all damages to life and property arising out of the performance of this Contract due to the Bidder's negligence, that of his employees, subcontractors, etc., or due to the negligence of the City, its employees, representatives, agents, etc.

30. The City of Manchester may withhold acceptance of or reject any merchandise which is found, upon examination, not to meet the specification requirements. When rejected, it shall be removed by the Contractor within ten (10) days after notification of rejection.

31. Assignment of Contract: A contract shall not be assignable by the Contractor in whole or in part without the written consent of the Public Works Director or designee.

32. The Revised Statutes Annotated of the State of New Hampshire, the Charter of the City, and all City Ordinances insofar as they apply to the laws of competitive Bids, contracts and purchases are made a part hereto.

33. All deliveries of commodities hereunder shall comply in every respect with all applicable laws of the Federal Government and/or the State of New Hampshire.

34. The Bidder to whom a contract is awarded guarantees to the City that all warranties of merchantability and fitness for a particular purpose as provided for in New Hampshire 382A-2-314 and 2-314 shall remain in force and will not be disclaimed.

35. Payment Terms:

   a. The successful bidder shall keep accurate, document records of time, material and transportation allocable to the Contract. Related records will be available for audit purposes during normal business hours, as often as deemed necessary.

   b. Payments shall be made within 15-45 days of delivery and acceptance of contracted item(s)/services or upon receipt of a verified request for payment, whichever is later.

   c. Pay requests shall be on forms approved by the Department.
d. Requests for payment must be submitted to:

Mr. David L. Winslow  
Department of Public Works  
475 Valley Street  
Manchester, NH 03103  
Email: dwinslow@manchesternh.gov

36. The Public Works Director may terminate the contract for breach by the Contractor of any of the provisions of the contract by giving the Contractor ten (10) days’ notice by registered mail.

37. The City may terminate the Contract at any time by giving written notice to Contractor of such termination and specify the effective date thereof, at least ten (10) days before the effective date of such termination.

FAILURE TO COMPLY WITH THESE REQUIREMENTS COULD RESULT IN THE CANCELLATION OF AN ORDER OR CONTRACT
STANDARD SPECIFICATIONS
FOR ROAD, DRAIN & SEWER CONSTRUCTION

These specifications are intended to relay to developers, contractors and other builders and trades, information concerning the Department of Public Works' requirements relative to all construction under its jurisdiction in the City of Manchester, NH.

To facilitate this end, the Standard Specifications have been divided into three parts as follows:

PART I -- PUBLIC IMPROVEMENTS

Part I of the Standard Specifications outlines the Department's requirements concerning public improvements included in site development and subdivision projects. These requirements shall also apply to off-site improvements conducted within streets, rights-of-way, easements or other public lands belonging to the City of Manchester, New Hampshire.

All work relative to the above shall be conducted according to Section V of this part and the Technical Specifications as outlined in Part III.

PART II -- CONTRACT GENERAL PROVISIONS

Part II of the Standard Specifications outlines the Department's contractual requirements concerning work for road, drain and sewer projects along with other related work. These requirements shall apply to all such work contracted by the City of Manchester, Department of Public Works and shall be considered a part of all proposals.

PART III -- TECHNICAL SPECIFICATIONS

Part III of the Standard Specifications outlines the Department's detailed requirements concerning the control of material, rules of construction and basis of payment. Supplemental Specifications not yet considered standard and Special Provisions for explaining items of work unique to a specific project, will be included in the proposal forms prepared by the Department.

The sections included in this part along with any Supplemental Specifications and Special Provisions, shall be considered a part of all proposals.

A copy of the Standard Specifications can be found on the City’s website at:

http://www.manchesternh.gov/Departments/Public-Works
BID SECURITY

The undersigned agrees to comply with the requirements as to the conditions of employment, wage rates and hours of labor set forth in the Form of "Contract Agreement". The undersigned hereby agrees to complete all the work shown or specified under this contract and as shown on the contract drawings as specified in the contract documents and he further agrees that the OWNER may retain from the moneys that are or which may become due an amount of two hundred dollars ($200.00) plus engineering charges for each and every calendar day (Sunday and holidays excluded) of time consumed in completing the work beyond the time conditions stipulated or any extension of time that is duly authorized and such amount so to be retained, is hereby agreed to be liquidated damages accruing to the OWNER incident to such delay.

The undersigned agrees that if he is selected as CONTRACTOR, he will within ten (10) days, (Saturdays, Sundays and legal holidays excluded) after presentation thereof by the "Awarding Authority", execute a contract in the form attached hereto and furnish a Performance Bond and also a labor and materials or Payment Bond, each of a surety company registered and licensed to do business in the State of New Hampshire and satisfactory to the OWNER and each in the sum of at least one hundred percent (100%) of the contract price, the premiums for which are to be paid by the CONTRACTOR and are included in the bid price.

The undersigned understands that the OWNER reserves the right to reject any and all bids and to waive any informalities in the bidding.

________________________________________
Contractor's Signature

________________________________________
Title

________________________________________
Date
Certificate of Acknowledgement of Contractor, if a Corporation

State of ______________________, ss:
County ______________________,

On this ______________________ day of ______________________, 2020

before me personally came ______________________

to me known, who being duly sworn did say as follows:

that he resides at: ______________________

and is the ______________________

of ______________________

the corporation described herein and which executed the foregoing instrument; that he knows the corporate seal of said corporation; the seal affixed to the foregoing instrument is such corporate seal and it was so affixed by order of the Board of Directors of said corporation and by the like order, he signed thereto his name and official designation.

_____________________________
Notary Public (seal)

My commission expires: ______________________
PROPOSAL

COLD IN PLACE RECYCLING

The City of Manchester acting through its Department of Public Works hereinafter called the "Awarding Authority", requests bids for the furnishing of all labor, equipment and materials required for the construction of the “COLD IN PLACE RECYCLING” contract in accordance with the plans and specifications prepared by the City of Manchester, Department of Public Works.

The undersigned as Bidder declares that the only person or parties interested in this proposal as principals are those named herein; that this Proposal is made without collusion with any other firm, that the undersigned has carefully examined the location of the proposed work, the proposed form of contract and the plans and specifications therein referred to, and the undersigned proposes and agrees if this Proposal is accepted, he will contract with the "Awarding Authority" to provide all the necessary labor, machinery, tools, apparatus and other means of construction to do all the work and furnish all the materials specified in the contract in the manner and time therein described and according to the requirements of the Engineer therein set forth and the undersigned will take full payment therefore, the following unit and total prices:

Total price of this Proposal (for comparison of bids) based on the estimated quantities is:

_________________________________     $_________________________
Total Price In Words               Total Price In Figures

CONTRACTOR: _________________________
BY: _________________________
TITLE: _________________________

It is agreed that the total price presented above, is to be used solely for the comparison of bids to determine the lowest responsible bidder.

Addendums received ____________________________
PROPOSAL

The undersigned agrees that this Bid shall be good and may not be withdrawn for a period of one hundred fifty (150) calendar days after the scheduled closing time for receiving bids.

This Proposal includes Addenda No.: ______________________

___________________________________
Contractor (Bidder) (seal)

By: ________________________________
(Signature and Title)

Address: _________________________________

Being a (corporation incorporated)
(under the laws of the )
(State of ________________)
(Partnership, )
(Individual)

Composed of Officers, partners, or owner, as follows:

___________________________________
___________________________________
___________________________________
___________________________________
___________________________________

___________________________________
PROJECT: COLD IN PLACE RECYCLING

DATE BIDS OPENED At 2:15 P.M., February 27, 2020

PROJECT TYPE: This work consists of cold in place recycling of various City Streets.

CONTRACT PERIOD: The contract period for this project shall be 12 months, from the date in the Notice to Proceed. The time frame for individual projects will be determined by mutually agreement between the Contractor and the City.

PROPOSAL GUARANTEE: $30,000.00
This proposal shall be filled in by the bidder in ink with the prices written in both works and numerals and the extensions shall be made by him. Amount in words will govern.

Due to limited funding for this project, the City of Manchester intends to delete any part of this work necessary to keep the expenditures within the limits of available funds.

<table>
<thead>
<tr>
<th>Bid Item Number</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Description (Bid Price in Words)</th>
<th>Unit Price (Bid in Figures)</th>
<th>Total Price (Bid in Figures)</th>
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<tr>
<td>403.113</td>
<td>4,000</td>
<td>TON</td>
<td>HMA 12.5MM (1/2”), MACHINE METHOD</td>
<td>___________________________ dollars and ___________________________ cents per TON</td>
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<td>TON</td>
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<tr>
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<td>HMA, HAND METHOD</td>
<td>___________________________ dollars and ___________________________ cents per TON</td>
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<td>403.13</td>
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<td>417.01</td>
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<td>COLD PLANING OF BITUMINOUS SURFACES (1” DEEP)</td>
<td>___________________________ dollars and ___________________________ cents per SY</td>
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<td>COLD IN PLACE RECYCLED ASPHALT PAVEMENT, INCLUDING FOG SEAL</td>
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<td>MINERAL STABILIZING AGENT</td>
<td>___________________________ dollars and ___________________________ cents per TON</td>
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<td>COLD IN PLACE MIX DESIGNS</td>
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<td>RECONSTRUCTING MH, CB &amp; DI</td>
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<td>One dollars and no cents. per Dollar.</td>
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<td>Unit</td>
<td>Description (Bid Price in Words)</td>
<td>Unit Price (Bid in Figures)</td>
<td>Total Price (Bid in Figures)</td>
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<td>PREFORMED THERMOPLASTIC, ARROW, WORD, SYMBOL</td>
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**Notes:**
- The description specifies the unit price in dollars and cents per LF.
- The unit price is in figures as stated in the description.
<table>
<thead>
<tr>
<th>Bid Item Number</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Description (Bid Price in Words)</th>
<th>Unit Price (Bid in Figures)</th>
<th>Total Price (Bid in Figures)</th>
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<td>692</td>
<td>1</td>
<td>L.S.</td>
<td>MOBILIZATION __________________ dollars and __________________ cents per L.S.</td>
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<td>20,000</td>
<td>$</td>
<td>Miscellaneous Authorized Work One Dollar and Zero Cents per DOLLAR</td>
<td>$1.00</td>
<td>$20,000.00</td>
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<td>TOTAL BID (in Words)</td>
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</table>
BID BOND: COLD IN PLACE RECYCLING

The undersigned as bidder, understands and agrees that the quantities of work as given for each item in this Proposal are only approximate and are assumed solely for the comparison of proposals. They are not guaranteed to be accurate statements or estimates of the quantities of work to be performed under this contract and any departures therefrom, will not be accepted as valid grounds for any claim or loss of profits. In case of variation between unit prices and total prices stated by the bidder, the unit prices will be considered to be his bid.

The undersigned further agrees to comply with the requirements as to conditions of employment, wage rates and hours of labor set forth in the form of Contract Agreement.

Accompanying this Proposal under separate cover is Thirty Thousand Dollars ($30,000.00) in the form of a Bid Bond, Cashier's Check or Certified Check* payable to the Department of Public Works of the City of Manchester.

The undersigned understands that the OWNER reserves the right to reject any and all bids and to waive any informalities in the bidding.

*Bidder will cross out words which do not apply.

_____________________________________
Contractor's Signature           Date

_____________________________________
Title
PROSECUTION OF THE WORK

Description of the Work:

This Contract consists of cold in place recycling treatment of various City roadways. Work shall include cold in place recycling of existing pavement including removal, reinstallation and adjustment of utility structure castings to support the work.

Utilities:

There are utility installations in the project area belonging to, but not necessarily limited to, the following:

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comcast</td>
<td>751 E Industrial. Dr.</td>
<td>626-9900</td>
</tr>
<tr>
<td>Liberty Utilities</td>
<td>1260 Elm Street</td>
<td>625-4000</td>
</tr>
<tr>
<td>Manchester Fire Dept.</td>
<td>100 Merrimack St.</td>
<td>669-2256</td>
</tr>
<tr>
<td>Manch. Water Works</td>
<td>281 Lincoln St.</td>
<td>624-6494</td>
</tr>
<tr>
<td>Consolidated Comm.</td>
<td>100 Gay Street, 2nd Fl.</td>
<td>645-2700</td>
</tr>
<tr>
<td>Eversource</td>
<td>780 N. Commercial St.</td>
<td>1-800-662-7764</td>
</tr>
</tbody>
</table>

Prosecution:

Due to the limited funding for this work, the City reserves the right to delete any part of the work in order to keep expenditures with the limits of available funds.

For each street, 4” of Cold in Place Recycled material will be placed. The Contractor will coordinate with the Engineer for the proposed wearing course treatment on each street and the need to adjust Cold in Place grades to allot for the proposed wearing course thicknesses. New traffic loops will be cut into the Cold in Place layer and structures raised prior to the installation of any final wearing course.

Bidder shall be aware that the City of Manchester, Department of Public Works, Standard Specifications for Road, Drain and Sewer Construction (referred to as the “Standard Specifications”) were updated in January 2020. These Standard Specifications may be found on the City’s website at:

http://www.manchesternh.gov/Departments/Public-Works

The City reserves the right to extend this contract to include additional related services at other City of Manchester facilities for up to five years after contract execution.

This Contract is subject to Special Provision for Asphalt Cement Adjustment
This Contract is subject of Special Provision for Tack Coat Pay Adjustment. Contractor shall be required to provide printed documentation to the Engineer showing gallons of tack coat material applied at specific job sites.

It is understood that the Contractor will be required to work in close cooperation with Eversource, Manchester Water Works, Liberty Utilities, Consolidated Communications, and all other utilities until the project is completed. Coordination and cooperation with each utility is essential for the satisfactory completion of the project.

The Contractor shall be aware of testing requirements and responsibilities outlined in Specification Section 401 – Plant Mix Pavements – General and the Supplemental Specifications attached hereto. Contractor QA/QC personnel to attend preconstruction meeting with City to confirm compliance with specification and availability of materials during construction.

It is understood that the Contractor will match their work schedule with that of the Department of Public Works and other utility companies as applicable.

Items under Section 403 are intended, when directed by the Engineer, for the placement of shim (9.5mm [3/8"] HMA) and final wearing courses over the Cold in Place material. The City will determine the type of hot mix asphalt to be used and if a shim course is required prior to placement of top (wearing) course. If HMA is used in the top course, it is intended to be 1.5” thick, however the City will determine final thicknesses. The unit cost of the pavement will remain as bid, regardless of the thickness.

Street intersections, driveways and other limits of work area may need to be trimmed to provide a keyway so transitions are smooth between top course and existing adjacent pavement. Any said cold milling required to create these keyways shall be paid for under 417. Any vertical faces at keyways shall be no more than 1.5” high. If left for more than 24 hours, these vertical faces shall be painted with a highly visible color that will provide contrast and a warning to a motorist. Appropriate warning signage (Bump, Dip) shall be placed as needed. This work shall be considered subsidiary to Item 417.

Contractor attention is directed to the fact that milling under Items in 417 at are within -0.4 to +0.5 inches of the nominal depth listed under the 417 pay items and shall be paid under that Item.

During HMA paving, the Contractor is required to supply an adequate number trucks to provide a continuous asphalt supply during paving operations. The paving unit shall stop for no more than 15 minutes at a time. Should the wait time be exceeded, the Engineer may require the Contractor to square off the mat and compact all placed material. Before resuming paving operations, a clean straight transverse joint will be created by saw cutting the compacted mat. Operations shall resume once the proper supply has been reestablished. In cases where excessive starting and stopping is occurring, the Engineer may require all paving to cease for the day. No additional payment will be made to the Contractor for costs incurred for this work or costs due to the ceasing of paving operations. If the issue becomes chronic, stronger measures may be taken, up to and including termination of Contract.
An emulsified asphalt tack coat shall be used prior to placement of pavement courses. The Contractor shall take care not to apply the tack coat to surfaces that will remain exposed. Any bituminous material that remains on exposed surfaces shall be removed by the Contractor, at their expense. A tack coat shall be required and is subsidiary to the hot mix asphalt paving items. Sweeping of areas to be paved prior to placement of tack coat shall be subsidiary.

Unless otherwise noted on the plans, the Contractor shall make sure that grade of the Cold in Place material is adjusted accordingly so when the final pavement wearing course is placed, reveal at curbing, sidewalk ramps, driveways and other entranceways of paving is maintained. The contractor shall achieve this grade adjustment during placement, pre-milling of areas or removal of existing pavement. This work shall be considered incidental to pau item 417 and there will be no separate payment made for this work.

The Contractor shall make sure that there is a smooth transition from new pavement to existing pavement.

Item 420.5- Premilling of Bituminous Surfaces for CIR, 1” Deep, is specifically for removal of existing pavement by cold milling areas ahead and/or outside the path of the main CIR milling unit. This removal will allow the paving unit to place the CIR material to the proper width. Given the varied depth of milling in the process, payment under this item will be by the square yard of milled area per inch of depth removed.

All work associated with the placement and removal of hot mix asphalt pavement used for temporary fillets at milled transition points shall be subsidiary to the Contract.

Item 618 provides for the services of Police Officers/Flaggers for traffic control as specified in the supplemental specifications. The Contractor shall be responsible for maintaining traffic in a safe, satisfactory manner. Any costs in connection with maintenance of traffic over the cost of the Police Officers/Flaggers, will be considered incidental to the contract.

The Contractor will be responsible for the adjustment of all frames and covers/grates owned by the City within the work area. Payment for the adjustments will be made under 604.4 and 604.5. Payment shall be for; removal of the structure casting, plating structure opening, backfill, including temporary asphalt patch, and resetting of structure casting to final pavement grade after the CIR process, including all necessary, brickwork concrete, etc. City will coordinate the adjusting of frames/covers owned by the utilities.

Engineer may require new drainage and sewer castings to replace old or broken castings found on the project. All new castings will be in the DPW inventory and will be picked up by the Contractor at the DPW stock yard. The Engineer, or their appointee, shall be present to confirm the number and type of castings taken by the Contractor. This work shall be considered subsidiary to Item 604.5.
Item 604.4 - Reconstructing Manholes, Catch Basins or Drop Inlets is intended to provide a price for any structure reconstruction from a point one foot below the rim of the casting to a point below on the existing structure as needed and as directed by the Engineer. The Engineer must be present during the start of this work to confirm the payment quantities. All frame resetting work within the area of one foot below the rim of the casting is considered part of Item 604.5 – Adjustment of Manholes, Catch Basins or Drop Inlets.

Polyetheyne liners shall be installed on catch basins and drop inlets that are adjusted as directed by the Engineer. Payment for the installation of the liners shall be made under 604.7. Payment shall include all labor, material, and equipment required for the complete in place installation of the liners.

Utility companies will be responsible for adjustment of valves and structures owned by them, however occasionally minor adjustments may be need by the Contractor while completing work. The intent of Item 602.56 - Adjust Utility Valves and Small Structures is for the payment of minor adjustment work that may be required by the Contractor to adjust water gate valves, gas gate valves and other castings less than 20 in diameter. The installation of grade rings on the utility gate valves shall be subsidiary to the Contract and not be considered for payment under this item.

Contractor to provide all on site construction warning signage necessary for the duration of the projects including, but not limited to: Road Construction Ahead, Flag Person Ahead, Bump, Dip, Raised Structures, Road Closed, and Detour. All signage shall comply with the latest edition of the MUTCD. Placement and management of signs shall be subsidiary to the work.

The Contractor is responsible for supply of water used during the work. Connections and use of municipal fire hydrants without approval and permit from Manchester Water Works is prohibited. It is the responsibility of the Bidder to contact Manchester Water Works to understand the costs and procedure involved with permitting a connection to a hydrant. Any costs associated with the permit shall be responsibility of the Contractor and incidental to the Contract.

Painting of lines not possible by a truck mounted unit, such as parking stall lines and painted islands, may be applied with a motorized paint cart unit. If utilized, lines applied by this method shall be paid under the respective item numbers.

When directed by the Engineer, traffic paint may be used instead of thermoplastic paint. Payment will be made under respective item numbers.

The Contractor is responsible for placement of temporary markings upon completion of surface treatment. This shall provide guidance to vehicles of the lane edges and stop bar locations prior to the placement of permanent pavement markings. If a product other than raised plastic pavement markers (RPMs) as outlined in the Standard Specifications is to be used, the Contractor shall submit to Engineer the proposed alternative for review and approval prior to work commencing. This work shall be subsidiary to Item 420.10.
Contractor’s attention is directed to the fact that Item 1000 - Miscellaneous Authorized Work is and allowance that shall be used for payment of work directed and authorized by the Engineer but not specifically covered by other items within the Contract. Prior to commencement of work, the Contractor shall provide the Engineer a written estimate that includes material costs and hourly costs for equipment and labor. The price listed within the Bid Schedule shall not be altered by the bidder.

Contractor shall work with the City on choosing a suitable staging area for work operations and material storage. No material or equipment shall be staged at any location until approved by the Engineer. City may provide barricades and “no parking” signs to the Contractor for use in securing the staging area. The Contractor shall be responsible for maintaining and securing the site.

Contractor shall notify of residents on affected streets a minimum of 72 hours prior to the start of work. The means and method of the notification shall be reviewed and approved by the Engineer before implementing. This work shall be subsidiary to the Contract.

Contractor shall provide to the Engineer with the following information a minimum of 2 weeks in advance of anticipated start of work:

- A Job Mix Formula (JMF) as outlined in section 420 of the specification;
- Proposed Quality Control Plan;
- Proposed schedule of work including anticipated start and end times during the normal work shift;
- Order of locations to be done;
- Traffic Control Plans for each location identifying any detours and lane closures needed;
- Name and contact number of the responsible individual in charge of crews who will be present during work;
- Any proposed night work (9:00PM to 7:00AM);

A minimum of 48 hours notice to the Engineer is required to have the City post affected streets with “no parking” signs.

Permits required from the Department of Public Works shall be furnished without charge. Any required permits from other city departments or agencies are the responsibility of the Contractor and are incidental to the Contract. All work to be performed shall be in compliance with the City of Manchester Ordinances or as specified on the permit itself.

The cost for each Item bid shall cover all labor, materials, parts and other incidentals required to perform the work.

Prior to the start of work, the Contractor will provide the City with an insurance certificate with the City of Manchester and the Manchester Department of Public Works named as additional
insured. The certificate shall meet all requirements of the Standard Specifications for Road, Drain and Sewer Construction of the Manchester Department of Public Works.

When submitting for payment Contractor shall submit the request the Department payment request form in Appendix A (Excel file available to Contractor). Pay Request shall include all backup information such as, traffic control invoices, material tonnage slips, etc. Submitted information shall also include an itemized cost breakdown for each street in the pay request.

**Work Schedule**

It is understood that the Contractor will match his work schedule with that of the Department of Public Works and other utility companies as applicable.

The work may be performed during the day or at night at the Contractor’s discretion. However, if performed at night, the contractor shall provide all necessary temporary lighting needed to perform the work. No additional payment will be made for temporary lighting.

Night time work is defined as the period between 9:00 pm and 7:00 am.

**Two Way Traffic**

The Contractor will be required to maintain two way traffic on all streets at all times unless provisions have been made with the Department of Public Works. Detours onto adjacent parallel streets will be considered on a case by case basis.

**Traffic Control**

Traffic control shall be by uniformed officers and flagmen and in accordance with Section 618 of the Standard Specifications, and will be paid under item 618.109 for the value of work ordered. The City of Manchester Police Department, Extra Details (603-628-6255) shall be contacted to schedule details. If no details can be scheduled for day(s) of work, then flagmen in accordance to Section 618 can be utilized.

The placement and use of construction signs and warning devices, cones, delineators, etc. to maintain safe passable traffic during work shall subsidiary to the work.

**Surplus Material**

The Contractor will be responsible for disposal of any excess materials generated due to the work. No additional payment will be made for this work.

**Public Convenience and Property Protection**

The Contractor shall be aware that they will be required to maintain access to all properties in the project area at all times.
The Contractor will be responsible for the proper and timely notification to local residents and businesses should any temporary interruption of their access or services be absolutely necessary.

Prior to the start of work, the Contractor will provide the City with an insurance certificate with the City of Manchester and the Highway Department named as additional insured. The certificate shall meet all requirements of the Standard Specifications for Road, Drain and Sewer Construction of the Manchester Department of Public Works.

**Contract Period:**

The contract period for this project shall be for 12 months, beginning at the date in the Notice to Proceed. The time frame for individual projects will be determined by mutual agreement between the Contractor and the City.
SPECIAL PROVISIONS

ASPHALT CEMENT ADJUSTMENT

Bid items involving asphalt concrete mixtures containing asphalt cement shall be subject to a price adjustment. Only the asphalt portion of asphalt-rubber cement will be eligible for price adjustment. The adjustment will be based on the variance in price for the liquid asphalt component only from the Base Price to the Monthly Price. It shall not include transportation, fuel or other charges. This price adjustment will occur on a monthly basis. The price adjustment will take effect when the monthly price for asphalt cement as furnished by the New Hampshire Department of Transportation differs from the base price contained in the proposal by more than 10 percent. Affected Sections and formulas are detailed below.

The base price of asphalt cement for this Contract is $ 552.50 per ton.

The monthly price of asphalt cement used to determine the Asphalt Cement Adjustment will be furnished by the NH Department of Transportation and will be posted on the following web site:


*Source: The monthly price, applicable for the entire month, is developed from information in the Asphalt Weekly Monitor, a publication from Poten and Partners, Inc. The monthly price will be the average of the price range for Southern Maine/New Hampshire PG 64-28 asphalt binder, as published in the Asphalt Weekly Monitor on the dates shown in the following table. The base price is the latest available monthly price at the time the contract documents are prepared.

The contract prices of bituminous materials will be paid under the respective items in the contract. The price adjustment, as provided herein, upwards or downwards, will be made at the end of each month in which the work was accomplished as follows:

When the Monthly Price is more than 110% of the base price
\[
[\text{Adjustment Price}] = [\text{Monthly Price}] - [\text{Base Price} \times 110%]
\]

When the Monthly Price is less than 90% of the base price
\[
[\text{Adjustment Price}] = [\text{Monthly Price}] - [\text{Base Price} \times 90%]
\]
Asphalt Cement Products

Item 403.__ - Pavement and Item 411.__ - Hot Bituminous Concrete Leveling Course and Plant Mix Surface Treatment

The price adjustment will be based on the percent of virgin asphalt cement stated in the Approved Mix Design containing the maximum percentage of reclaimed asphalt pavement. In the event of breakdown or unforeseen circumstances other than weather, an Approved Virgin Mix Design may be used. The price adjustment will then be based on the total percent of virgin asphalt cement in that approved design.

A contract adjustment will be made under Item 1010.1 based on \[\text{Adjustment Price} \times \text{Approved Mix Design percent of virgin asphalt cement} \times \text{tons of pavement used}.\]

Item 420.11 – Cold in Place Recycling - Asphalt Stabilizing Agent

The price adjustment will be based amount of virgin PG binder used in the process. Tonnage of PG binder used shall through calculated weigh slips of delivery vehicles.

A contract adjustment will be made under Item 1010.1 based on \[\text{Adjustment Price} \times \text{Tons of Asphalt Stabilizing Agent Used}.\]

Item 1010.1 Asphalt Cement Adjustment$^1$ Dollar

$^1$Not a bid item
SPECIAL PROVISION

TACK COAT PAYMENT ADJUSTMENT

Machine method paving items where tack coat material is subsidiary shall be subject to a payment adjustment to ensure tack coat is properly applied. The adjustment will be based on the comparison of the computed average application rate for the project site to the application rate specified in Section 410, Table 410-1 of the Standard Specifications. This Provision shall not be applicable to work under 403.12- HMA, Hand Method.

The Tack Coat Payment Adjustment will be computed as follows:

**Average Application Rate**

\[
\text{Average Application Rate} = \frac{\text{Gallons of Tack Used}}{\text{Area applied in SY}}
\]

For purposes of this provision tack emulsion shall be 240 gallons/ton

If the **Average Application Rate** is within the tolerance listed in Section 410, Table 410-1 for the work being performed, then **no pay adjustment is made ($0.00)**

If the **Average Application Rate** is outside the tolerance listed in Section 410, Table 410-1 of the Standard Specifications, then **an adjustment under Item 1020.1 will be made as follows:**

\[
\text{Tack Coat Pay Adjustment} = \left( \frac{\text{Tons of HMA Mix Receiving Tack Coat}}{\text{Contract Unit Price of HMA Mix}} \right) \times \left( \frac{\text{Contract Unit Price of HMA Mix}}{\text{Contract Unit Price of HMA Mix}} \right) \times -2.0\% \\
\text{(this is a negative adjustment)}
\]

Item 1020.1 Tack Coat Payment Adjustment\(^1\) Dollar

\(^1\)Not a bid item
CONTRACT AGREEMENT

THIS AGREEMENT made this _____th day of _____, A.D. 2020 by and between the City of Manchester, New Hampshire acting through its Department of Public Works, hereinafter called the party of the first part and ______________________________________________ their successors and assigns, part of the second part, hereinafter called the Contractor. Witnesseth, that the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the party of the first part, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor in the construction of the COLD IN PLACE RECYCLING contract hereinafter called the project, in the City of Manchester, County of Hillsborough, State of New Hampshire at the unit prices bid by the said Contractor for the respective estimated quantities, aggregating approximately the sum of: ______________________________________________ ($___________)

and such other items as are mentioned in the original proposal, which proposal and prices named, together with the General Provisions and Technical Specifications and the Special Provisions accompanying the proposal, and made a part of this Contract and accepted as such, are also agreed by each party as being a part hereof, the said project being situated as follows:

Various City Streets agreed upon between the Contractor and the City.

The Contractor further covenants and agrees that all of the said materials shall be furnished and delivered and all of said labor shall be done and performed in every respect to the satisfaction and approval of the Department of Public Works aforesaid, within The contract period for this project shall be 12 months, from the date in the Notice to Proceed. The time frame for individual projects will be determined by mutually agreement between the Contractor and the City.
IN WITNESS WHEREOF, the parties of this contract have hereunto set their hands and seals as of the day and year first above written.

CITY OF MANCHESTER
(SEAL)

The Honorable Mayor of the
CITY OF MANCHESTER

By ________________________
Joyce Craig

Director of Public Works
DEPARTMENT OF PUBLIC WORKS

By ________________________
Kevin A. Sheppard, P.E.
Public Works Director

Signed and sealed in presence of:

______________________________                         _____________________________
Date

CONTRACTOR
(SEAL)

By: ________________________
Name: ______________________
Title: ______________________

Federal I.D. No. _____________

Approved as to form and execution

______________________________
City Solicitor
NOTARIZATION

Certificate of Acknowledgment of Contractor, if a Corporation

State of New Hampshire,

ss:

County of Hillsborough,

On this ___ th day of ______, 2020

before me personally came ______________________

to me known, who being duly sworn did say as follows:

that he resides at: ________________________________ and is the

____________________ of __________________________ the corporation

described herein and which executed the foregoing instrument; that he knows the corporate seal
of said corporation; the seal affixed to the foregoing instrument is such corporate seal and it was
so affixed by order of the Board of Directors of said
corporation and by the like order, he signed thereto his name and official designation.

________________________________________

Notary Public (seal)

________________________________________

My commission expires:___________________________
STATEMENT OF UNDERSTANDING

Project Safety

WHEREAS this project is subject to all Safety and Health Regulations as promulgated by the U.S. Department of labor, it shall be a requirement that the Contractor designate a "Safety Officer" who's duty shall be to monitor the project on a daily basis in order to insure that all safety measures alluded to in the contract and otherwise pertinent to this project, are strictly adhered to. Special attention shall be paid to maintaining existing guide, regulatory and warning signs affecting the movement of traffic.

IT IS hereby agreed that responsibility for the above mentioned safety measures is solely that of the Contractor and that an individual has been designated as the project "Safety Officer".

________________________  Date:  ______________
Name:________________________
Title:_________________________
STATEMENT OF COMPLIANCE

Drug Testing Program

WHEREAS this project is subject to federal laws, rules and regulations, and WHEREAS all drivers of commercial vehicles over 26,000 pounds GVWR are required to have a Commercial Drivers License (CDL), it is hereby certified that the Alcohol and Drug Testing requirements for Commercial Motor Vehicle Drivers mandated by the Federal Highway Administration, United States Department of Transportation are being complied with.

________________________ Date: ______________

Name:________________________

Title:_________________________
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we ______________________
_________________________ a ________________________________ hereinafter
called the "Principal" and _____________________ of ______________________, State
of ______________________ hereinafter called the "Surety", are held and firmly bound
unto THE CITY OF MANCHESTER, NEW HAMPSHIRE, hereinafter called "Owner",
in the penal sum of (___________________________) in lawful money of the United States, for
the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,
administrators and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that WHEREAS, the Principal enter into a
certain contract with the Owner, dated the (Date) copy of which is hereto attached and made a
part of hereof for the construction of:

"COLD IN PLACE RECYCLING" in accordance with drawings and specifications prepared
by the City of Manchester, N.H. which contract is by reference made a part hereof, and is
hereinafter referred to as the Contract.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the
undertakings, covenants, terms, conditions and agreements of said contract during the original
term thereof; and any extensions thereof which may be granted by the Owner, with or without
notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract,
and shall fully indemnify and save harmless the Owner from all costs and damages which it may
suffer by reason of failure to do so, and shall fully reimburse and repay the Owner for all outlay
and expense which Owner may incur in making good any default, then this obligation shall be
void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees
that no change, extension of time, alteration or addition to the terms of the contract or to the work
to be performed thereunder, or the specifications accompanying the same, shall in any way affect
its obligation on this bond, and it does hereby waive notice of any such change, extension of
time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED FURTHER, that no final settlement between the Owner and the Contractor shall
abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
IN WITNESS WHEREOF, this instrument is executed in six (6) counterparts, each one of which shall be deemed and original, this the ___ day of ______________________ 2020.

ATTEST:

________________________
Principal

________________________(S)
(Principal)

________________________
(Seal) By________________________ (S)

________________________
Witness as to Principal

________________________
Address

ATTEST:

________________________
Surety

________________________(S)
(SURETY) By________________________(s)

________________________
Attorney-in-Fact

________________________
(SEAL) (S)
Witness to Surety

________________________
(Address)

________________________
Address

Note: Date of Bond must not be prior to date of Contract.
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That ______________________________

_________________________________ as Principal, hereinafter called Principal, and
_________________________________ as surety, hereinafter called Surety, are held and firmly
bound unto THE CITY OF MANCHESTER, NEW HAMPSHIRE, as obligee, hereinafter called
Owner, for the use and benefit of claimants as herein below defined, in the amount of
(______________________________________________) for the payment where of Principal
and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly
and severally, firmly by these presents.

WHEREAS, Principal has by written agreement, dated ___________, 2020 entered into a
contract with Owner for the construction of “COLD IN PLACE RECYCLING" in accordance
with drawings and specifications prepared by the City of Manchester, N.H. which contract is by
reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,
subcontractors, and corporations furnishing materials for or performing labor in the
prosecution of the work, provided for in such contract, and any authorized extension or
modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and
coke, repairs on machinery, equipment and tools consumed or used in connection with the
construction of such work, and all insurance premiums on said work, and for all labor, performed
in such work, whether by subcontractor or otherwise, then this obligation shall be void; otherwise
to remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees
that no change, extension of time, alteration or addition to the terms of the contract or to the work
to be performed thereunder, or the specifications accompanying the same shall in any way affect
its obligation on this bond, and it does hereby waive notice of any such change, extension of
time, alteration or addition to the terms of the contract or to do the work or the specifications.

PROVIDED FURTHER, that no final settlement between the Owner and the Contractor shall
abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
IN WITNESS WHEREOF, this instrument is executed in six (6) counterparts, each one of which shall be deemed and original, this ____ day of ________________, 2020

ATTEST: ____________________________ Principal
____________________________ (Principal)
(Seal) By __________________________ (S)

____________________________
By: _____________________________ Witness as to Principal(s)

____________________________
____________________________ Address

____________________________ Surety

ATTEST: By ________________________ Attorney-in-Fact(s)
____________________________ (Surety)
(Seal)

By: _____________________________ (S)
Witness as to Surety

____________________________

Note: Date of Bond must not be prior to date of Contract.
SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 401 – PLANT MIX PAVEMENTS - GENERAL

Item #1

Delete paragraph 3.20 Quality Acceptance of HMA and all subparagraphs

Replace with:

3.20 Quality Acceptance of HMA

3.20.1 All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor, unless otherwise stated herein. Testing organizations performing these tests shall meet the requirements of ASTM D 3666. All equipment in Contractor furnished laboratories shall be calibrated and verified by a testing organization prior to the start of operations. Such verification/certification shall be furnished to the Engineer prior to production or affixed to the equipment. Engineer’s testing personnel shall be certified by the New England Transportation Technician Certification Program (NETTCP).

3.20.2 The day paving is planned, the Contractor shall provide to the Engineer the plant’s daily test report that includes the Max Theoretical Density (AASHTO T 209) of all mixes being used.

3.20.3 Plant-Produced Material. Plant-produced material shall be sampled and tested for VMA, gradation, asphalt binder content, and air voids (Superpave at \( N_{\text{design}} \)), on a lot basis. The Engineer’s testing personnel shall be certified by the New England Transportation Technician Certification Program (NETTCP), as HMA Plant Technicians. Sampling shall be from material deposited into trucks at the plant or from trucks at the job site.

A lot will consist of one day’s production from a single production facility;

3.20.3.1 Sampling. Sufficient material for analysis and preparation of test specimens will be sampled by the Engineer on a random basis, in accordance with the procedures contained in ASTM D 3665. A minimum of one set of laboratory compacted specimens will be prepared for each lot in accordance with AASHTO T 312, at the design number of gyrations required by the JMF. Each set of laboratory compacted specimens will consist of two test portions prepared from the same field sample.
The sample of hot mix asphalt may be put in a covered metal tin and placed in an oven for not more than 30 minutes to maintain the heat. The compaction temperature of the specimens should be as specified in the JMF.

In addition to the HMA samples, the Contractor shall take one, one-quart sample of the PG binder used to produce the hot mix asphalt at the start of the work. The PG sample shall be turned over to the Engineer on the first day of project production.

3.20.3.2 Testing.

a. **Bulk Specific Gravity** - Sample specimens shall be tested for bulk specific gravity in accordance with AASHTO T 166 or T 275, whichever is applicable, for use in computing air voids and density. Air voids shall be computed in accordance with AASHTO T 269;

b. **Gradation and Asphalt Binder Content** - The gradation and asphalt binder content of the mixture shall be measured for each lot in accordance with the following:

   i. **Asphalt Binder Content** - A minimum of three (3) extraction tests shall be performed in accordance with AASHTO T 164 or AASHTO T 308 for determination of asphalt content. The weight of ash portion of the extraction test, as described in AASHTO T 164, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture. If utilizing AASHTO T 308 for asphalt content determination, the calibration process and calibration factor, as described in AASHTO T 308, shall be determined as stated, prior to acceptance testing. Verification shall be performed as part of every twentieth test performed thereafter or when changes in the mix are apparent.

   ii. **Gradation** - Aggregate gradations shall be determined from mechanical analysis of extracted aggregate in accordance with AASHTO T 30 and AASHTO T 27 (Dry Sieve). When asphalt content is determined by the nuclear method, aggregate gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix or continuous mix plants, and tested in accordance with AASHTO T 27 (dry sieve) using actual batch weights to determine the combined aggregate gradation of the mixture.
c. The Dust-to-Effective Asphalt ratio shall be determined once for each lot from the mechanical analysis of extracted aggregate and the asphalt binder content. The Dust-to-Effective Asphalt ratio shall be determined by the Engineer in accordance with AASHTO PP 28-02.

d. The Theoretical Maximum Specific Gravity of the mixture shall be measured for each lot in accordance with AASHTO T 209, Type C, D, or E container. Samples shall be taken on a random basis in accordance with ASTM D 3665. The value used in the field placed void computations shall be the average of the maximum specific gravity measurements for the street paved.

e. Temperatures of the mixture shall be checked, at least three times per lot, either at the plant after placement into the truck or at the job site.

f. VMA and air voids, for each plant field sample, will be determined by the Engineer in accordance with the applicable AASHTO test method. The VMA, and air voids for each lot shall be computed by averaging the results of the two test specimens representing that lot.

3.20.3.3 Acceptance of Plant Produced HMA. Acceptance of plant produced HMA material will be based upon plant air voids, gradation, asphalt binder content, and temperature, and shall be determined by the Engineer in accordance with these specifications.

3.20.4 Field Placed HMA Material. HMA material placed in the field shall be tested for both joint and mat density on a completed street or public facility. Each completed street or public facility will be considered a lot. Where more than one plant is simultaneously producing material for the job, the lot sizes shall apply separately for each plant. Testing shall be by one of two methods as determined by the Engineer.

3.20.5 Test Method #1

3.20.5.1 Sampling. Samples shall be neatly cut with a core drill. The cutting edge of the core drill bit shall be of hardened steel or other suitable material with diamond chips embedded in the metal cutting edge. The minimum diameter of the sample shall be 6 inches for the joint samples and mat samples. Samples that are clearly defective, as a result of sampling, shall be discarded and another sample taken. The Engineer shall furnish the randomly selected coring locations. The Contractor shall furnish all tools, labor, and materials for cutting samples and filling the cored pavement. Pavement cores shall be clearly marked so they can be properly identified later. Cores will be delivered by the Contractor to a location as determined by the Engineer. Cores will be taken randomly by the Engineer on the basis of five cores for mat density and three cores for
longitudinal joint density per one thousand (1,000) tons of material placed. A minimum of five core samples for mat and three core samples for joint density will be removed from each lot. The average density of the core samples will be used to determine the density of the street. The removal and patching of cores shall be by the Contractor. Cored holes shall be filled in a manner acceptable to the Engineer the day of sampling. Resampling of pavement shall be in accordance with applicable provisions of the NETTCP Quality Assurance Technologist Manual, latest edition.

3.20.5.2 Testing. The bulk specific gravity of each cored sample will be measured by the Engineer in accordance with AASHTO T 166 or T 275, whichever is applicable. The theoretical maximum specific gravity shall be the average maximum specific gravity for the street in accordance with the plant-produced material section. The theoretical value used for the percent density of the core samples shall be the average of the measurements for maximum specific gravity for each street. The percent density of each sample will be determined in accordance with AASHTO T 269, using the bulk specific gravity of each sample and the average theoretical maximum specific gravity. Retesting of pavement shall be in accordance with applicable provisions of the NETTCP Quality Assurance Technologist Manual, latest edition.

a. Mat Density. Five (5) six inch diameter cores of finished longitudinal joint will be taken by the Engineer or the Engineer’s representative from each street or public facility. Core locations will be determined by the Engineer on a random basis in accordance with procedures contained in ASTM D 3665. Cores shall not be taken closer than 1 foot from a longitudinal joint and 10 feet from a transverse joint.

b. Joint Density. Three (3) six inch diameter cores of finished longitudinal joint will be taken by the Engineer or the Engineer’s representative from each street or public facility. Core locations will be determined by the Engineer on a random basis over the joint, not adjacent to the joint.

3.20.6 Test Method #2

3.20.6.1 First placement of any HMA mix shall require Testing and Sampling procedures of Test Method #1 for the entire street.

3.20.6.2 At time of coring, density measurements at each core location shall be taken by gauges of both the Contractor and Engineer. Gauges will be correlated to the average of the measurements for maximum specific gravity of cores taken.

3.20.6.3 Further density measurements at other project locations, using the same HMA mix and originating plant, shall be determined through the use of
the correlated gauges. Any change in mix design or plant shall require testing per Test Method #1 to provide new correlation.

3.20.7 Measurements taken under either test method shall be used in the calculation the Adjustment Pay Schedule outlined in 4.2

3.20.8 Acceptance of Field Placed HMA. Acceptance of field placed HMA material will be based upon mat and joint densities, thickness, uniformity, surface smoothness, grade, and temperature, and shall be determined by the Engineer in accordance with these specifications.

Item #2

Replace:

4.1.3 No adjustment in Contract Unit Prices will be made due to liquid asphalt price fluctuations.

With:

4.1.3 Unless provided under Special Provisions, no adjustment in Contract Unit Prices will be made due to liquid asphalt price fluctuations.
SECTION 420 – COLD IN PLACE RECYCLED ASPHALT PAVEMENT

Description

1.1 Cold in Place Recycling (CIR) is a multi-step recycling process where existing HMA is milled (full or partial depth), Crushed, screened, blended with asphalt stabilizing agent, water and other additives. Blended material is placed and compacted back into the roadway surface.

Materials

2.1 Reclaimed Asphalt Pavement (RAP).

2.1.1 Material shall be processed from existing roadway surface that is set to receive the treatment.

2.1.2 Material shall be free of contamination of underlying base material, shoulder material, concrete, silt, clay and other deleterious material.

2.1.2.1 Rubberized crack filler, pavement markers, traffic signal detection loops, fabric or other material observed in the roadway shall be removed during the recycling process.

2.1.3 Milling equipment and/or any supplemental crushing or sizing equipment shall be capable of producing RAP to the maximum particle size required prior to the addition of the asphalt stabilizing agent. Milled material shall conform to the gradation in Table 420-1.

Table 420-1 Recycled Asphalt Pavement Gradation

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ½ inches (37.5 mm)</td>
<td>100</td>
</tr>
<tr>
<td>1 inch</td>
<td>95 to 100</td>
</tr>
</tbody>
</table>

2.2 Liquid Bituminous Material

2.3 Asphalt Stabilizing Agent - Foamed Asphalt

2.3.1.1 Asphalt binder shall be PG 64-22 or PG 64-28.

2.3.1.2 Asphalt binder shall be heated to the mix design expansion and half-life criteria, but shall not exceed 375° F.
2.3.1.3 Asphalt binder shall produce asphalt foam with a minimum expansion ratio of 8 and half-life of no less than 6 seconds.

2.4 Mineral Stabilizing Agent

2.4.1 Portland Cement powder used as a mineral stabilizing agent shall be Type I or Type II cement (AASHTO M 85, AASHTO M 240 or ASTM C150, ASTM C595) and shall conform to Section 520.

2.5 Water

2.5.1 Water shall be sourced from a known location and be free of any deleterious substance which may affect the finished product.

2.6 Fog Seal

2.6.1 Fog Seal used shall conform Section 409.

Mixture Design

3.1 Representative samples shall be obtained from coring the subject roadways in order to create project mix design(s). A minimum of three hundred fifty pounds (350lbs) of representative material to be recycled shall be sampled for each Job Mix Formula (JMF) to be used. Number of cores required for a sample weight of 350 lbs shall be determined assuming a core weight of 145 pcf.

3.2 A plan outlining the proposed material sampling shall be submitted to the Engineer for review a minimum of 14 days prior to the work to be performed.

3.3 Core material used for the JMF shall consist of only the core to depth of recycle. Material below the depth of recycle shall be trimmed and not used for mix design purposes.

3.4 A sample holes shall be filled by a method approved by the Engineer.

3.5 The JMF shall conform to the requirements of Table 420-2.
<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt Content of RAP (^a)</td>
<td>AASHTO T 308 (ASTM D6307)</td>
<td>Quantity of Existing Binder, Report Only</td>
</tr>
<tr>
<td>Gradation of Unextracted RAP (^a)</td>
<td>AASHTO T 11 (^b) &amp; T 27 (ASTM C117 (^b) &amp; C136)</td>
<td>Maximum particle size</td>
</tr>
<tr>
<td>Foaming Properties of Asphalt (^c)</td>
<td></td>
<td>Minimum Expansion: 8.0 times. Minimum Half Life: 6.0 seconds</td>
</tr>
<tr>
<td>Modified Proctor (^d)</td>
<td>AASHTO T 180 (ASTM D1557)</td>
<td>Maximum Dry Density &amp; Optimum Moisture Content. Report for Use in Sample Preparation &amp; Compaction Control</td>
</tr>
<tr>
<td>Bulk Specific Gravity of Compacted, Cured Specimens (^e)</td>
<td>AASHTO T 166 (ASTM D2726)</td>
<td>Report Only</td>
</tr>
<tr>
<td>Maximum Theoretical Specific Gravity (^f)</td>
<td>AASHTO T 209 (ASTM D2041)</td>
<td>Report Only</td>
</tr>
<tr>
<td>Air Voids of Compacted, Cured Specimens (^e,f)</td>
<td>AASHTO T 269 (ASTM D3203)</td>
<td>Report Only – Asphalt stabilizing agent content should not be adjusted to meet an air void content.</td>
</tr>
<tr>
<td>Indirect Tensile Strength (^e,g)</td>
<td>AASHTO T 283 (ASTM D4867)</td>
<td>Minimum 45 psi (310 kPa)</td>
</tr>
<tr>
<td>Tensile Strength Ratio based on Moisture Conditioning (^e,g,i)</td>
<td>AASHTO T 283 (ASTM D4867)</td>
<td>Minimum 30 psi Minimum Ratio 0.70 (^k)</td>
</tr>
<tr>
<td>Ratio of Residual Asphalt to Cement</td>
<td></td>
<td>Minimum 3:1</td>
</tr>
<tr>
<td>RAP Coating Test</td>
<td>AASHTO T 59</td>
<td>Minimum Good</td>
</tr>
<tr>
<td>Minimum Virgin Asphalt Content</td>
<td></td>
<td>1.5%</td>
</tr>
<tr>
<td>PG Grade of Foamed Asphalt Stabilizing Agent</td>
<td>AASHTO M 320</td>
<td>As specified per 2.3.1.1. Not polymer modified.</td>
</tr>
<tr>
<td>Recovery of Binder from RAP (^1)</td>
<td>AASHTO T 170 (ASTM D1856)</td>
<td>Recovery of Binder for Penetration Testing</td>
</tr>
<tr>
<td>Penetration of Bituminous Materials</td>
<td>AASHTO T 49 (ASTM D5)</td>
<td>Report Only</td>
</tr>
</tbody>
</table>

\(^a\) For cores from in-place materials, a laboratory milling machine shall be used to model the gradation expected during recycling. Sieve analysis of material shall report percent passing on 1.5 inch (
37.5 mm), 1 inch (25.0 mm), No 4 (4.75 mm), No 30 (600 μm), No 200 (75 μm) sieves. Selected gradation shall conform to Table 420-1. Only the material passing the 1-inch (25-mm) sieve shall be used to manufacture test specimens with 4-inch (100 mm) molds. RAP shall be dried to a constant mass at 104 ± 4 °F (40 ± 2 °C) prior to mixing.

b-If a washed sieve analysis is required, the samples should be dried to a constant mass at 104 °F (40 °C) prior to performing the sieve analysis.

c The temperature and percentage of water addition shall be determined that produces the best foam properties (maximum expansion ratio and half-life) for required PG asphalt. Expansion Ratio is a measure of the viscosity of the foamed asphalt, calculated as the ratio of the maximum volume of the foam relative to the original volume of asphalt. Half-life is a measure of the stability of the foamed asphalt, calculated as the time taken in seconds for the foam to collapse to one-half of its maximum volume.

Expansion ratio and half-life shall be determined by heating the asphalt in the laboratory foaming unit until the required temperature is achieved and stabilized during testing, starting at 320°F (160°C). The discharge rate of the asphalt shall be calibrated and the timer shall be set on the laboratory foaming unit to discharge a known amount of asphalt. The water flow-meter shall be set to achieve the required water injection rate, normally starting with 2 percent by mass of the asphalt. 500 grams of foamed asphalt shall be discharged into a steel drum preheated to ± 135°F (± 75°C) of the asphalt temperature at the calculated spray time. Immediately after the foam discharge stops, a timer shall be started and the maximum height of the foamed asphalt shall be measured with a calibrated dipstick. The maximum height measured with the calibrated dipstick shall be recorded as the expansion ratio. The time in seconds required for the foamed asphalt to reach one-half of its expanded volume shall be recorded as its half-life. The above procedure shall be repeated three times or until similar readings are achieved.

The above procedure shall be repeated for three water injection rates, typically 2.0%, 3.0% and 4.0% by mass of asphalt with asphalt temperatures at 320°F (160°C), 340°F (170°C) and 360°F (180°C). Injection rates are typical may be adjusted to produce the data points needed to obtain the optimum rate.

A graph shall be plotted of the expansion ratio versus half-life at the different water injection rates on the same set of axes. The optimum water addition shall be selected as an average of the two water contents required to meet these minimum criteria.

d If the RAP material does not produce a well-defined moisture-density curve then use an optimum moisture content between 3 and 4%.

e Mixing of test specimens shall be performed with a mechanical bucket mixer or with a laboratory size pugmill. RAP and any additives shall be thoroughly mixed with 75% of the optimum water content determined in accordance with AASHTO T 180 (ASTM D1557), then mixed with the foamed asphalt stabilizing agent. A minimum of three foamed asphalt stabilizing agent contents that bracket the estimated recommended stabilizing agent content shall be selected. Foamed asphalt shall be applied with a properly calibrated foaming apparatus at the optimum half-life and expansion ratio. After adding the foamed asphalt stabilizing agent the entire mixture shall be mixed at room temperature 77 ± 9 °F (25 ± 5 °C) for 30 seconds or until uniformly mixed. Additional mix water may be used to bring the mixture to the optimum moisture content as determined in accordance with AASHTO T 180 (ASTM D1557). The mixture shall be blended until uniform. The specimen shall be compacted immediately or transferred to an air-tight container and immediately sealed for compaction to occur as soon as possible.

Specimens shall be compacted at room temperature, 77 ± 9 °F (25 ± 4 °C). Specimens shall be compacted using either 4-inch (100 mm) or 6-inch (150 mm) diameter molds. Four-inch (100 mm)
diameter specimens shall be compacted to 2.5 ± 0.1 inch (63.5 ± 2.5 mm) tall using either 75 blows per side by a Marshall hammer or with 30 gyrations using a Superpave gyratory compactor (SGC) at 1.25 degree angle, 87 psi (600 kPa) stress. Six-inch (150-mm) diameter samples shall be compacted to 3.7 ± 0.1 inch (95 ± 5 mm) tall with 30 gyrations using the SGC at 1.25 degree angle, 87 psi (600 kPa) stress. Molds and Marshall compaction hammer shall not be heated. A total of 6 specimens at each foamed asphalt stabilizing agent content shall be prepared for indirect tensile strength testing, 3 for cured specimens and 3 moisture condition cured specimens. If paper disks are used, the paper disks shall be placed on the top and bottom of the specimen before compaction and shall be immediately removed after compaction. Specimens shall be extruded from molds within 24 hours after compaction in a manner so as not to damage the specimens. Specimen heights shall be determined according to AASHTO T 245 (ASTM D6927) or may be obtained directly from the readout if the SGC is used.

After removal from the molds, specimens shall be placed in a forced draft oven with ventilation on sides and top. Each specimen shall be placed in a small container to account for material loss from the specimens. Specimens shall be cured at 104 °F (40 °C) to constant weight for at least 16 hours but not more than 72 hours. Constant weight is defined as 0.05% change in weight in 2 hours. After curing, specimens shall be cured at ambient temperature a minimum of 12 hours to a maximum of 24 hours.

Two additional specimens, mixed in accordance with note e above, shall be prepared for Theoretical Maximum Specific Gravity according to AASHTO T 209 (ASTM D2041) with the exception that loose RAP foamed asphalt mixtures shall be cured in an oven at 104 ± 2 °F (40 ± 1 °C) to constant weight for at least 16 hours but not more than 72 hours. Constant weight is defined as less than a 0.05% change in weight in 2 hours. Agglomerates which will not easily reduce with a flexible spatula shall not be broken. Both specimens shall be tested at the highest foamed asphalt stabilizing agent content in the design and back calculated for the lower agent contents. The optional dry-back procedure of AASHTO T 209 (ASTM D2041) may be required to account for the effect of uncoated particles.

Compacted and cured specimens shall be brought to test temperature by placing each specimen in a leakproof bag and submerging in a water bath at 77 ± 2 °F (25 ± 1 °C) for 30-45 minutes immediately prior to testing in accordance with AASHTO T 283 (ASTM D4867). This testing shall be performed at the same time that moisture-conditioned specimens are tested.

When recycling RAP with rounded aggregate, a sandy gradation, or softer binders (recovered penetrations greater than 30) 45 psi (310 kPa) may not be achievable without an additive. In such instances a minimum of 34 psi (225 kPa) may be acceptable. The Engineer shall determine whether the specification needs to be reduced.

Minimum values to be obtained are for mix design only.

Moisture conditioning shall be conducted on 3 compacted, cured specimens at each foamed asphalt stabilizing agent content by applying a vacuum of 2 psi to 10 psi (13 to 67 kPa) or absolute pressure 10 to 26 inches (254 to 660 mm) of Hg partial pressure for a time duration required to vacuum saturate specimens to 55 to 75 percent. Percent saturation shall be calculated by comparing saturated surface dry mass with dry mass in air. Specimens shall then be submerged in a 77 ± 2 °F (25 ± 1 °C) water bath for 24 hours and indirect tensile strength determined in accordance with AASHTO T 283 (ASTM D4867) immediately after removal from the water bath. Tensile Strength Ratio shall be defined as the average moisture conditioned specimen strength divided by the average dry specimen strength.

The Tensile Strength Ratio may be reduced to 0.60, provided the moisture condition indirect tensile strength exceeds the minimum dry strength requirement.
3.3 lbs. to 6.6 lbs. (1,500 to 3,000 g) of RAP shall be used to recover binder.

3.6 JMF shall be the baseline measure for the rate of stabilizing agent application and water blended with the RAP to construct the CIR mixture. The JMF shall indicate the allowable tolerance for field adjustments for the stabilizing agent and/or water so as not to jeopardize the performance of the mix, but allow the contractor to adjust the mix in response to field conditions in consultation with the Engineer.

3.7 The JMF report shall be provided to the Engineer for review a minimum of 14 day prior to the start of the work. The report, at a minimum, shall provide:

- Project location and limits
- Gradation of RAP
- RAP binder content
- Penetration of recovered binder from RAP
- Density, maximum specific gravity, air void content, indirect dry tensile strength, indirect wet (conditioned) tensile strength, and tensile strength ratio at each stabilizing agent content iteration (minimum of 4, inclusive of recommended moisture and stabilizing contents) and at the recommended moisture and stabilizing agent contents
- Recommended water content range as a percentage of dry RAP
- Optimum stabilizing agent content as a percentage of dry RAP
- Stabilizing agent designation, PG grading of asphalt binder, Supplier name and location, and certificates of compliance
- Application means of asphalt stabilizing agent
- Ratio of residual asphalt content of stabilizing agent to mineral stabilizing agent(cement)
- Percent of mineral stabilizing agent to dry weight to RAP
- Compaction method used to prepare strength specimens
- Allowable tolerances for field adjustments for stabilizing agent and/or water.

Testing

4.1 Quality Control

4.1.1 A qualified QC technician shall be provided by the Contractor. Technician shall be certified in monitoring field density and field moisture content of the product.

4.1.2 Contractor shall have in place a written quality control (QC) plan. The plan shall be submitted to the Engineer for review a minimum of 14 days prior to commencement of work.

4.1.3 All proposed work shall follow the QC plan. Any changes to the plan will require review and approval by the Engineer.
4.1.4 The QC plan shall include the following items:

- An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
- The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication process that will be used, and action time frames.
- A list of suppliers for all stabilizing agents.
- A list of source locations for all water.
- An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.
- Location of the QC laboratory, retained sample storage, and other documentation.

4.1.5 Density readings shall be by nuclear density gauge or other approved method. Records and certification of the calibration of devices shall be furnished to the Engineer.

4.1.6 Field Testing Requirements

4.1.6.1 Production lots will be defined as 4000 feet of production. Each lot will consist of two 2000 production foot sublots. Each project location shall have a minimum of one lot.

4.1.6.2 Random locations selected shall follow ASTM Method D3665

4.1.6.3 Field Tests required are as listed in Table 420-3
<table>
<thead>
<tr>
<th>Type of Test</th>
<th>Method</th>
<th>Frequency</th>
<th>Target/Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAP Gradation</td>
<td>Wet gradation. Sampled in accordant to AASHTO T 168 or ASTM D979</td>
<td>Minimum twice per project. Tests shall be in separate sublots. Thereafter if visual change in gradation occurs</td>
<td>Meet requirements of Table 420-1. Report only on additional sieves, See note a</td>
</tr>
<tr>
<td>Asphalt Stabilizing Agent Application Rate</td>
<td>Verify amount injected and accuracy of readings by volumetric distribution by truck gauging, weighing and meter readings</td>
<td>Meter readings every hour and tank distribution once per day</td>
<td>Within tolerances in mix design</td>
</tr>
<tr>
<td>Mill Depth</td>
<td>Tape measurement</td>
<td>Every 500 Feet, record every 3 third measurement</td>
<td>Minimum per plan or specified depth</td>
</tr>
<tr>
<td>Compacted Material Density</td>
<td>Nuclear Gauge, AASHTO T355 (ASTM D 2950)</td>
<td>3 random tests per sublot</td>
<td>Within 95 -105% target density</td>
</tr>
<tr>
<td>Indirect Tensile Strength</td>
<td>Cured post production cores. AASHTO T 283 (ASTM D4867)</td>
<td>Minimum of 2 tests per lot. Core locations randomly selected</td>
<td>Greater than minimums per Table 420-2</td>
</tr>
</tbody>
</table>

a – sieves required for test shall be 1.5 inch (37.5mm), 1 inch (25.0mm), No 4 (4.75mm), No 30 (600μm), No 200 (75μm).

4.1.6.4 Contractor shall provide a Daily Inspection Report to the Engineer summarizing the: daily beginning and ending stations, applicable mix design, subplot tests (RAP gradation, mill depth check, density test, and stabilizing agent application rate) locations and values, and any adjustments to the application rate of the stabilizing agent or water.

4.1.6.5 Report on Indirect Tensile Strength values for post-production cores cut shall be provided to the Engineer summarizing the: core locations, psi values obtained, and ratio obtained.

4.1.6.6 If at any time during production, stabilizing agent adjustments for mixing and placement exceed the allowable limits defined in Table 420-2 or the stabilizing agent application rate falls below the 1.5% mix design minimum specified in Table 420-2, based on a single test or meter adjustment,
from the Job Mix Formula (JMF) value, re-evaluate the entire process. Obtain approval by the Engineer before resuming production.

4.1.6.7 The City reserves the right to conduct its own testing to validate the quality of the product.

Construction Methods

5.1 Equipment used by the Contractor shall include, but not be limited, to the following:

5.1.1 Milling Machine. Shall be a unit capable of milling a full lane width (12’- 6” minimum) to the depth shown on the plans, in a single pass. Unit shall have a depth control that can maintain constant cutting depth, width, uniform grade, and uniform slope. If a crushing/screening unit is not utilized the machine shall be capable of creating RAP that is uniform in size conforming to 2.1.

5.1.1.1 Milling machines used ahead and/or outside the path of the main CIP milling unit shall meet all the requirements outlined in 5.1.1 except minimum width shall be 4 feet.

5.1.2 Mixing Unit. Unit shall be capable of mixing processed RAP from milling unit along with stabilizing agents and water to produce a uniformly mixed homogeneous recycled pavement mixture. The asphalt stabilizing agent shall be applied to the processed RAP in a mixing chamber, or a pugmill at a uniform predetermined computer controlled application rate. Unit shall be equipped with an interface that allows the operator to continuously monitor the application rates from the separate pumping systems for adding stabilizing agent and water to the mixing unit. The asphalt stabilizing agent and any additives shall be introduced at a percentage of weight of RAP calculated volumetrically based on width, depth and unit weight of RAP. The System shall be capable of automatic adjustment for working speed of the unit. Separate nozzles shall be present for the stabilizing agent and/or water sampling capable of being used without interrupting the process. After introduction of stabilizing agent and any additives, mixing shall continue until the asphalt stabilizing agent is evenly distributed in the recycled pavement.

5.1.2.1 Asphalt stabilizing agent shall be metered by weight of RAP using a calibrated meter that will accurately measure the amount of asphalt stabilizing agent to within a tolerance of ± 2.0% of the specified rate. The device shall be capable of automatically adjusting the flow of the agent to compensate for any variation in the amount of RAP introduced into the mixing apparatus. The mixing apparatus shall have an independent source of water to properly disperse the agent. Calibration of the water meter is not necessary. Automatic digital readings shall be displayed for flow rate of both the RAP and agent in appropriate units of weight and time.
5.1.2.2 The system shall be equipped with heating capable of maintaining the temperature of asphalt flow components in order to maintain the required expansion ratio and half-life. The binder injection system shall contain an independent pumping system and spray bar to regulate the application of foamed asphalt separate from the water used to increase moisture content for compaction. The additive system shall be computer controlled and the rate of addition of water into the hot asphalt binder shall be automatically kept at a constant percent by weight of asphalt binder. An inspection or test nozzle shall be fitted at one end of the spray bar to produce a representative sample of foamed asphalt binder.

5.1.3 Paving Equipment. Unit shall be a self-propelled paver or screed integral to the recycling equipment capable of placing and shaping of the recycled pavement mixture in one continuous pass, without segregation, to the lines and grades established by the Owner. Unit shall be equipped with automatic feed controls, which are properly adjusted to maintain a uniform depth of material ahead of the screed. Screed shall be unheated. Self-propelled paver units have recycled mix deposited directly into the hopper from the mixing unit or shall use a material transfer vehicle (MTV). The MTV shall be capable removing the entire windrow of recycled mix from the milled surface and transferring it into the paver hopper.

a) Grade Control. The paving unit shall be controlled by electronic grade and cross-slope control. Sensors shall be capable of sensing the transverse slope of the screed, and providing the automatic signals that operate the screed to maintain grade and transverse slope from a reference such as a grade wire or ski type device, either a floating beam with a minimum length of 30 ft. or sonic averaging with a minimum length of 24 ft.

5.1.4 Compaction Equipment. Equipment shall be self-propelled and include:

- At least one double drum vibratory roller with a minimum weight of not less than 10 tons.
- At least one pneumatic-tired roller with a minimum weight of not less than 22 tons.
- The combined weight of the two required rollers shall be not less than 34 tons. Rollers shall have a width of not less than 65 inches. Tires on pneumatic rollers shall be evenly inflated and matched in size and profile so as to maximize compactive effort.

5.1.5 Fog Sealing– Equipment and placement shall conform to Section 409

5.1.6 Miscellaneous. Tankers supplying hot asphalt stabilizing agent components shall be equipped to constantly monitor temperature within the tank
5.2 Excess Material. Excess processed CIR material from operations is the property of the Contractor and shall be properly disposed of. Trucking of material to a designated staging area for stockpiling shall be subsidiary to the work.

5.3 Pre-paving Meeting - Supervisory personnel of the Contractor and any subcontractor who are to be involved with the work shall be available to meet seven (7) days prior to work to discuss methods of accomplishing all phases of the work.

5.4 Weather and Seasonal Limitations – Unless specifically allowed by the Engineer, operations shall not begin before May 1st and shall not be allowed after August 30th. Operations shall not be allowed during wet conditions, in the rain or if cold conditions (less than 45°F) are forecast within 48 hour period after placement. However, work may be performed during light precipitation so long as the Contractor can demonstrate that performance of the recycled asphalt pavement will not be adversely affected. Recycling and placement operation shall not start unless ambient temperature and RAP material is above 55°F. Ambient air temperature shall be at least 60°F within 3 hours after start of operations. Ambient air temperature during operation shall remain above 60°F until compaction of the material is completed. In the event that the RAP temperature cannot be measured prior to the addition of the asphalt stabilizing agent, the original asphalt pavement surface temperature, in the shade, shall be utilized as the reference temperature.

5.5 Site Preparation. Existing pavement shall be inspected for any areas of yielding subgrade and repaired as needed. Existing aggregate roadway shoulders shall be bladed away from the asphaltic surface edge to minimize contamination of the CIR. On curbed roadways existing gutters shall be swept of objectionable material which might interfere with the process.

5.6 Processing and Placement of Recycled Pavement Mixture. Existing pavement shall be milled to the required depth and width. Milled material shall be processed as necessary by crushing, screening, and/or sizing to meet the gradation requirements outlined in 2.1. Loop wires, pavement markers, crack fill material, thermoplastic marking materials, milled concrete and other materials that may be recycled shall be screened out during the milling process unless the Contractor can demonstrate that the minor amounts of residual materials that remain will not compromise the integrity of the product. Any pavement fabric encountered may be incorporated as long as any of the milled pieces do not have any dimension exceeding 2 inches in length. and blended with the stabilizing agent and water; produce a uniform and homogeneous recycled mixture. The recycled mixture shall be spread to the grade, elevations, and slopes specified. tearing or scarring of the recycled pavement surface shall be avoided. Proper techniques for material transfer, handling, and spreading shall be adhered to prevent particle segregation. Longitudinal joints between successive CIR operations shall overlap a minimum of 3 inches and transverse joints a minimum of 2 feet. The Contractor shall control the addition of asphalt to the CIR in overlap areas in order to avoid excessive localized high asphalt in the CIR layer.
5.7 Compaction

5.7.1 Control Strip. A control strip shall be constructed at the beginning of the work for the purpose of establishing the correct rolling pattern that will achieve the required wet density for the CIR layer. The equipment used to construct the control strip shall be the same as that to be used during full production. The strip shall be a minimum of 500 feet long and one full lane width. Completed control strips may remain in-place to be incorporated into the final roadway cross-section. Unacceptable control strips shall be corrected or removed and replaced at the Contractor's expense. Perform the control strip construction and density testing under the direct observation and/or assistance of the Engineer. Density testing of the strip shall be as follows:

- After compacting the control strip with a minimum of two passes to cover testing area, mark and take density measurements at 3 random locations, at least 1 ½ feet from the edge of the CIR layer. Mark location for further reference.
- Take subsequent density measurements at the same 3 locations. Each subsequent pass of compaction equipment over the entirety of the control strip, take density measurements at the 3 marked locations. Continue compacting and testing until the increase in density measurements is less than 2.0 lb/ft$^3$, or the density measurements begin to decrease.
- Upon completion of control strip compaction, take 10 randomly located density measurements within the limits of the control strip, at least 1 ½ feet from the edge of the base.
- The final measurements recorded at the 3 marked locations may be included as 3 of the 10 measurements. Average the 10 measurements to obtain the control strip target density.

5.7.2 Compaction Requirements.

5.7.2.1 The Contractor shall determine the time from which the treated material is placed until compaction can commence. Rolling patterns shall be established and the mixture compacted using the procedures established in Control Strip. Compaction shall be monitored using nuclear density testing in accordance with AASHTO T 355 (ASTM D2950) throughout the time compaction is being completed to continuously verify the compaction is within tolerance.

5.7.2.2 The selected rolling pattern shall be followed unless changes in the recycled mix or placement conditions occur and a new rolling pattern is established at that time. Any type of rolling that causes cracking, major displacement, and/or any other type of pavement distress shall be discontinued.
until such time as the problem can be resolved. Discontinuation and commencement of rolling operations shall be at the discretion of the Engineer.

5.7.2.3 The recycled mat shall be continuously observed during compaction efforts. If moisture cracking occurs under vibratory compaction mode, the vibrators shall be turned off and static rolling only applied. If moisture cracking of the mat continues under static steel rolling, steel drum compaction shall cease, the mat shall be allowed to cure for a time in order for moisture to escape, and pneumatic rolling commenced, followed by steel drum rolling to correct irregularities from the pneumatic-tired roller. This procedure shall be followed until there is no longer any displacement of the mat observed from roller action on the recycled surface.

5.7.2.4 Care shall be taken to ensure that aggregate from the recycled mixture does not stick to the drums or wheels of rollers. Water shall be uniformly applied to the wheels and drums, along with mechanical means, if necessary, so as to keep aggregate from sticking. Sufficient water shall be applied to keep rollers and tires clean, but not to the extent that water pools or ponds on the recycled surface.

5.7.2.5 Rollers shall not be started or stopped on uncompacted recycled material. Rolling patterns shall be established so that starting and stopping shall be on previously compacted material or the adjacent, existing surfacing.

5.8 Surface Requirements. Final compacted CIR surface shall be smooth uniform with surface deviations no greater than 1/4 inch in a 10 foot distance. The Engineer may direct the Contractor to repair these areas by reworking, rerolling, trimming, milling, or grinding. Minor depressions greater than 3/4 inch may be corrected by reworking surface prior to compaction. Depressions may also be tack coated and filled with HMA immediately prior to placement of the surface treatment.

5.9 Maintaining the Work. The CIR shall not be opened to traffic until it is determined that the surface is sufficiently stable and cured to support the traffic load. Prior to opening to traffic, a fog seal shall be applied to minimize raveling and reduce water intrusion. After opening to traffic, and prior to placing a surface treatment, the Contractor shall maintain the surface of the recycled pavement in a condition suitable for safe movement of traffic. This includes protecting and maintaining the recycled pavement surface from standing water, deleterious substances, and/or other damage. Damage to the recycled pavement prior to placement of the upper layer at no additional cost to the owner.

5.10 Curing. Application of a surface treatment will not be allowed until the moisture content of the CIR layer is no more than 1.5% or the moisture content is less than 0.10 percentage points for three consecutive rain free calendar days.
5.11 **Surface Treatment.** The finish wearing course should be applied as soon as curing is complete, and generally not more than 14 days after the recycling process. If HMA is utilized for final wearing course, a tack coat shall be required. The tack coat shall be an asphalt emulsion applied at 0.05 gal/SY.

**Method of Measurement**

6.1 Cold In-Place (CIR) asphalt recycling performed with the application of fog seal shall be measured by the square yard.

6.2 Asphalt Stabilizing Agent incorporated into the work shall be measured by the ton. Measurement shall be as measure through weight slips in accordance with Section 108.

6.3 Mineral Stabilizing Agent incorporated into the work shall be measured by the ton. Measurement shall be as metered through a calibrated auger, or through delivered ticket quantity.

6.4 Coring of roadways to obtain samples for mix design(s) shall be measured by the day. Day for this instance shall consist of a minimum of 8 hours.

6.5 Transporting of the Cold In-Place (CIR) equipment within the City by truck and trailer shall be measured by the hour. Time will commence once the transport vehicle arrives on site and will end once the equipment is completely unloaded at the next site.

   6.5.1 Mobilizing and demobilizing of equipment into and out of the City shall not be included under this item.

6.6 Pavement milling of bituminous surfaces to support the main milling operation of the Cold In-Place (CIR) process shall be measured by the square yard per inch of depth removed. Area shall be as determined by the surface measurements of the lengths and widths of the bituminous areas removed.

**Basis of Payment**

6.1 Accepted quantities of Cold In-Place (CIR) asphalt recycling will be paid for at the contract unit price per square yard, complete in place including all labor equipment and material including; milling the existing pavement for recycling, sizing milled RAP, injecting and mixing RAP with the stabilizing agent, paving, compacting the completed CIR; QA/QC required during operations including in place density testing, removal of excess CIR material, fog seal and maintaining the completed CIR until final wearing course is installed.

6.2 Asphalt Stabilizing Agent used in the Cold In-Place (CIR) asphalt recycling will be paid at the contract unit price per ton.
6.3 Mineral stabilizing agent in the Cold In-Place (CIR) asphalt recycling will be paid at the contract unit price per ton.

6.4 The quantity of accepted mix designs created will be paid for at the contract unit price per each design created and accepted. This shall include all costs for the furnishing of labor, tools, and incidentals necessary to the conduct mix design(s).

6.5 Sampling of project roadways to obtain samples required for the creation of a mix design will be paid at the contract unit price per day of sampling. The appropriate fraction of a day will be paid for any day less than 8 hours. No additional compensation will be made for a day in excess of 8 hours.

6.6 Cost for the movement of milling equipment by truck and trailer to each project location within the City shall be paid at the contract unit price per hour. If no item is provided in the Contract for this, it shall be considered subsidiary to the work.

6.6.1 Moving of milling equipment under its own power from site to site shall be considered incidental.

6.7 The accepted quantities of pavement milling outside of the reach of the main CIR milling unit and supporting the Cold In-Place (CIR) process will be paid for at the Contract Unit Price per square yard per inch of depth removed.

6.8 Costs for connection for water supply shall be subsidiary.

6.9 Temporary pavement markings shall be subsidiary.

6.10 Repair of existing pavements and areas of yielding sub base areas shall be paid for under the appropriate sections or be performed by others.

6.11 Repair or reshaping to eliminate localized depressions in finished CIR surface and created during the process shall be subsidiary to the work.

6.12 Wearing course placement shall be paid for under the appropriate sections or be performed by others.

6.12.1 Tack coat used in the placement of wearing course shall be paid for as appropriate under the wearing course item.

6.13 Sweeping of surfaces shall be subsidiary.

6.14 Traffic Control will be paid for under Section 619.

6.15 Traffic signal loops replaced within the work area shall be paid for under Section 616.6- Inductive Loop Detectors or performed by others.
6.15.1 Traffic signal loops damaged by the Contractor’s negligence or carelessness shall be replaced at no additional cost the City.

6.16 Permanent pavement markings shall be installed and paid for under Section 632 – Reflectorized Pavement Markings or installed by others.

Pay Items and Units, Section 420 – Cold In Place Recycled Asphalt Pavement:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>420.10</td>
<td>Cold In-Place Recycled Asphalt Pavement</td>
<td>SY</td>
</tr>
<tr>
<td>420.11</td>
<td>Asphalt Stabilizing Agent</td>
<td>Ton</td>
</tr>
<tr>
<td>420.12</td>
<td>Mineral Stabilizing Agent</td>
<td>Ton</td>
</tr>
<tr>
<td>420.2</td>
<td>Cold In-Place Mix Design</td>
<td>EA</td>
</tr>
<tr>
<td>420.3</td>
<td>Roadway Sampling</td>
<td>Day</td>
</tr>
<tr>
<td>420.4</td>
<td>Transport of CIR Equipment</td>
<td>HR</td>
</tr>
<tr>
<td>420.5</td>
<td>Premilling of Bituminous Surfaces for CIR, 1 inch deep</td>
<td>SY</td>
</tr>
</tbody>
</table>
# Contract Name

**CONTRACTOR:** Contractor  
One Any Way  
Town, NH 00000  

**PAY REQUEST #:** Number  
**DATE OF REQUEST:** Date  

**FOR PERIOD:**  
Date A  
TO  
Date B

<table>
<thead>
<tr>
<th>1. Original Contract Amount</th>
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<tbody>
<tr>
<td>2. Net Amount Changed by Change Orders</td>
<td>..................................................</td>
<td>$0.00</td>
</tr>
<tr>
<td>3. Contract Total To Date (Line 1+Line 2)</td>
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<tr>
<td>4. Total Work Complete to Date</td>
<td>..................................................</td>
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<table>
<thead>
<tr>
<th>5. Retainage 5% RETAINAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Retainage to Date (Line 4 x % retainage)</td>
</tr>
<tr>
<td>b) Total Retainage Released to Date</td>
</tr>
<tr>
<td>c) Remaining Retainage (Line 5a - Line 5b)</td>
</tr>
<tr>
<td>d) Retainage Withheld this Pay Period</td>
</tr>
</tbody>
</table>

| 6. Total Amount Earned, Less Retainage (Line 4 - Line 5c) | $ | - |
| 7. Total Previous Payments Made | .................................................. | |
| 8. Current Amount Due (Line 6-Line 7) | .................................................. | $ | - |

**Contractor:**  
By: ___________________________  
Date: ________________________  

**Project Manager:**  
By: ___________________________  
Date: ________________________  

### Change Orders

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Amount</th>
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### Retainage Releases

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
</tr>
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