INDEX TO TECHNICAL SPECIFICATIONS

INTRODUCTION TO THE TECHNICAL SPECIFICATIONS

The following Technical Specifications shall apply to the various items of work which constitute the construction contemplated under this Contract.
Within the Technical Specifications of this Contract, the following definitions shall apply:

1. **Standard Specifications** shall mean the State of Connecticut, Department of Transportation, "Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, dated 2004" and its latest supplements. It should be noted that portions of the Standard Specifications that are referred to in this Contract's Technical Specifications, may be supplemented, revised and/or amended per these Technical Specifications. These Technical Specifications shall govern as modified. Within the referred to portions of the Standard Specifications wherein the following terms are used, they shall mean respectively:

   *Enginee*r - acting directly or through the City of New London, or a duly-authorized representative

   Inspector - City of New London acting directly or through a duly-authorized representative, assigned to make inspections of the work performed and materials furnished by the Contractor.

   Laboratory - designated by the City of New London

2. **Applicable Safety Code** shall mean the latest edition including any and all amendments, revisions, and additions thereto of the Federal Department of Labor, Occupational Safety and Health Administration's "Occupational Safety and Health Standards" and "Safety and Health Regulations for Construction," the State of Connecticut, Labor Department, "Construction Safety Code," or State of Connecticut "Building Code," whichever is the more stringent for the applicable requirement.

3. **Items**: Items are generally numbered consistent with Connecticut Department of Transportation nomenclature. Please note that these Technical Specifications may be particular to this contract and differ from the Standard Specifications. Technical Specifications are included on the following pages. Sections or Articles referred to with a number refer to the State of Connecticut Department of Transportation, Bureau of Highways, Standard Specifications Sections or Articles.

4. **Regulatory Agency (ies)**: Regulatory Agency (ies) shall be defined as the governing body or authority having jurisdiction over or responsibility for a particular activity within the scope of this Contract. They may be as specifically defined within the Special Conditions; otherwise the Contractor shall be responsible to determine same in the local area of the Contract.

5. **"These Specifications"** where used in the text of the Technical Specifications items shall mean the Technical Specifications of this Contract.

6. **Bid Proposal Items**: Payment will only be made for items in the Bid Proposal. Other items may be included in the Standard Specifications but payment for items not listed in the Bid Proposal will be included in the cost of other items of work. Bid Proposal items shall have similar designations as the similar item in the Standard Specifications.

STANDARD SPECIFICATIONS

PLEASE NOTE THAT WHILE FORM 816 GENERALLY APPLIES IN TERMS OF MATERIALS AND CONSTRUCTION METHODS, IN MANY CASES AS OUTLINED IN THESE SPECIFICATIONS, DESCRIPTION, METHOD OF MEASUREMENT AND BASIS OF PAYMENT HAVE BEEN MODIFIED.

State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, 2004 Form 816 and supplements thereto dated, except as otherwise noted herein or on the plans are hereby incorporated into this document. Applicable sections of Form 816 as may be referenced are as follows:

SECTION	TITLE
2.01	Clearing and Grubbing
2.02	Roadway Excavation, Formation of Embankment & Disposal of Surplus Material
2.09	Subgrade
2.05	Trench Excavation
2.12	Subbase
2.13	Granular Fill
2.19	Sedimentation Control System
3.04	Processed Aggregate Base
4.06	Bituminous Concrete Pavement
5.07	Catch Basins, Manholes, and Drop Inlets
6.51	Culverts
8.11	Concrete Curbing
8.13	Stone Curbing
8.14	Reset Stone Curbing
8.22	Temporary Precast Concrete Barrier Curb
9.21	Concrete Sidewalks
9.24	Concrete Driveway Ramps
9.39	Sweeping for Dust Control
9.43	Water for Dust Control
9.44	Topsoil
9.49	Furnishing, Planting and Mulching Trees, Shrubs, Vines, and Ground Cover Plants
9.50	Turf Establishment
9.70	Trafficperson

9.71	Maintenance and Protection of Traffic
9.75	Mobilization
9.76	Barricade Warning Lights
9.77	Traffic Cone
9.78	Traffic Drum
9.79	Construction Barricades
9.80	Construction Staking
9.81	42" (1 Meter) Traffic Cone
10.08	Electrical Conduit
10.12	Single Conductor
11.11	Loop Vehicle Detector and Sawcut
12.08	Sign Face – Sheet Aluminum
12.10	Epoxy Resin Pavement Markings, Symbols, and Legends
12.11	Removal of Pavement Markings

SUPPLIMENTAL SPECIFICATIONS

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as revised by the Supplemental Specifications dated July 2014 (otherwise referred to collectively as "Form 816") are hereby made part of this contract, as modified by the Technical Specifications contained herein. The State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), May 14, 2010 edition or latest issue is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available upon request from the City of New London. The Technical Specifications relate in particular to the REHABILITAION OF PARKING LOTS ALONG EUGENE O'NEILL DRIVE in the City of New London.

NOTICE TO CONTRACTOR - CONTRACT DURATION

The Contractor is hereby notified that this is not to be considered an ordinary project by any means and that due to funding time constraints, extra manpower, equipment and workshifts may be required to complete the work in accordance within the specified contract time.

One hundred fifty (150) calendar days will be allowed for completion of the work.

NOTICE TO CONTRACTOR – PROCUREMENT OF MATERIALS

Upon award, the Contractor shall proceed with shop drawings, working drawings, procurement of materials, and all other submittals required to complete the work in accordance with the contract documents. Due to funding time constraints the contractor may be allowed to purchase certain

materials and be paid for material only prior to installation if properly stored and protected on site and only with approval by the City.

NOTICE TO CONTRACTOR – DEFINITION OF OWNER

Whenever the terms Owner, Department, State of Connecticut Department of Transportation, Commissioner, Engineer and/or State appear in the Contract Documents, it shall be understood to mean the City of New London acting directly or through a duly authorized representative.

NOTICE TO CONTRACTOR - BUY AMERICA

The Contractor agrees to comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used on Federal Transit Administration (FTA)-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7.

Bidders must submit the appropriate certificate, as set forth below, of either a completed Certificate of Compliance or a completed Certificate for Non-Compliance with their bid. These certificates are attached to the bid proposal form. Failure to complete and submit one of the referenced certificates will result in rejection of the bid.

Certificate of Compliance with Buy America Requirements
The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j) (1), and the applicable regulations in 49 CFR part 661.

Signature _____ Date _____

Company _____

Name _____

Title _____

Certificate of Non-Compliance with Buy America Requirements
The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but it may qualify for an exception to the requirement pursuant to 49 U.S.C. 5323(j)(2), as amended, and the applicable regulations in 49 CFR 661.7.

Signature _____ Date _____

Company _____

Name _____

Title _____

The Contractor shall obtain and submit to the State copies of all signed Buy America certifications, including Buy America certifications that may be required of its subcontractors if the dollar thresholds established by FTA are exceeded. These completed certifications if applicable, shall be mailed to the Connecticut Department of Transportation, to the attention of the Department.

NOTICE TO CONTRACTOR - CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

For all State contracts as defined in P.A. 10-1 having a value in a calendar year of $50,000 or more or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this agreement/contract expressly acknowledges receipt of the State Elections Enforcement Commission's Notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. The State Elections Enforcement Commission Notice titled "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations" is attached hereto and hereby made a part of this agreement/contract.

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban
No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor,* with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or *solicit* contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee; In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform
State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations
Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties: Civil penalties--$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of $2000 or twice the amount of the prohibited contributions made by their principals. Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or $5000 in fines, or both.

Contract Consequences
Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided. Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor,

unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation. The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban." Definitions: "State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee. "Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee. "Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization**,** (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract,* (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one

hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee.

"State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan or a loan to an individual for other than commercial purposes. "State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

STATE OF CONNECTICUT

Contract Identifier:

GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Certification to accompany a State contract with a value of $50,000 or more in a calendar or fiscal year, pursuant to C.G.S. §§ 4-250 and 4-252(c); Governor M. Jodi Rell's Executive Orders No. 1, Para. 8, and No. 7C, Para. 10; and C.G.S. §9-612(g)(2), as amended by Public Act 07-1

INSTRUCTIONS:

Complete all sections of the form. Attach additional pages, if necessary, to provide full disclosure about any lawful campaign contributions made to campaigns of candidates for statewide public office or the General Assembly, as described herein. Sign and date the form, under oath, in the presence of a Commissioner of the Superior Court or Notary Public. Submit the completed form to the awarding State agency at the time of initial contract execution (and on each anniversary date of a multi-year contract, if applicable).

CHECK ONE: ☐ Initial Certification ☐ Annual Update (Multi-year contracts only.)

GIFT CERTIFICATION:

As used in this certification, the following terms have the meaning set forth below:

1) "Contract" means that contract between the State of Connecticut (and/or one or more of it agencies or instrumentalities) and the Contractor, attached hereto, or as otherwise described by the awarding State agency below;
2) If this is an Initial Certification, "Execution Date" means the date the Contract is fully executed by, and becomes effective between, the parties; if this is an Annual Update, "Execution Date" means the date this certification is signed by the Contractor;
3) "Contractor" means the person, firm or corporation named as the contactor below;
4) "Applicable Public Official or State Employee" means any public official or state employee described in C.G.S. §4-252(c)(1)(i) or (ii);
5) **"Gift"** has the same meaning given that term in C.G.S. § 4-250(1);
6) "Planning Start Date" is the date the State agency began planning the project, services, procurement, lease or licensing arrangement covered by this Contract, as indicated by the awarding State agency below; and
7) "Principals or Key Personnel" means and refers to those principals and key personnel of the Contractor, and its or their agents, as described in C.G.S. §§ 4-250(5) and 4-252(c)(1)(B) and (C).

I, the undersigned, am the official authorized to execute the Contract on behalf of the Contractor. I hereby certify that, between the Planning Start Date and Execution Date, neither the Contractor nor any Principals or Key Personnel has made, will make (or has promised, or offered, to, or otherwise indicated that he, she or it will, make) any **Gifts** to any Applicable Public Official or State Employee.

I further certify that no Principals or Key Personnel know of any action by the Contractor to circumvent (or which would result in the circumvention of) the above certification regarding **Gifts** by providing for any other principals, key personnel, officials, or employees of the Contractor, or its or their agents, to make a **Gift** to any Applicable Public Official or State Employee. I further certify that the Contractor made the bid or proposal for the Contract without fraud or collusion with any person.

CAMPAIGN CONTRIBUTION CERTIFICATION:

I further certify that, on or after December 31, 2006, neither the Contractor nor any of its principals, as defined in C.G.S. § 9-612(g)(1), has made any **campaign contributions** to, or solicited any contributions on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support, any candidate for statewide public office, in violation of C.G.S. § 9-612(g)(2)(A). I further certify that **all lawful campaign contributions** that have been made on or after December 31, 2006 by the Contractor or any of its principals, as defined in C.G.S. § 9-612(g)(1), to, or solicited on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support any candidates for statewide public office or the General Assembly, are listed below:

OPM Ethics Form 1 Rev. 10-31-07

STATE OF CONNECTICUT

Contract Identifier:

GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Lawful Campaign Contributions to Candidates for Statewide Public Office:

Contribution Date	Name of Contributor	Recipient	Value	Description

Lawful Campaign Contributions to Candidates for the General Assembly:

Contribution Date	Name of Contributor	Recipient	Value	Description

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Printed Contractor Name

Signature of Authorized Official

Subscribed and acknowledged before me this _____ day of _____, 200__.

Commissioner of the Superior Court (or Notary Public)

For State Agency Use Only

Awarding State Agency: Transportation

Planning Start Date

Contract Number or Description

NOTICE TO CONTRACTOR - GIFT CERTIFICATION DISCLOSURE

Pursuant to Connecticut General Statutes, Section 4-252 and Executive Order No. 7C, paragraph 10, the Contractor is notified of subsections (c) and (d) of this Section as follows. The Contractor must incorporate the planning date indicated below under subsection (e) on Certification Form 1, at the time the Contract is executed.

(c) The official of the person, firm or corporation awarded the contract, who is authorized to execute the contract, shall certify on such form as the State shall provide the following:

(1) That no gifts were made between the date that the state agency or quasi-public agency began planning the project, services, procurement, lease or licensing arrangement covered by the contract and the date of execution of the contract, by (A) such person, firm, corporation, (B) any principals and key personnel of the person, firm or corporation, who participated substantially in preparing the bid or proposal or the negotiation of the contract, or (C) any agent of such person, firm, corporation or principals and key personnel, who participated substantially in preparing the bid or proposal or the negotiation of the contract, to (i) any public official or state employee of the state agency or quasi-public agency soliciting bids or proposals for the contract, who participated substantially in the preparation of the bid solicitation or request for proposals for the contract or negotiation or award of the contract, or (ii) any public official or state employee of any other state agency, who has supervisory or appointing authority over such state agency or quasi-public agency;

(2) That no such principals and key personnel of the person, firm or corporation, or agent of such person, firm or corporation or principals and key personnel, knows of any action by the person, firm or corporation to circumvent such prohibition on gifts by providing for any other principals and key personnel, official, employee or agent of the person, firm or corporation to provide a gift to any such public official or state employee; and

(3) That the person, firm or corporation made the bid or proposal without fraud or collusion with any person.

(d) Any bidder or proposer that does not make the certifications required under subsection (c) of this section shall be disqualified and the state agency or quasi-public agency shall award the contract to the next highest ranked proposer or the next lowest responsible qualified bidder or seek new bids or proposals.

(e) The date that the City began planning the project, services, procurement, lease or licensing arrangement to be covered by this contract is July 2015.

NOTICE TO CONTRACTOR – CAMPAIGN CONTRIBUTION CERTIFICATION

A certification of campaign contribution to accompany State Contracts with a value of $50,000 or more in a calendar or fiscal year, pursuant to Conn. Gen. Stat. §4-250 and Executive Orders No. I, paragraph 8 and No. 7C, paragraph 10, must be completed on the form provided by the Department of Transportation (DOT); and such certification shall cover the two year period preceding the execution of the contract. Each principal of a joint venture, if any, must submit a separate certification. The Department of Transportation will not accept a bid for a large state construction or procurement contract without such certification.

NOTICE TO CONTRACTOR - AFFIDAVIT REGARDING CONSULTING AGREEMENTS

The "Affidavit Regarding Consulting Agreements" must be completed and should be submitted in response to such a request for procurement or solicitation for those contracts having an anticipated total value to the State of more than fifty thousand dollars ($50,000) in a calendar or fiscal year. Contractors will not be selected if the required Affidavit is not submitted.

This Affidavit is attached to all bid proposals when issued to prospective bidders. Bidders are responsible for the submission of this Affidavit.

NOTICE TO CONTRACTOR - ETHICS SUMMARY

The current “Acknowledgment of Receipt of Summary of State Ethics Laws” must be completed by you and should be submitted with your bid for any large construction or procurement contract as defined in Section 32 of Public Act 05-287. The Department of Transportation will not accept a bid for a large state construction or procurement contract without such Acknowledgment.

In addition, if you are awarded such a contract, you will be required to obtain from your sub-contractors and consultants a fully and properly executed copy of the attached “Subcontractor and/or Consultant Acknowledgment of Receipt of Summary of State Ethics Laws,” and to submit said copies to the initiating unit.

NOTICE TO CONTRACTOR – CONTRACTOR TRAINING REQUIREMENT FOR 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

In accordance with Connecticut General Statute 31-53b and Public Act No. 08-83, the Contractor is required to furnish proof that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53, has completed a course of at least ten hours in duration in construction safety and health approved by the Federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Proof of compliance with the provisions of the statute shall consist of a student course completion card issued by the federal Occupational Safety and Health Administration, or other such proof as deemed appropriate by the Commissioner of the Connecticut Department of Labor, dated no earlier than five years prior to the commencement of the project. Each employer shall affix a copy of the construction safety course completion card for each applicable employee to the first certified payroll submitted to the Department of Transportation on which the employee's name first appears.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

This section does not apply to employees of public service companies, as defined in section 16-1 of the 2008 supplement to the General Statutes, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

The internet website for the federal Occupational Safety and Health Training Institute is http://www.osha.gov/fso/ote/training/edcenters.

Additional information regarding this statute can be found at the Connecticut Department of Labor website, http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm.

Any costs associated with this notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 –"Claims".

NOTICE TO CONTRACTOR - CONNECTICUT DEPARTMENT OF TRANSPORTATION DISCLAIMER

Connecticut Department of Transportation bidding and other information and documents which are obtained through the Internet, World Wide Web Sites or other sources are not to be construed to be official information for the purposes of bidding or conducting other business with the Department.

It is the responsibility of each bidder and all other interested parties to obtain all bidding related information and documents from official sources within the Department.

Persons and/or entities which reproduce and/or make such information available by any means are not authorized by the Department to do so and may be liable for claims resulting from the dissemination of unofficial, incomplete and/or inaccurate information.

NOTICE TO CONTRACTOR - VEHICLE EMISSIONS

All motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

The contractor shall establish staging zones for vehicles that are waiting to load or unload at the contract area. Such zones shall be located where the emissions from the vehicles will have minimum impact on abutters and the general public.

Idling of delivery and/or dump trucks, or other equipment shall not be permitted during periods of non-active use, and it should be limited to three minutes in accordance with the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

No mobile source engine shall be allowed "to operate for more than three (3) consecutive minutes when the mobile source is not in motion, except as follows:

1. When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
2. When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
3. When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,
4. To bring the mobile source to the manufacturer's recommended operating temperature,
5. When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F),
6. When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or
7. When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation."

All work shall be conducted to ensure that no harmful effects are caused to adjacent sensitive receptors. Sensitive receptors include but are not limited to hospitals, schools, daycare facilities, elderly housing and convalescent facilities. Engine exhaust shall be located away from fresh air intakes, air conditioners, and windows.

A Vehicle Emissions Mitigation plan will be required for areas where extensive work will be performed in close proximity (less than 50 feet (15 meters)) to sensitive receptors. No work will proceed until a sequence of construction and a Vehicle Emissions Mitigation plan is submitted in writing to the Engineer for review and all comments are addressed prior to the commencement of any extensive construction work in close proximity (less than 50 feet (15 meters)) to sensitive receptors. The mitigation plan must address the control of vehicle emissions from all vehicles and construction equipment.

If any equipment is found to be in non-compliance with this specification, the contractor will be issued a Notice of Non-Compliance and given a 24 hour period in which to bring the equipment into compliance or remove it from the project. If the contractor then does not comply, the Engineer shall withhold all payments for the work performed on any item(s) on which the non-conforming equipment was utilized for the time period in which the equipment was out of compliance.

Any costs associated with this "Vehicle Emissions" notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims."

NOTICE TO CONTRACTOR – TRAFFIC CONTROL

A) Traffic Control – Flag Persons

Any Flagger utilized by the Contractor to control traffic during construction shall be a "certified" card carrying Flagger. The local police may periodically check their credentials. Flaggers shall be provided by the Contractor doing the work, and all costs shall be in accordance with the Contract Specifications.

B) Traffic Control – City Police Department

The Contractor shall utilize City patrol officers on all high volume roadways and any roadway that will be closed off during construction.

The Contractor shall request the use of police officers three (3) days before their intended use by contacting the Public Work's office at 860-447-5250. The Contractor shall be responsible to fax all requests with the appropriate requested information.

NOTICE TO CONTRACTOR – REDUCTION, ELIMINATION OF OR ALTERNATES TO CONTRACT WORK

The Contractor is hereby notified that the City reserves the right to reduce the contract work by reducing or eliminating all work associated with various installations depending on available funding and the successful bidder's bid. The Contractor is alerted that reduction or elimination of this work from the project shall not affect the contract unit prices bid for the other work and that the determination of the most responsible bidder submitting the lowest bid will be based on the bid total for all the work.

Also the contractor is hereby notified that sections of granite curbing may be eliminated and replaced with precast concrete curbing.

NOTICE TO CONTRACTOR – WORK ON ADJACENT PROJECTS

The Contractor is responsible for coordinating with the City of New London for any projects being constructed concurrently within the area of this project. The Contractor is responsible for coordinating with the City of New London to minimize disruption to traffic operations within the area. Detour operations on the project will require approval by the City of New London.

NOTICE TO CONTRACTOR – NCHRP REPORT 350 REQUIREMENTS FOR WORK ZONE TRAFFIC CONTROL DEVICES

CATEGORY 1 DEVICES (traffic cones, traffic drums, tubular markers, flexible delineator posts)

Prior to using the Category 1 Devices on the project, the Contractor shall submit to the Engineer a copy of the manufacturer's self-certification that the devices conform to NCHRP Report 350.

CATEGORY 2 DEVICES (construction barricades, construction signs and portable sign supports)

Prior to using Category 2 Devices on the project, the Contractor shall submit to the Engineer a copy
of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Specific requirements for these devices are included in the Special Provisions.

Information regarding NCHRP Report 350 devices may be found at the following web sites:

FHWA: http://safety.fhwa.dot.gov/roadway_dept/road_hardware/index.htm

ATSSA: http://www.atssa.com/resources/NCHRP350Crashtesting.asp

NOTE: The portable wooden sign supports that have been traditionally used by most contractors in the State of Connecticut do NOT meet NCHRP Report 350 criteria and shall not be utilized on any project advertised after October 01, 2000.

CATEGORY 3 DEVICES (Truck-Mounted Attenuators & Work Zone Crash Cushions)
Prior to using Category 3 Devices on the project, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices conform to NCHRP Report 350.

NOTICE TO CONTRACTOR – TRAFFIC DRUMS AND TRAFFIC CONES

Traffic Drums and 42-inch (1 m) Traffic Cones shall have four six-inch (150 mm) wide stripes (two - white and two - orange) of flexible bright fluorescent sheeting.
The material for the stripes shall be one of the following, or approved equal:

- 3M Scotchlite Diamond Grade Flexible Work Zone Sheeting, Model 3910 for the white stripes and Model 3914 for the orange stripes,

Avery Dennison WR-7100 Series Reboundable Prismatic Sheeting, Model WR-7100 for the white stripes and Model WR-7114 for the orange stripes

NOTICE TO CONTRACTOR – PROTECTION OF EXISTING UTILITIES

Existing utilities shall be maintained during construction except as specifically stated herein and/or noted on the plans and as coordinated with the utilities. The Contractor shall verify the location of underground, structure mounted and overhead utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.
The Contractor shall notify "Call Before You Dig", telephone 1-800-922-4455 for the location of public utility, in accordance with Section 16-345 of the Regulations of the Department of Utility Control.

Representatives of the various utility companies shall be provided access to the work, by the Contractor.

Contractors are cautioned that it is their responsibility to verify locations, conditions, and field dimensions of all existing features, as actual conditions may differ from the information shown on the plans or contained elsewhere in the specifications.

The Contractor shall notify the Engineer prior to the start of work and shall be responsible for all coordination with the Department. The Contractor shall allow the Engineer complete access to the work.

The Contractor shall be liable for all damages or claims received or sustained by any persons, corporations or property in consequence of damage to the existing utilities, their appurtenances, or other facilities caused directly or indirectly by the operations of the Contractor.

Any damage to any existing private and public utility, as a result of the Contractors operations, shall be repaired to the utilities and Engineer's satisfaction at no cost to the State or the Utilities, including all materials, labor, etc., required to complete the repairs.

The Contractor's attention is directed to the requirements of Section 1.07.13 – "Contractor's Responsibilities for Adjacent Property and Services".

Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., water, sanitary, gas, electric ducts, communication ducts, etc., will be

encountered and, if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined by careful probing or hand digging, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation, as noted above.

The following utility operators have facilities within and/or in the vicinity of the project limits. This list is not intended to be exhaustive, and the contractor shall maintain existing utilities subject to this Notice to Contractor.
The Contractor shall notify the utility representatives a minimum of thirty (30) days prior to the start of the construction work.

Sewer & Water:
Mr. Joseph Lnazafame, Director
Department of Public Utilities
City of New London
120 Broad Street
New London, CT 06320
(860) 437-6365
jlanzafame@ci.newlondon.ct.us

Electric:
CL&P dba Eversource Energy – Electric Distribution
Mr. Barry C. Lashley, Misc.
Supervisor Construction Engineering
135 New Road
Madison, CT 06443
(203) 245-5208
barry.lashley@eversource,com

Gas:
Yankee Gas Services Co. dba Eversource Energy – Gas Distribution
Mr. Bret Factora
Manager of Gas Engineering/GIS
47 Eagle Street
Waterbury, CT 06708
(203) 596-3071
Bret.factora@eversource.com

Communication;
Frontier Communications
Mr. Raymond Puzemis
1441 North Colony Road
Meriden, CT 06450
(203) 238-7407
Raymond.puzemis@ftr.com

Lightower Fiber Networks
Mr. Eric Clark
Manger Fiber Construction
1781 Highland Ave.
Cheshire, CT 06410
(203) 649-3904
eclark@lightower.com

Cable TV:
Atlantic Broadband (CT) LLC
Mr. Chap Hanley
VP and General Manger
61 Myrock Ave.
Waterford, CT 06385
(860) 629-6782
chanley@atlanticbb.com

NOTICE TO CONTRACTOR – VERIFICATION OF PLAN DIMENSIONS AND FIELD MEASUREMENTS

The Contractor is responsible for verifying all dimensions before any work is begun. Dimensions of the existing structures shown on the plans are for general reference only; they are not guaranteed. The Contractor shall take all field measurements necessary to assure proper fit of the finished work and shall assume full responsibility for their accuracy. When shop drawings and/or working drawings based on field measurements are submitted for approval and/or review, the field measurements shall also be submitted for reference by the reviewer.

In the field, the Contractor shall examine and verify all existing and given conditions and dimensions with those shown on the plans. If field conditions and dimensions differ from those shown on the plans, the Contractor shall use the field conditions and dimensions and make the appropriate changes to those shown on the plans as approved by the Engineer. All field conditions and dimensions shall be so noted on the drawings submitted for approval.

There shall be no claim made against the City by the Contractor for work pertaining to modifications required by any difference between actual field conditions and those shown by the details and dimensions on the contract plans. The Contractor will be paid at the unit price bid for the actual quantities of materials used or for the work performed, as indicated by the various items in the contract.

NOTICE T CONTRACTOR – AS-BUILT PLANS

A complete set of prints shall be maintained at the site at all times and the Contractor shall be responsible for having clearly, neatly, accurately and promptly recorded thereon, as the work is performed, the as-built record of the contract work. Principal dimensions, elevations and such other data as required shall be recorded for all work.
The marked-up prints will be inspected weekly by the Owner and shall be corrected immediately if found either inaccurate or incomplete.

At the completion of the project, complete as-built maps showing all improvements shall be prepared and Certified Plans shall be on reproducible 3 mil mylar and shall be submitted to the Owner for final inspection and comment. At a minimum, the plans shall show the following:

1. North Arrow.
2. Bench Mark – Indicate elevation, datum used, with exact location and description noted.
3. Location, size and material of all underground utilities including sanitary sewers, drainage, water, electric, telephone, gas transmission mains, shall be shown with depths indicated at intervals of not more than 500’. Location of manholes, catch basins, end walls, wyes, tees, risers, etc. shall be noted.
4. Scale shall be noted.
5. Date construction was completed (month and year only), and date of finished As-Built map shall be indicated.
6. Revisions shall be noted and redated.
7. As-Built pipe grade in percent shall be shown as well as invert elevations at every

structure.

8. The name of the Professional Engineer or Surveyor shall be shown on said plan with the plan sealed by the Professional.
9. Houses or other structure shall be located and noted on the plan along with corresponding house number or lot number, if available.
10. Location, size and depth of all utilities entering homes shall be shown.
11. All drainage outfalls shall be profiled for a distance of not less than 50’ from the outlet structures.

The Contractor shall correct, amplify and do all other work as may be required by the Owner to complete the drawings in a manner satisfactory to the Owner.

This work shall be performed on a continuing basis and shall be included in the general cost of the work. No separate payment will be made for As-Built Drawings. This information will be used by the Municipality and may serve as public information.

NOTICE TO CONTRACTOR – MATERIALS CERTIFICATES AND TESTING

This item shall conform to Sections 1.06 of the Standard Specifications, as amended. The Contractor shall furnish certificates signed and dated by a person in responsible charge of the source of materials furnished that the materials meet the specification requirements contained herein. The Engineer reserves the right to have samples tested independently. If the samples fail to meet the specification requirements, the entire load will be rejected. If the same supplier certifies more than once that a material meets the specification and the samples fail an independent test, then the supplier will be rejected from furnishing any further materials on the project. There will be no separate payment for materials certificates and tests as specified herein.

Materials Certificates:

For pipe, cement, steel reinforcement, and similar materials which are normally tested in the shop by the manufacturer, the Contractor shall furnish the Engineer certified records of physical, chemical, and other pertinent tests, and/or certified statements from the manufacturer that the materials have been manufactured and tested in conformity with the specifications. Where such a small quantity of material is required as to make physical or chemical analyses impractical, a certificate from the manufacturer stating the results of such tests or analyses of similar material which were concurrently produced, may at the discretion of the Engineer, be considered as the basis for the acceptance of such materials.

Materials Testing:

If the Engineer so requires, either prior to beginning or during the progress of the work, the Contractor shall submit samples of materials for such special tests and analyses as may be necessary to demonstrate that they conform to the specifications. The actual costs for such testing shall be the responsibility of the City acting directly or through a duly authorized representative. The Contractor shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing and approval before the materials and equipment are necessary for incorporation in the work. Any delays resulting from his failure so to do shall not be used as a basis of a claim against the City or the Engineer. If the Engineer orders sampling and analyses or tests of materials which are usually accepted on certification of the manufacturer but which appear defective or not conforming to the requirements of the specifications, the City will bear the costs of tests and analyses if the material is found to be sound and conforming to the specifications; if found defective or not conforming to the specifications, the Contractor shall bear all of the costs.

NOTICE TO CONTRACTOR - CODE OF ETHICS

The Contractor shall comply with the provisions contained in Section 1-86e of the Connecticut General Statutes, which provides as follows:

a. No person hired by the State as a Contractor or independent contractor shall:

   1. Use the authority provided to the person under the contract, or any confidential information acquired in the performance of the contract, to obtain financial gain for the person, an employee of the person or a member of the immediate family of any such person or employee;

   2. Accept another state contract which would impair the independent judgment of the person in the performance of the existing contract; or

   3. Accept anything of value based on an understanding that the actions of the person on behalf of the state would be influenced.

b. (b) No person shall give anything of value to a person hired by the state as a Contractor or independent contractor based on an understanding that the actions of the Contractor or independent contractor on behalf of the state would be influenced.

*The following clause is applicable to those contracts with a value of five hundred thousand dollars ($500,000) or more**:***

The Contractor shall comply with the Code of Ethics for Public Officials, Conn. Gen. Stat. §§ 1-79 *et seq.,* and Code of Ethics for Lobbyists, Conn. Gen. Stat. §§1-91 *et seq.,* when and where applicable. Insofar as state contractors are concerned, a summary of the most relevant provisions of the Codes of Ethics is contained in the Summary of State Ethics Laws for Current and Potential State Contractors. The Contractor acknowledges receiving such Summary, which is incorporated herein by reference. The Summary may change from time to time and may be accessed via the Internet at www. ethics.state.ct.us.

The Contractor agrees that the above clause will also be incorporated in all of its contracts with its subcontractors and consultants.

The Contractor agrees that any instance of its violating the Code of Ethics or the Department of Transportation Ethics Policy will be sufficient cause for the Department to terminate any or all of the Contractor's pending contracts with the Department.

In addition, the Contractor hereby acknowledges and agrees to comply with the policies enumerated in "Connecticut Department of Transportation Policy Statement Policy No. F&A-10, Subject: Code of Ethics Policy", dated June 1, 2007, a copy of which is attached hereto and made a part hereof.

CONNECTICUT DEPARTMENT OF TRANSPORTATION

POLICY STATEMENT

POLICY NO. F&A-10
June 1, 2007

SUBJECT: Code of Ethics Policy

The purpose of this policy is to establish and maintain high standards of honesty, integrity, and quality of performance for all employees of the Department of Transportation ("DOT" or "Department"). Individuals in government service have positions of significant trust and responsibility that require them to adhere to the highest ethical standards. Standards that might be acceptable in other public or private organizations are not necessarily acceptable for the DOT.

It is expected that all DOT employees will comply with this policy as well as the Code of Ethics for Public Officials, and strive to avoid even the appearance of impropriety in their relationships with members of the public, other agencies, private vendors, consultants, and contractors. This policy is, as is permitted by law, in some cases stricter than the Code of Ethics for Public Officials. Where that is true, employees are required to comply with the more stringent DOT policy.

The Code of Ethics for Public Officials is State law and governs the conduct of all State employees and public officials regardless of the agency in which they serve. The entire Code, as well as a summary of its provisions, may be found at the Office of State Ethics' web site: www.ct.gov/ethics/site/default.asp. For formal and informal interpretations of the Code of Ethics, DOT employees should contact the Office of State Ethics or the DOT's Ethics Compliance Officer or her designee.

All State agencies are required by law to have an ethics policy statement. Additionally, all State agencies are required by law to have an Ethics Liaison or Ethics Compliance Officer. The DOT, because of the size and scope of its procurement activities, has an Ethics Compliance Officer who is responsible for the Department's: development of ethics policies; coordination of ethics training programs; and monitoring of programs for agency compliance with its ethics policies and the Code of Ethics for Public Officials. At least annually, the Ethics Compliance Officer shall provide ethics training to agency personnel involved in contractor selection, evaluation, and supervision. A DOT employee who has a question or is unsure about the provisions of this policy, or who would like assistance contacting the Office of State Ethics, should contact the Ethics Compliance Officer or her designee.

The DOT Ethics Compliance Officer is:

Denise Rodosevich, Managing Attorney
Office of Legal Services

For questions, contact the Ethics Compliance Officer's Designee:

Alice M. Sexton, Principal Attorney
Office of Legal Services
2800 Berlin Turnpike
Newington, CT 06131-7546
Tel. (860) 594-3045

To contact the Office of State Ethics:

Office of State Ethics
20 Trinity Street, Suite 205
Hartford, CT 06106
Tel. (860) 566-4472
Facs. (860) 566-3806
Web: www.ethics.state.ct.us

Enforcement

The Department expects that all employees will comply with all laws and policies regarding ethical conduct. Violations of the law may subject an employee to sanctions from agencies or authorities outside the DOT. Whether or not another agency or authority imposes such sanctions, the Department retains the independent right to review and respond to any ethics violation or alleged ethics violation by its employees. Violations of this policy or ethics statutes, as construed by the DOT, may result in disciplinary action up to and including dismissal from State service.

Prohibited Activities

1. ***Gifts:*** DOT employees (and in some cases their family members) are prohibited by the Code of Ethics and this Policy from accepting a gift from anyone who is: (1) doing business with, or seeking to do business with, the DOT; (2) directly regulated by the DOT; (3) prequalified as a contractor pursuant to Conn. Gen. Stat. §4a-100 by the Commissioner of the Department of Administrative Services (DAS); or (4) known to be a registered lobbyist or a lobbyist's representative. These four categories of people/entities are referred to as "restricted donors." A list of registered lobbyists can be found on the web site of the Office of State Ethics (www.ct.gov/ethics/site/default.asp). A list of prequalified consultants and contractors, *i.e.,* those seeking to do business with the DOT, can be found on the DOT's Internet site under "Consultant Information" and "Doing Business with ConnDOT," respectively.

   The term "gift" is defined in the Code of Ethics for Public Officials, Conn. Gen. Stat. §1-79(e), and has numerous exceptions. For example, one exception permits the acceptance of food and/or beverages valued up to $50 per calendar year from any one donor and consumed on an occasion or occasions while the person paying or his representative is present. Therefore, such food and/or beverage is not a "gift." Another exception permits the acceptance of items having a value up to ten dollars ($10) provided the aggregate value of all things provided by the donor to the recipient during a calendar year does not exceed fifty dollars ($50). Therefore, such items are not a "gift." Depending on the circumstances, the "donor" may be an individual if the individual is bearing the expense, or a donor may be the individual's employer/group if the individual is passing the expense back to the employer/group he/she represents.

   This policy requires DOT employees to immediately return any gift (as defined in the Code of Ethics) that any person or entity attempts to give to the employee(s). If any such gift or other item of value is received by other than personal delivery from the subject person or entity, the item shall be taken to the Office of Human Resources along with the name and address of the person or entity who gave the item. The Office of Human Resources, along with the recipient of the item of value, will arrange for the donation of the item to a local charity (e.g., Foodshare, local soup kitchens, etc.). The Office of Human Resources will then send a letter to the gift's donor advising the person of the item's donation to charity and requesting that no such gifts be given to DOT employees in the future.

2. ***Contracting for Goods or Services for Personal Use With Department Contractors, Consultants, or Vendors:*** Executive Order 7C provides that: "Appointed officials and state employees in the Executive Branch are prohibited from contracting for goods and services, for personal use, with any person doing business with or seeking business with his or her agency, unless the goods or services are readily available to the general public for the price which the official or state employee paid or would pay."

3. ***Gift Exchanges Between Subordinates and Supervisors/Senior Staff:*** A recent change in the Code of Ethics prohibits exchanges of gifts valued at $100 or more between (*i.e.*, to and from) supervisors and employees under their supervision. The Citizen's Ethics Advisory Board has advised that: (1) the monetary limit imposed by this provision is a per-gift amount; (2) gifts given between supervisors and subordinates (or *vice versa)* in celebration of a "major life event," as defined in the Code of Ethics, need not comply with the $100 limit; and (3) the limitations imposed by this provision apply to a direct supervisor and subordinate *and to any individual up or down the chain of command.* The Citizen's Ethics Advisory Board has also advised that supervisors or subordinates may not pool their money to give a collective or group gift valued at $100 or more, even though each of the individual contributions is less than $100.

4. ***Acceptance of Gifts to the State:*** A recent change to the Code of Ethics for Public Officials modified the definition of the term "gift" to limit the application of the so-called "gift to the State" exception. In general, "gifts to the State" are goods or services given to a State agency for use on State property or to support an event and which facilitate State action or functions. Before accepting any benefit as a "gift to the State," DOT employees should contact the Ethics Compliance Officer.

5. ***Charitable Organizations and Events:*** No DOT employee shall knowingly accept any gift, discount, or other item of monetary value for the benefit of a charitable organization from any person or entity seeking official action from, doing or seeking business with, or conducting activities regulated by, the Department.

6. ***Use of Office/Position for Financial Gain:*** DOT employees shall not use their public office, position, or influence from holding their State office/position, nor any information gained in the course of their State duties, for private financial gain (or the prevention of financial loss) for themselves, any family member, any member of their household, nor any "business with which they are associated." In general, a business with which one is associated includes any entity of which a DOT employee or his/her immediate family member is a director, owner, limited or general partner, beneficiary of a trust, holder of 5 percent or more stock, or an officer (president, treasurer, or executive or senior vice president).

   DOT employees shall not use or distribute State information (except as permitted by the Freedom of Information Act), nor use State time, personnel, equipment, or materials, for other than State business purposes.

7. ***Other Employment:*** DOT employees shall not engage in, nor accept, other employment that will either impair their independence of judgment with regard to their State duties or require or induce them to disclose confidential information gained through their State duties.

   Any DOT employee who engages in or accepts other employment (including as an independent contractor), or has direct ownership in an outside business or sole proprietorship, shall complete an Employment/Outside Business Disclosure Form (see attached) and submit it to the Department's Human Resources Administrator. Disclosure of other employment to the DOT Human Resources Administrator shall *not* constitute approval of the other employment for purposes of the Code of Ethics for Public Officials.

   Inquiries concerning the propriety of a DOT employee's other employment shall be directed to the Office of State Ethics to assure compliance with the Code of Ethics for Public Officials. Employees anticipating accepting other employment as described above should give ample time (at least one month) to the Office of State Ethics to respond to such outside employment inquiries.

No employee of the DOT shall allow any private obligation of employment or enterprise to take precedence over his/her responsibility to the Department.

8. ***Outside Business Interests:*** Any DOT employee who holds, directly or indirectly, a financial interest in any business, firm, or enterprise shall complete an Employment/Outside Business Disclosure Form (see attached) and submit it to the Department's Human Resources Administrator. An indirect financial interest includes situations where a DOT employee's spouse has a financial interest in a business, firm, or enterprise. A financial interest means that the employee or his spouse is an owner, member, partner, or shareholder in a non-publicly traded entity. Disclosure of such outside business interests to the DOT Human Resources Administrator shall *not* constitute approval of the outside business interest under this Policy or the Code of Ethics for Public Officials. DOT employees shall not have a financial interest in any business, firm, or enterprise which will either impair their independence of judgment with regard to their State duties or require or induce them to disclose confidential information gained through their State duties. Inquiries concerning the propriety of a DOT employee's outside business interests shall be directed to the Office of State Ethics to assure compliance with the Code of Ethics for Public Officials.

9. ***Contracts With the State***: DOT employees, their immediate family members, and/or a business with which a DOT employee is associated, may not enter into a contract with the State, other than pursuant to a court appointment, valued at $100 or more unless the contract has been awarded through an open and public process.

10. ***Sanctioning Another Person's Ethics Violation***: No DOT official or employee shall counsel, authorize, or otherwise sanction action that violates any provision of the Code of Ethics.

11. ***Certain Persons Have an Obligation to Report Ethics Violations:*** If the DOT Commissioner, Deputy Commissioner, or "person in charge of State agency procurement" and contracting has reasonable cause to believe that a person has violated the Code of Ethics or any law or regulation concerning ethics in State contracting, he/she *must* report such belief to the Office of State Ethics. All DOT employees are encouraged to disclose waste, fraud, abuse, and corruption about which they become aware to the appropriate authority (see also Policy Statement EX.O.-23 dated March 31, 2004), including, but not limited to, their immediate supervisor or a superior of their immediate supervisor, the DOT Office of Management Services, the Ethics Compliance Officer, the Auditors of Public Accounts, the Office of the Attorney General, or the Office of the Chief State's Attorney.

12. ***Post-State Employment Restrictions:*** In addition to the above-stated policies of the Department, DOT employees are advised that the Code of Ethics for Public Officials bars certain conduct by State employees ***after they leave State service. Upon leaving State service:***

    - ***Confidential Information***: DOT employees must never disclose or use confidential information gained in State service for the financial benefit of any person.

    - ***Prohibited Representation***: DOT employees must *never* represent anyone (other than the State) concerning any "particular matter" in which they participated personally and substantially while in State service and in which the State has a substantial interest.

      DOT employees also must not, for one year after leaving State service, represent anyone other than the State for compensation before the DOT concerning a matter in which the State has a substantial interest. In this context, the term "represent" has been very broadly defined. Therefore, any former DOT employee contemplating post-State employment work that might involve interaction with any bureau of DOT (or any Board or Commission administratively under the DOT) within

their first year after leaving State employment should contact the DOT Ethics Compliance Officer and/or the Office of State Ethics.

- ***Employment With State Vendors:*** DOT employees who participated substantially in, or supervised, the negotiation or award of a State contract valued at $50,000 or more must not accept employment with a party to the contract (other than the State) for a period of one year after resigning from State service, if the resignation occurs within one year after the contract was signed.

13. ***Ethical Considerations Concerning Bidding and State Contracts:*** DOT employees also should be aware of various provisions of Part IV of the Code of Ethics that affect any person or firm who: (1) is, or is seeking to be, prequalified by DAS under Conn. Gen. Stat. §4a-100; (2) is a party to a large State construction or procurement contract, or seeking to enter into such a contract, with a State agency; or (3) is a party to a consultant services contract, or seeking to enter into such a contract, with a State agency. These persons or firms shall not:

    - With the intent to obtain a competitive advantage over other bidders, solicit any information from an employee or official that the contractor knows is not and will not be available to other bidders for a large State construction or procurement contract that the contractor is seeking;

    - Intentionally, willfully, or with reckless disregard for the truth, charge a State agency for work not performed or goods not provided, including submitting meritless change orders in bad faith with the sole intention of increasing the contract price, as well as falsifying invoices or bills or charging unreasonable and unsubstantiated rates for services or goods to a State agency; and

    - Intentionally or willfully violate or attempt to circumvent State competitive bidding and ethics laws.

    Firms or persons that violate the above provisions may be deemed a nonresponsible bidder by the DOT.

    In addition, no person with whom a State agency has contracted to provide consulting services to plan specifications for any contract, and no business with which such person is associated, may serve as a consultant to any person seeking to obtain such contract, serve as a contractor for such contract, or serve as a subcontractor or consultant to the person awarded such contract.

    DOT employees who believe that a contractor or consultant may be in violation of any of these provisions should bring it to the attention of their manager.

Training for DOT Employees

A copy of this policy will be posted throughout the Department, and provided to each employee either in hard copy or by e-mail. As set forth above, State law requires that certain employees involved in contractor/consultant/vendor selection, evaluation, or supervision must undergo annual ethics training coordinated or provided by the Ethics Compliance Officer. If you believe your duties meet these criteria, you should notify your Bureau Chief to facilitate compilation of a training schedule. In addition, the DOT Ethics Compliance Officer can arrange for periodic ethics training provided by the Office of State Ethics. Finally, the Department will make available, on its web site or otherwise, a copy of this policy to all vendors, contractors, and other business entities doing business with the Department.

Important Ethics Reference Materials

It is strongly recommended that every DOT employee read and review the following:

- Code of Ethics for Public Officials, Chapter 10, Part 1, Conn. General Statutes Sections 1-79 through 1-89a found at: www.ct.gov/ethics/site/default.asp
- Ethics Regulations Sections 1-81-14 through 1-81-38, found at: www.ct.gov/ethics/site/default.asp
- The Office of State Ethics web site includes summaries and the full text of formal ethics advisory opinions interpreting the Code of Ethics, as well as summaries of previous enforcement actions: www.ct.gov/ethics/site/default.asp. DOT employees are strongly encouraged to contact the Department's Ethics Compliance Officer or her designee, or the Office of State Ethics with any questions or concerns they may have.

(This Policy Statement supersedes Policy Statement No. F&A-10 dated January 6, 2006)

R. J. Carpenter

Ralph J. Carpenter
COMMISSIONER

Attachment

List 1 and List 3
(Managers and supervisors are requested to distribute a copy of this Policy Statement to all employees under their supervision.)

cc: Office of the Governor, Department of Administrative Services, Office of State Ethics

Emp&discForm 5/07

Department of Transportation
Employment & Outside Business
Disclosure Form

In accordance with Department of Transportation (Department) Policy Statement No. F&A-10, Code of Ethics Policy, I am hereby advising the Department that in addition to my current DOT position, I have other employment and/or a direct or indirect financial interest in an outside business as follows:

1. Full name of outside employer, or entity in which I or my spouse have a financial interest (e.g., ownership or member/partner):

_____

2. Location of Employer/Entity disclosed above: _____

3. Nature of my/my spouse's relationship to employer/entity disclosed above (check at least one):

_____ Employee or Independent Contractor (circle one)
_____ Owner/Member/Partner/etc.
_____ Family Member of Owner/Member/Partner/etc.

4. State agency(ies) with which above employer/entity is doing business or seeking Business (write "N/A" if not applicable): _____

5. Job Title at Outside Employer: _____

6. Job Responsibilities at Outside Employer: _____

_____

_____

7. Current State Title: _____

8. Current State Job Responsibilities: _____

_____

_____

9. Name/Title of Current State Supervisor: _____

I understand that the filing of this Disclosure with the DOT Human Resources Administrator does not relieve me of any obligations I have to comply with the Code of Ethics for Public Officials, and does not constitute approval of my outside employment and/or financial interests under the Code of Ethics for Public Officials. *Employees engaging in outside employment are strongly urged to seek written approval of their outside employment from the Office of State Ethics, 20 Trinity Street, Hartford, CT 06106.* I also understand that if either my State or outside employment/financial interest changes in location or function I am required to notify the Department immediately.

Signed: _____ Date: _____
Printed Name: _____

NOTICE TO CONTRACTOR – SUPERPAVE DESIGN LEVEL INFORMATION

Hot-Mix Asphalt (HMA) constructed according to the Superpave mix-design system is required to attain a Superpave Design Level and is required to use a Performance Graded (PG) binder. The Superpave Design Levels required for this project are listed in Table 1. The required PG binder is indicated for each mix with an "X" in the appropriate box in Table 1.

TABLE 1 – Superpave Design Level and Performance Graded (PG) Binder

This Project will require the following Superpave Design Level(s):				
Mix Designation	**PG Binder**	**Eugene O'Neill/Green**	**Route _____**	**Route _____ _____**
	PG64-22	**Design Level**	**Design Level**	**Design Level**
HMA S0.25	-	2	-	-
HMA S0.375	-	2	-	-
HMA S0.5	-	2	-	-
HMA S1	-	2	-	-

NOTICE TO CONTRACTOR - SECTION 4.06 AND M.04 MIX DESIGNATION EQUIVALENCY

Sections 4.06 and M.04 have been replaced in their entirety with the Special Provisions included as part of this contract. These Special Provisions reflect changes in mix designations for various types of hot-mix asphalt (HMA). The following table is to be used to associate mix designations noted on the plans with that in the contract specifications and related documents. Mix designations on each row are equivalent and refer to a single mix, which shall be subject to the requirements of the Special Provisions replacing Sections 4.06 and M.04.

Mix Designation Equivalency Table

(a) Official Mix Designation	Equivalent Mix Designation (a)	Equivalent Mix Designation (b)
(c)	Superpave 1.5 inch	Superpave 37.5 mm
HMA S1	Superpave 1.0 inch	Superpave 25.0 mm
HMA S0.5	Superpave 0.5 inch	Superpave 12.5 mm
HMA S0.375	Superpave 0.375 inch	Superpave 9.5 mm
HMA S0.25	Superpave 0.25 inch	Superpave 6.25 mm
(d)	Superpave #4	Superpave #4
Bituminous Concrete Class 1 **Bituminous Concrete Class 2** **Bituminous Concrete Class 3** **Bituminous Concrete Class 4** **Bituminous Concrete Class 12**	N/A* N/A* N/A* N/A* N/A*	N/A* N/A* N/A* N/A* N/A*

This mix designation is generally included with projects where the English measurement system is used. The mix designation may contain both the English measurement system designation and the SI (metric) measurement system designation, one of which would be in parenthesis.

(b) This mix designation is generally included with projects where the SI (metric) measurement system is used. The mix designation may contain both the English measurement system designation and the SI measurement system designation, one of which would be in parenthesis.

(c) This mix is no longer in use except by contract-specific Special Provision; if this mix is called for in the Plans but no such Special Provision is included for this contract a suitable substitute must be approved by the Engineer.

(d) This mix is no longer in use except by contract-specific Special Provision; if this mix is called for in the Plans but no such Special Provision is included for this contract a suitable substitute must be approved by the Engineer.

***** N/A = Not applicable; mix designation has not changed.

NOTICE TO CONTRACTOR - REQUIREMENTS OF TITLE 49, CODE OF FEDERAL REGULATIONS PART 26

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

NOTICE TO CONTRACTOR - BIDRIGGING AND/OR FRAUDS

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or frauds.

A toll-free "HOT LINE" telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or frauds either past or current. The "HOT LINE" telephone number will be manned during normal working hours (8 A.M. -5 P.M. EST.), and information will be treated confidentially and anonymity respected.

REQUIREMENTS OF TITLE 49, CODE OF FEDERAL REGULATIONS PART 23

"Policy. -It is the policy of the Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 23 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal or State funds under this agreement. Consequently the D.B.E. requirements of 49 CFR Part 23 apply to this agreement."

"D.B.E. OBLIGATION .--The State or its contractor agrees to ensure that disadvantaged business enterprises as defined in 49 CFR Part 23 have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard, the State and its contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 23 to ensure that minority business enterprises have the maximum opportunity to compete for and perform contracts. Recipients and their contractors shall not discriminate on the basis of race, color, national origin or sex in the
award and performance of Department of Transportation assisted contracts."

PROMPT PAYMENT TO SUBCONTRACTORS

Your attention is called to the serious problem of delayed payments to subcontractors for work completed and for which payment has been made by the Connecticut Department of

Transportation to the general contractor or consultant.
Section 49-41a and Section 49-41c of the Connecticut General Statutes require general contractors to pay their subcontractors within thirty (30) days of having received payment by the State for work performed or materials furnished by such subcontractor. In turn, subcontractors have thirty (30) days upon receiving payment from the general contractor to pay their subcontractors.

Therefore, it is vital that prompt payments be made in accordance with the spirit and intent of the law.

Schedule 1

SPECIAL PROVISIONS
DISADVANTAGED BUSINESS ENTERPRISES
FOR FEDERAL FUNDED PROJECTS
(For Municipal Advertised and Awarded Projects Only) Revised –
February 26, 2009

NOTE: Certain of the requirements and procedures stated in this special provision are applicable prior to the execution of the Contract document.

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

A. "CDOT" means the Connecticut Department of Transportation.

B. "DOT" means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration ("FHWA), the Federal Transit Administration ("PTA"), and the Federal Aviation Administration ("FAA").

C. "Broker" means a party acting as an agent for others in negotiating contracts, agreements, purchases, sales, etc., in return for a fee or commission.

D. "Contract," "agreement" or "subcontract" means a legally binding relationship obligating a seller to furnish supplies or services (including, but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision a lease for equipment or products is also considered to be a Contract.

E. "Contractor," means a consultant, second party or any other entity doing business with CDOT or, as the context may require, with another Contractor.

F. "Disadvantaged Business Enterprise" ("DBE") means a small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock of which is owned by one or more such individuals; and

2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

G. "DOT-assisted Contract" means any Contract between a recipient and a Contractor (at any tier) funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees.

H. "Good Faith Efforts" means efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement. Refer to Appendix A of 49 Code of Federal Regulation ("CFR")' Part 26 -"Guidance Concerning Good Faith Efforts," a copy

of which is attached to this provision, for guidance as to what constitutes good faith efforts.

I. "Small Business Concern" means, with respect to firms seeking to participate as DBEs in DOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration ("SBA") regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts specified in 49 CFR Part 26, Section 26.65(b).

J. "Socially and Economically Disadvantaged Individuals" means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is

1 Any individual who CDOT finds on a case-by-case basis to be a socially and economically disadvantaged individual.

2 Any individuals in the following groups, members of which are reputably presumed to be socially and economically disadvantaged:

i. "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;

ii. "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

iii. "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

iv. "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

v. "Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

vi. Women;

vi. Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

II GENERAL REQUIREMENTS

A. The Contractor, sub-recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall

catty out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted Contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy, as the DOT deems appropriate.

B. The Contractor shall cooperate with the Municipality, CDOT and DOT in implementing the requirements concerning DBE utilization on this Contract in accordance with Title 49 of the Code of Federal Regulations, Part 26 entitled "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs" ("49 CFR Part 26"), as revised. The Contractor shall also cooperate with the Municipality, CDOT and DOT in reviewing the Contractor's activities relating to this Special Provision. This Special Provision is in addition to all other equal opportunity employment requirements of this Contract

C. The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contact, the name of the liaison officer shall be furnished in writing to the Municipality.

D. For the purpose of this Special Provision, DBEs to be used to satisfy the DBE goal must be certified by CDOT's Division of Contract Compliance for the type(s) of work they will perform.

E. If the Contractor allows work designated for DBE participation required under the terms of this Contract and required under III-B to be performed by other than the named DBE organization without concurrence from the Municipality, the Municipality will not pay the Contractor for the value of the work performed by organizations other than the designated DBE.

F. At the completion of all Contract work, the Contractor shall submit a final report to the Municipality, indicating the work done by, and the dollars paid to DBEs. If the Contractor does not achieve the specified Contract goals for DBE participation, the Contractor shall also submit written documentation to the Municipality, detailing its good faith efforts to satisfy the goal that were made during the performance of the Contract. Documentation is to include but not be limited to the following:

    1 A detailed statement of the efforts made to select additional subcontracting opportunities to be performed by DBEs in order to increase the likelihood of achieving the stated goal.

    2 A detailed statement, including documentation of the efforts made to contact and solicit bids/proposals with CDOT certified DBEs, including the names, addresses, dates and telephone numbers of each DBE contacted, and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and nature of response from firms contacted.

    3 Provide a detailed statement for each DBE that submitted a subcontract proposal,

which the Contractor considered not to be acceptable stating the reasons for this conclusion.

4 Provide documents to support contacts made with CDOT requesting assistance in satisfying the Contact specified goal.

5 Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal.

G. Failure of the Contractor at the completion of all Contract work to have at least the specified percentage of this Contract performed by DBEs as required in III-B will result in the reduction in Contract payments to the Contractor by an amount determined by multiplying the total Contract value by the specified percentage required in III-B and subtracting from that result, the dollar payments for the work actually performed by DBEs. However, in instances where the Contractor can adequately document or substantiate its good faith efforts made to meet the specified percentage to the satisfaction of the Municipality, no reduction in payments will be imposed.

H. All records must be retained for a period of three (3) years following acceptance by the Municipality of the Contact and shall be available at reasonable times and places for inspection by authorized representatives of the Municipality, CDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audits findings involving the records are resolved.

I. Nothing contained herein, is intended to relieve any Contractor or subcontractor or material supplier or manufacturer from compliance with all applicable Federal and State legislation or provisions concerning equal employment opportunity, affirmative action, nondiscrimination and related subjects during the term of this Contract

III. SPECIFIC REQUIREMENTS:

In order to increase the participation of DBEs, the Municipality requires the following

A. The Contractor shall assure that certified DBEs will have an opportunity to compete for subcontract work on this Contract, particularly by arranging solicitations and time for the preparation of proposals for services to be provided so as to facilitate the participation of DBEs regardless if a Contract goal is specified or not.

B. The DBE contact goal percentage for the Project is10% (Construction) and 0% (Construction Inspection). The goal shall be based upon the total contract value. Compliance with this provision may be fulfilled when a DBE or any combination of DBEs perform work under Contract in accordance with 49 CFR Part 26, Subpart C, Section 26.55, as revised. Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the prime Contractor or its affiliate cannot be counted toward the goal.

If the Contractor does not document commitments, by subcontracting and/or procurement of material and/or services that at least equal the goal, it must document the good faith efforts that outline the steps it took to meet the goal in accordance with VII.

C. Within 7 days after the bid opening, the low bidder shall indicate in writing to the Municipality, on the forms provided, the DBE(s) it will use to achieve the goal indicated in III-B. The submission shall include the name and address of each DBE that will participate in this Contact, a description of the work each will perform, the dollar amount of participation, and the percentage this is of the bid amount. This information shall be signed by the named DBE and the low bidder. The named DBE shall be from a list of certified DBEs available from CDOT. In addition, the named DBE(s) shall be certified to perform the type of work they will be contracted to do.

D. The prime Contractor shall submit to the Municipality all requests for subcontractor approvals on the standard forms provided by the Municipality.
If the request for approval is for a DBE subcontractor for the purpose of meeting the Contract DBE goal, a copy of the legal Contract between the prime and the DBE subcontractor must be submitted along with the request for subcontractor approval. Any subsequent amendments or modifications of the Contract between the prime and the DBE subcontractor must also be submitted to the Municipality with an explanation of the change(s). The Contract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties.

In addition, the following documents are to be attached:

1 An explanation indicating who will purchase material.

2 A statement explaining any method or arrangement for renting equipment. If rental is from a prime, a copy of the rental Agreement must be submitted.

3 A statement addressing any special arrangements for manpower.

E. The Contractor is required, should there be a change in a DBE they submitted in III-C, to submit documentation to the Municipality which will substantiate and justify the change, (i.e., documentation to provide a basis for the change for review and approval by the Municipality) prior to the implementation of the change. The Contractor must demonstrate that the originally named DBE is unable to perform in conformity to the scope of service or is unwilling to perform, or is in default of its Contract, or is overextended on other jobs. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.** Documentation shall include a letter of release from the originally named DBE indicating the reason(s) for the release.

F. Contractors subcontracting with DBEs to perform work or services as required by this Special Provision shall not terminate such firms without advising the Municipality in writing, and providing adequate documentation to substantiate the reasons for termination if the DBE has not started or completed the work or the services for which it has been

contracted to perform.

G. When a DBE is unable or unwilling to perform or is terminated for just cause the Contractor shall make good faith efforts to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the goal required by III-B.

H. In instances where an alternate DBE is proposed, a revised submission to the Municipality together with the documentation required in III-C, III-D, and III-E, must be made for its review and approval.

I. Each quarter after execution of the Contact, the Contractor shall submit a report to the Municipality indicating the work done by, and the dollars paid to the DBE for the current quarter and to date.

J. Each contract that the Municipality signs with a contractor and each subcontract the Contractor signs with a subcontractor must include the following assurance: The contractor, sub-recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49CFR part 26 in the award and administration of DOT-assisted contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

IV. MATERIAL SUPPLIERS OR MANUFACTURERS

A. If the Contractor elects to utilize a DBE supplier or manufacturer to satisfy a portion or all of the specified DBE goal, the Contractor must provide the Municipality with:

1. An executed "Connecticut Department of Transportation DBE Supplier/Manufacturer Affidavit" (sample attached), and

2. Substantiation of payments made to the supplier or manufacturer for materials used on the project.

B. Credit for DBE suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from a regular DBE dealer. A regular dealer is a firm that owns, operates, or maintains a store, warehouse or other establishment in which the materials or supplies required for the performance of the Contact are bought, kept in stock and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the firm must engage in, as its principal business, and in its own name, the purchase and sale of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone and petroleum products, need not keep such products in stock if it owns or operates distribution equipment Brokers and packagers shall not be regarded as material suppliers or manufacturers.

C. Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces

on the premises the materials or supplies obtained by the Municipality, Department of Transportation or Contractor.

V. NON-MANUFACTURING OR NON-SUPPLIER DBE CREDIT:

A. Contactors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

1. Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the performance of the Contact provided that the fee or commission is determined by the Municipality to be reasonable and consistent with fees customarily allowed for similar services.

2. The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is a DBE but is not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fees are determined by the Municipality to be reasonable and not excessive as compared with fees customarily allowed for similar services.

3. The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by the Municipality to be reasonable and not excessive as compared with fees customarily allowed for simi1ar services.

VI. BROKERING

A. Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.

B. DBEs involved in the brokering of subcontract work that they were approved to perform may be decertified.

C. Firms involved in the brokering of work whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. Department of Transportation's Office of the Inspector General for prosecution under Title 18, U.S. Code, Section 10.20.

VII. REVIEW OF PRE-AWARD GOOD FAITH EFFORTS

A. If the Contractor does not document commitments by subcontracting and/or procurement of material and/or services that at least equal the goal stipulated in III-B, the Contractor must document the good faith efforts that outline the specific steps it took to meet the goal. The Contract will be awarded to the Contractor if its good faith efforts are deemed satisfactory and approved by CDOT. To obtain such an exception, the Contractor must

submit an application to the Municipality, which documents the specific good faith efforts that were made to meet the DEE goal. **Application form for Review of Pre-Award Good Faith Efforts is attached hereto.**

The application must include the following documentation:

1. a statement setting forth in detail which parts, if any, of the Contract were reserved by the Contractor and not available for subcontracting;

2. a statement setting forth all parts of the Contract that are likely to be sublet;

3. a statement setting forth in detail the efforts made to select subcontracting work in order to likely achieve the staled goal;

4. copies of all letters sent to DBEs;

5. a statement listing the dates and DBEs that were contacted by telephone and the result of each contact;

6. a statement listing the dates and DBEs that were contacted by means other than telephone and the result of each contact;

7. copies of letters received from DBEs in which they declined to bid;

8. a statement setting forth the facts with respect to each DBE bid received and the reason(s} any such bid was declined;

9. a statement setting forth the dates that calls were made to CDOT's Division of Contract Compliance seeking DBE referrals and the result of each such call; and

10. any information of a similar nature relevant to the application.

The review of the Contractor's good faith efforts may require an extension of time for award of the Contract. In such a circumstance, and in the absence of other reasons not to grant the extension or make the award, the Municipality will agree to the needed extension(s) of time for the award of the Contract, provided the Contractor and the surety also agree to such extension(s).

B. Upon receipt of the submission of an application for review of pre-award good faith efforts, the Municipality shall submit the documentation to CDOT initiating unit for submission to the CDOT Division of Contract Compliance. CDOT Division of Contract Compliance will review the documents and determine if the package is complete, accurate and adequately documents the Contractor's good faith efforts. Within fourteen (14) days of receipt of the documentation the CDOT Division of Contract Compliance shall notify the Contractor by certified mail of the approval or denial of its good faith efforts.

C. If the Contractor's application is denied, the Contractor shah have seven (7) days upon receipt of written notification of denial to request administrative reconsideration. The Contractor's request for administrative reconsideration should be sent in writing to the Municipality. The Municipality will forward the Contractor's reconsideration request to the CDOT initiating unit for submission to the DBE Screening Committee. The DBE Screening Committee will schedule a meeting within fourteen (14) days from receipt of the Contractors request for administrative reconsideration and advise the Contractor of the date, time and location of the meeting. At this meeting the Contractor will be provided with the opportunity to present written documentation and/or argument concerning the issue of whether it made adequate good faith efforts to meet the goal. Within seven (7) days following the reconsideration meeting, the chairperson of the DBE Screening Committee will send the contractor via certified mail a written decision on its reconsideration request, explaining the basis of finding either for or against the request. The DBE Screening Committee's decision is final. **If the reconsideration is denied, the Contractor shall indicate in writing to the Municipality within fourteen (14) days of receipt of written notification of denial, the DBEs it will use to achieve the goal indicated in III-B.**

D. Approval of pre-execution good faith efforts does not relieve the Contractor from its obligation to make additional good faith efforts to achieve the DBE goal should contracting opportunities arise during actual performance of the Contract work.

APPENDIX A TO 49 CFR PART 26 GUIDANCE CONCERNING GOOD FAITH EFFORTS

I. When, as a recipient, you establish a Contract goal on a DOT-assisted Contract, a Bidder/Contractor must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The Bidder/Contractor can meet this requirement in either of two ways. First, the Bidder/Contractor can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the Bidder/Contractor can document adequate good faith efforts. This means that the Bidder/Contractor must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.

II. In any situation in which you have established a Contract goal, Part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a Bidder/Contractor that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the Bidder/Contractor has made. The efforts employed by the Bidder/Contractor should be those that one could reasonably expect a Bidder/Contractor to take if the Bidder/Contractor were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE Contract goal. Mere pro forma efforts are not good faith efforts to meet the DBE Contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.

III. The Department also strongly cautions you against requiring that a Bidder/Contractor meet a Contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a Contract, even though the Bidder/Contractor makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring bona fide good faith efforts.

IV. The following is a list of types of actions which you should consider as part of the Bidder/Contractor's good faith efforts to obtain DBE participation. it is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the Contract. The Bidder/Contractor must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The Bidder/Contractor must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out Contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform

these work items with its own forces.

C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the Contract in a timely manner to assist them in responding to a solicitation.

D. (1) Negotiating in good faith with interested DBEs. It is the Bidder/Contractor's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A Bidder/Contractor using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as Contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a Bidder/Contractor's failure to meet the Contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime Contractor to perform the work of a Contract with its own organization does not relieve the Bidder/Contractor of the responsibility to make good faith efforts. Prime Contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The Contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids/proposals in the Contractor's efforts to meet the project goal.

F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

H. Effectively using the services of available minority/women community organizations; minority/women Contractors' groups local, state, and Federal minority/women business assistance offices; arid other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

V. In determining whether a Bidder/Contractor has made good faith efforts, you may take into account the performance of other Bidder/Contractors in meeting the Contract For example, when the apparent successful Bidder/Contractor fails to meet the Contract goal, but others

meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful Bidder/Contractor could have met the goal. If the apparent successful Bidder/Contractor fails to meet the goal, but meets or exceeds the average DBE participation obtained by other Bidder/Contractors, you may view this, in conjunction with other factors, as evidence of the apparent successful Bidder/Contractor having made good faith efforts.

CONNECTICUT DEPARTMENT OF TRANSPORTATION DBE SUPPLIER/MANUFACTURER AFFIDAVIT

This affidavit must be completed by the State Contractor's DBE notarized and attached to the Contractor's request to utilize a DBE supplier a manufacturer as a credit towards its DBE Contract requirements: failure to do so will result in not receiving credit towards the Contract DBE requirement.

State Project No. _____

Federal Aid Project No._____

Description of Project _____

I, _____ , acting in behalf
(Name of person signing)

of_____
(DBE person, firm, association or organization)
of which I am the_____ certify and affirm that
(Title of Person)

_____
(DBE person, firm, association or organization)
is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that _____ will assume the actual
(DBE person, firm, association or organization)
(DBE person, firm, association or organization)
contractual responsibility for the provision of the materials and/or supplies sought by

_____.
(State Contractor) If a manufacturer, I produce goods from raw materials or substantially alter them before resale, or if a supplier, I perform a commercially use function in the supply process.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

_____
(Name of Organization or Firm)

_____
(Signature & Title of Official making the Affidavit)

Subscribed and sworn to before me, this _____day of_____20 ____.

Notary Public (Commissioner of the Superior Court)
My Commission Expires

CERTIFICATE OF CORPORATION

I,_____, certify that I am the _____ (Official) of the Organization named in the foregoing instrument; that I have been duly authorized to affix the seal of the Organization to such papers as require the seal; that _____, who signed said instrument on behalf of the Organization, was then _____ of said Organization; that said instrument was duly signed for and in behalf of said Organization by authority of its governing body and is within the scope of its organizational powers.

_____ _____

(Signature of Person Certifying) (Date)

SECTION 1.02 – PROPOSAL REQUIREMENTS AND CONDITIONS

Article 1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:

Replace the third sentence of the last paragraph with:

The City cannot ensure a response to inquiries received later than seven (7) days prior to the original scheduled opening of the related bid. Information and inquiries concerning such matters, and any other information or inquiry concerning the conditions of bidding or award or the interpretation of contract documents, must be transmitted in writing to: Mr. Bill Camosci, City of New London – Public Works Stanton building, 111 Union Street, New London, CT 06320.

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

Article 1.03.02 - Award and Execution of Contract:

After the second sentence of the only paragraph add the following:

The successful bidder is hereby notified of the Department's intent to award this contract within 14 days of the bid opening.

Article 1.03.08 - Notice to Proceed and Commencement of Work:

Change the first paragraph to read as follows:

The Contractor shall commence and proceed with the Contract work on the date specified in a written Notice to Proceed issued by the Engineer to the Contractor. The date specified will be no later than 14 calendar days after the date of the execution of the Contract by the Department, however, the contractor is hereby put on notice that it is the Department's intent to issue the Notice to Proceed no later than 14 calendar days after the date of the execution of the Contract by the Department.

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.05 - Load Restrictions:

Delete all three paragraphs and replace them with the following:

"(a) Vehicle Weights: This sub article will apply to travel both on existing pavements and pavements under construction. The Contractor shall comply with all legal load restrictions as to vehicle size, the gross weight of vehicles, and the axle weight of vehicles while hauling materials. Throughout the duration of the contract, the Contractor shall take precautions to ensure existing and newly installed roadway structures and appurtenances are not damaged by construction vehicles or operations.

Unless otherwise noted in contract specifications or plans, on and off road equipment of the Contractor, either loaded or unloaded, will not be allowed to travel across any bridge or on any highway when such a vehicle exceeds the statutory limit or posted limit of such bridge or highway. Should such movement of equipment become necessary the Contractor shall apply for a permit from the Department for such travel, as provided in the Connecticut General Statutes (CGS). The movement of any such vehicles within the project limits or detour routes shall be submitted to the Engineer for project record. Such permit or submittal will not excuse the Contractor from liability for damage to the highway caused by its equipment.

The Contractor is subject to fines, assessments and other penalties that may be levied as a result of violations by its employees or agents of the legal restrictions as to vehicle size and weight.

(b) Storage of Construction Materials/Equipment on Structures: Storage is determined to be non-operating equipment or material. The Contractor shall not exceed the statutory limit or posted limit for either an existing or new structure when storing materials and/or construction equipment. When a structure is not posted, then the maximum weight of equipment or material stored in each 12 foot wide travel lane of any given span shall be limited to 750 pounds per linear foot combined with a 20,000 pound concentrated load located anywhere within the subject lane. If anticipated storage of equipment or material exceeds the above provision, then the Contractor shall submit his proposal of storage supported by calculations stamped by a Professional Engineer registered in the State of Connecticut, to the Engineer for approval 14 days prior to the storage operation. Operations related to structural steel demolition or erection shall follow the guidelines under Section 6.03. All other submittals shall include a detailed description of the material/equipment to be stored, the quantity of storage if it is stockpiled materials, the storage location, gross weight with supporting calculations if applicable, anticipated duration of storage, and any environmental safety, or traffic protection that may be required. Storage location on the structure shall be clearly defined in the field. If structures are in a state of staged construction or demolition, additional structural analysis may be required prior to authorization of storage."

Delete Article 1.07.07 in its entirety and replace it with the following:

1.07.07—Safety and Public Convenience: The Contractor shall conduct the Project work at all times in such a manner as to ensure the least possible obstruction to traffic. In a manner acceptable to the Engineer, the Contractor shall provide for the convenience and interests of the general public; the traveling public; parties residing along or adjacent to the highway or Project

Site; and parties owning, occupying or using property adjacent to the Project Site, such as commuters, workers, tenants, lessors and operating agencies.

Notwithstanding any other Contract provision, the Contractor shall not close to normal pedestrian or vehicular traffic any section of road, access drive, parking lot, sidewalk, station platform, railroad track, bus stop, runway, taxiway, occupied space within a Site, or occupied space within a building, except with the written permission of the Engineer.

All equipment, materials, equipment or material storage areas, and work areas must be placed, located, and used in ways that do not create a hazard to people or property, especially in areas open to public pedestrian or vehicular traffic. All equipment and materials shall be placed or stored in such a way and in such locations as will not create a hazard to the traveling public or reduce sight lines. In an area unprotected by barriers or other means, equipment and materials must not be stored within 30 feet of any traveled way.

The Contractor must always erect barriers and warning signs between any of its work or storage areas and any area open to public, pedestrian, or vehicular traffic. Such barriers and signs must comply with all laws and regulations, including any applicable codes.

The Contractor must arrange for temporary lighting, snow and ice removal, security against vandalism and theft, and protection against excessive precipitation runoff within its Project work and storage areas, and within other areas specifically designated in the Contract.

In addition to meeting the requirements of Section 9.71, the Contractor shall take all precautions necessary and reasonable for the protection of all persons, including, but not limited to, employees of the Contractor or the Department, and for the protection of property, until the Engineer notifies the Contractor in writing that the Project or the pertinent portion of the Project has been completed to the Engineer's satisfaction.

The Contractor shall comply with the safety provisions of applicable laws, including building and construction codes and the latest edition of the CFR. The Contractor must make available for reference in its field office, throughout the duration of the Project, a copy of the latest edition and all supplements of the CFR pertaining to OSHA.

The Contractor shall make available to the Contractor's employees, subcontractors, the Engineer, and the public, all information pursuant to OSHA 29 CFR Part 1926.59 and The Hazard Communication Standard 29 CFR 1910.1200, and shall also maintain a file on each job site containing all MSDS for products in use at the Project. These MSDS shall be made available to the Engineer upon request.

The Contractor shall observe all rules and regulations of the Federal, State, and local health officials. Attention is directed to Federal, State, and local laws, rules, and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to the worker's health or safety.

Safety Plan: Before starting work on the Project, the Contractor shall submit to the Engineer a written Safety and Health Plan (hereinafter referred to as the "Plan"). The Plan shall meet or exceed the minimum requirements of this Subsection and any applicable State or Federal regulations.

The Plan shall apply to any work under the Contract whether such work is performed, by way of example and not limitation, by the Contractor's forces, subcontractors, suppliers, or fabricators.

The Plan shall be prepared by the Contractor and submitted to the Engineer for review before the actual start of work on the Project. Within ten (10) calendar days of receipt, the Engineer will determine whether or not the Plan meets the requirements of this Specification. If the Plan does not meet the requirements of this Specification, it will be returned for revision. Work on the Project may not proceed until the Engineer has accepted the Plan. Nothing herein shall be construed, however, to relieve the Contractor from responsibility for the prosecution of the Project.

The Plan shall conform to the following general format:

1. **General Introduction**.
   - **a. Description.** The general introduction of the Plan shall include a statement by the Contractor describing its commitment to maintain a safe work environment for its employees, Department representatives, and the public. Implementation procedures and company policies relative to safety shall be summarized or referenced in the Plan.
     - i. The Plan shall include the names, addresses, and telephone numbers of the Contractor's Project Manager, Project superintendent and/or its designee for safety oversight, all competent persons, and the traffic control coordinator. Any changes to the safety management and oversight for the Project shall be promptly communicated to all concerned.
     - ii. The Plan shall provide guidelines for protecting all personnel from hazards associated with Project operations and activities.
     - iii. The Plan shall establish the policies and procedures that are necessary for the Project to be in compliance with the requirements of OSHA and other State and Federal regulatory agencies with jurisdiction, rules, regulations, standards, or guidelines in effect at the time the work is in progress.
   - **b. Responsibility, Identification of Personnel, and Certifications.** The Contractor is solely responsible for creating, implementing, and monitoring the Plan.
     - i. The Contractor shall identify and designate on-site supervisory level personnel who shall be responsible for implementing and monitoring the Plan at all times throughout the duration of the Project and shall have authority to take prompt corrective measures to eliminate hazards including the ability to stop work activities.
     - ii. Documentation of training provided to the on-site supervisory level personnel shall be included as part of the Plan.
     - iii. For any work activities wherein the Contractor has identified a competent person as defined by OSHA, that person shall be capable of identifying existing and

predictable hazards and have the authority to take prompt corrective measures to eliminate the hazards, including the ability to stop work activities.

iv. Documentation of the qualifications of such competent persons identified, including any certifications received, shall be included as part of the Plan.

v. The Contractor shall further identify the qualified safety professional responsible for developing the Plan and shall provide that person's qualifications for developing the Plan which shall include, but not be limited to, education, training, certifications, and experience in developing this type of Plan.

vi. The Plan shall contain a certification executed by the qualified safety professional that developed the Plan, stating that the Plan complies with OSHA and other applicable State and Federal regulatory agencies with jurisdiction, rules, regulations, standards, or guidelines in effect at the time the work is in progress.

2. **Elements of the Plan.** The Plan shall address, but not be limited to, the following elements:

a. Management Safety Policy and Implementation Statement.

i. The Plan shall describe in detail the means by which the Contractor shall implement and monitor the Plan. Implementation and monitoring shall also mean that the Plan shall be a document with provision for change to update the Plan with new information on a yearly basis at a minimum and shall include new practices or procedures, changing site and environmental conditions, or other situations that could adversely affect site personnel. The Plan shall provide guidelines for protecting all personnel from hazards associated with Project operations and activities.

b. Emergency Telephone Numbers.

c. Personnel Responsibilities.

i. Management responsibilities
ii. Responsibilities of Supervisor(s)
iii. Site safety officer(s) responsibilities
iv. Employee responsibilities
v. Competent person(s) as defined by OSHA responsibilities

d. Training.

i. Regulatory
ii. Documentation
iii. Site hazard assessment -Daily employee awareness of site operations

e. Safety Rules.

i. General safety rules
ii. Personal protective equipment
iii. Housekeeping

f. Safety Checklists.

i. Project safety-planning checklist
ii. Emergency plans and procedures checklist
iii. Documentation checklist
iv. Protective materials and equipment checklist

g. Traffic Control Coordinator Inspections.

i. Responsible person

ii. Frequency
iii. Documentation of actions taken

h. Record Keeping.

i. OSHA 200 log

i. Reporting.

i. Accident(s)
ii. On site
iii. Legal notice requirement
iv. Public liability
v. Property damage
vi. Department of Labor
vii. Hazard Communications

j. Additional Procedures for Project Specific Situations as Applicable.

i. Compressed gas cylinders
ii. Confined spaces
iii. Cranes
iv. Crystalline silica (stone, masonry, concrete, and brick dust)
v. Electrical
vi. Equipment operators
vii. Fall protection
viii. Hand and power tools
ix. Hearing conservation
x. Highway safety
xi. Lead health and safety plan
xii. Lock out/tag out
xiii. Materials handling, storage, use, and disposal
xiv. Areas of environmental concern
xv. Night work
xvi. Personal protective equipment
xvii. Project entry and exit
xviii. Respiratory protection
xix. Sanitation
xx. Signs, signals, and barricades
xxi. Subcontractors
xxii. Trenching

3. **Appendix for Environmental Health and Safety Plan (HASP).** If environmental hazards are identified in the Contract, an Environmental HASP shall be included in an appendix to the Plan, or in a separate document. References to any Environmental HASP shall be included within the Plan, where appropriate.

The Plan shall be kept on the site and shall apply and be available to all workers and all other authorized persons entering the work site. Copies of all updates to the Plan shall be promptly supplied to the Engineer.

If at any time during the Project the Engineer determines that the Contractor is not complying with the requirements of this provision or the updated Plan, the Contractor shall correct such deficiencies immediately. Failure to remediate such deficiencies may result in suspension of the Contractor's operations until the deficiencies have been corrected. Suspensions ordered due to safety deficiencies will not be considered compensable or excusable delays.

The Contractor is responsible for implementation of the Plan. Pursuant to Article 1.07.10, the Contractor shall indemnify, and save harmless the State from any and all liability related to the Plan in proportion to the extent that the Contractor is held liable for same by an arbiter of competent jurisdiction.

The Contractor shall allow onto the Project site any inspector of OSHA or other legally responsible agency involved in safety and health administration upon presentation of proper credentials, without delay and without the presentation of an inspection warrant.

Article 1.07.10 – Contractor's Duty to Indemnify the City of New London against Claims for Injury or Damage:

Add the following after the only paragraph:

"It is further understood and agreed by the parties hereto, that the Contractor shall not use the defense of Sovereign Immunity in the adjustment of claims or in the defense of any suit, including any suit between the State or City of New London and the Contractor, unless requested to do so by the State or the City of New London."

Article 1.07.13 -Contractor's Responsibility for Adjacent Property and Services is supplemented as follows:
The following companies and representatives shall be contacted by the Contractor to coordinate the protection of their utilities on this project 30 days prior to the start of any work on this project involving their utilities:

Sewer & Water:
Mr. Joseph Lnazafame, Director
Department of Public Utilities
City of New London
120 Broad Street
New London, CT 06320
(860) 437-6365
jlanzafame@ci.newlondon.ct.us

Electric:
CL&P dba Eversource Energy – Electric Distribution
Mr. Barry C. Lashley, Misc.
Supervisor Construction Engineering
135 New Road
Madison, CT 06443
(203) 245-5208
barry.lashley@eversource,com

Gas:
Yankee Gas Services Co. dba Eversource Energy – Gas Distribution
Mr. Bret Factora
Manager of Gas Engineering/GIS
47 Eagle Street
Waterbury, CT 06708
(203) 596-3071
Bret.factora@eversource.com

Communication;
Frontier Communications

Mr. Raymond Puzemis
1441 North Colony Road
Meriden, CT 06450
(203) 238-4101
Raymond.puzemis@ftr.com

Lightower Fiber Networks
Mr. Eric Clark
Manger Fiber Construction
1781 Highland Ave.
Cheshire, CT 06410
(203) 649-3904
eclark@lightower.com

Cable TV:
Atlantic Broadband (CT) LLC
Mr. Chap Hanley
VP and General Manger
61 Myrock Ave.
Waterford, CT 06385
(860) 629-6782
chanley@atlanticbb.com

SECTION 1.08 - PROSECUTION AND PROGRESS

1.08.01 – Transfer of Work or Contracts: *Add the following after the last paragraph:*

The Contractor shall pay the subcontractor for work performed within thirty (30) days after the Contractor receives payment for the work performed by the subcontractor. Also, any retained monies on a subcontractor's work shall be paid to the subcontractor within thirty (30) days after satisfactory completion of all of the subcontractor's work. Completion of all of the subcontractor's work shall include test, maintenance and other similar periods that are required by the contract documents for the subcontractor's items of work.

For the purpose of this item, satisfactory completion shall have been accomplished when:

1 The subcontractor has fulfilled the contract requirements of both the Department and the subcontract for the subcontracted work, including the completion of any specified material and equipment testing requirement or plant establishment period and the submission of all submittals (i.e.: certified payrolls, material samples and certifications, required state and federal submissions, etc.) required by the specifications and the Department, and
2 The work done by the subcontractor has been inspected and approved by the State and the City and the final quantities of the subcontractor's work have been determined and agreed upon.

If the Contractor determines that a subcontractor's work is not complete, the Contractor shall notify the subcontractor and the Engineer, in writing, of the reasons why the subcontractor's work is not complete. This written notification shall be provided to the subcontractor and the Engineer within twenty-one (21) days of the subcontractor's request for release of retainage.

The Engineer will institute administrative procedures to expedite the determination of final quantities for the subcontractor’s satisfactorily completed work.

The inspection and approval of a subcontractor's work does not eliminate the Contractor's responsibilities for all the work as defined in Article 1.07.12, "Contractor's Responsibility for Work."

The inspection and approval of the subcontractor’s work does not release the subcontractor from its responsibility for maintenance and other periods of subcontractor responsibility specified for the subcontractor’s items of work. Failure of a subcontractor to meet its maintenance, warranty and/or defective work responsibilities may result in a finding that the subcontractor is non-responsible on future subcontract assignments.
For any dispute regarding prompt payment or release of retainage, the alternate dispute resolution provisions of this article shall apply.

The above requirements are also applicable to all sub-tier subcontractors and the above provisions shall be made a part of all subcontract agreements.
Failure of the Contractor to comply with the provisions of this section may result in a finding

that the Contractor is non-responsible on future projects.

1.08.03 – Prosecution of Work: is supplemented as follows:

The Contractor shall not be permitted to interrupt traffic for any continuous period of time until both of the following conditions are satisfied:

1 The Contractor has secured all of the required approvals from the Engineer, and,

2 The Contractor has, as much as practical, all of the required materials needed on the site or readily available for that construction which requires the interruption of traffic.

1.08.04 – Limitation of Operations: is supplemented by the following:

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be allowed to perform any work that will interfere with the existing traffic operations on all project roadways as follows:

ALL LOCATIONS

The Contractor shall not be allowed to perform any work from 7:00 p.m. to 6:00 a.m. Monday through Friday and 8:00 a.m. through 6:00 p.m. on Saturday only with approval of the City. Sunday work is not allowed.

The Contractor shall not be allowed to work on the following days in addition to the standard holidays:

- Sail Fest - Friday before (July 8 through 10)

Deliveries of materials / equipment to the site related to this construction project are limited to Monday to Saturday 7:00 a.m. to 5:00 p.m.

ALL AFFECTED STREETS

The Contractor shall not be allowed to perform any work that will interfere with one lane of through traffic in each direction on:

Monday through Friday, between 6:00 a.m. & 9:00 a.m. and between 3:00 p.m. & 6:00 p.m. and,

Saturday and Sunday at all times, unless approved otherwise by the City.

The Contractor will be allowed to provide alternating one lane of traffic on any affected side street during construction.

The Contractor will be allowed to halt traffic (detour) on Eugene O'Neill Drive a / Green Street and side streets to perform necessary work for pavement repair and paving, with the approval of the Engineer and only if a detour is properly established.

During stage construction, existing traffic operations will be considered to be as shown on the Construction Traffic Control Plans contained in Item No. 0971001A – Maintenance and Protection of Traffic.

COORDINATION WITH OTHER PROJECTS

Work on adjacent projects may be ongoing simultaneously with this project. The Contractor shall be aware of those projects so that coordination is maintained for proper traffic flow at all times on all project roadways and this coordination is acceptable to the Engineer.

STAGE CONSTRUCTION

In an attempt to minimize impacts to on street parking, the milling, total depth reconstruction, and paving operations will be conducted independently under separate stages. Respective milling, total depth reconstruction, and paving operations as required within each stage area will be completed independently prior to initiating these activities on the next stage unless otherwise directed by the Engineer. The reconstruction of other project elements must be completed at least during the stage in which they appear, but are not otherwise restricted by the various stages unless noted elsewhere within the contract documents.

Also stage construction is required to minimize interference with use of the parking lots by the general public. Therefore only one parking lot shall be under construction at one time. Phasing is shown on the plans. The easterly parking lot shall be available for use during “Sail Fest” at the times noted previously.

OTHER LIMITATIONS

Longitudinal drop downs greater than 3 inches will not be allowed during those periods when the maximum number of lanes of through traffic are required. The Contractor shall provide a temporary 1V:4H traversable slope of suitable material in those areas where a longitudinal dropdown exists. The cost of furnishing, installing, and removing this material shall be included in the contract lump sum for "Maintenance and Protection of Traffic".

The field installation of a signing pattern shall constitute an interference with existing traffic control operations and shall not be allowed except during the allowable periods.

No roadway, with the exception of transition areas, shall be open to traffic unless the appropriate pavement markings have been installed. The transition areas shall have pavement markings applied immediately before opening to traffic.

All temporary concrete barriers, other protective systems and traffic control devices as called for by the contract or ordered by the Engineer must be on-hand and available in sufficient quantity for immediate installation prior to any stage change.

If the Contractor is working on adjacent areas simultaneously, he shall be required to maintain proper traffic flow at all times on all areas and that this work is acceptable to the Engineer.

CONSTRUCTION STAGING - UTILITY IMPACTS

Utilities shall relocate all facilities as required and install prior to and in consultation and coordination with the Contractor to ensure proper pole and sub-surface structures and pipe locations to avoid conflicts with proposed drainage structures.

1.08.08 - Extension of Time:
In the first paragraph, replace the first sentence "The Contractor will be responsible for providing all the documentation necessary to support the reasonableness of the additional time requested." *with*:

The Contractor must provide to the Engineer all documentation necessary to support the reasonableness of the additional time requested. When applicable, the documentation shall include, but not be limited to, the following: (a) a complete description of the request or relevant delay(s); (b) all correspondence that shows or reflects how critical-path project activities were affected or delayed; (c) for material delays, all relevant purchase order requests and delivery dates, including all correspondence relating to those matters; and (d) a time chart comparing (i) an original, baseline or recovery schedule created prior to the alleged causes underlying the request for a time extension with (ii) a schedule showing the actual or anticipated time effects of said underlying causes on the project's progress and completion.

In the second paragraph, insert the following as a new paragraph after the sentence ending "....concurrent delays for which the State was not responsible."*:*

If, in the opinion of the Contractor, an unanticipated event or sequence of events subsequent to award of the Contract makes it feasible for the Contractor to complete the Project at least thirty (30) calendar days earlier than the then-current Contract completion date, the Contractor must either (a) submit to the Engineer, within thirty (30) calendar days of said event(s), a revised Project schedule showing the anticipated early completion, with a written explanation of how said event(s) made that early completion feasible when it otherwise would not have been feasible; or (b) forego any formal or informal claims based on the assertion that the Contractor, because of that event or sequence of events, could have completed the Project early if not for the action or inaction of the State.

Following this paragraph, insert a paragraph break, and continue with the revised text of the current article:

Damages for periods of Project delay for which the City of New London has sole responsibility.

SECTION 4.06 - BITUMINOUS CONCRETE

Section 4.06 is being deleted in its entirety and replaced with the following:

4.06.01—Description
4.06.02—Materials
4.06.03—Construction Methods
4.06.04—Method of Measurement
4.06.05—Basis of Payment

4.06.01—Description: Work under this section shall include the production, delivery and placement of a non-segregated, smooth and dense bituminous concrete mixture brought to proper grade and cross section. This section shall also include the method and construction of longitudinal joints. The Contractor shall furnish ConnDOT with a Quality Control Plan (QCP) as described in Article 4.06.03.

The terms listed below as used in this specification are defined as:

Bituminous Concrete: A concrete material that uses a bituminous material (typically asphalt) as the binding agent and stone and sand as the principal aggregate components. Bituminous concrete may also contain any of a number of additives engineered to modify specific properties and/or behavior of the concrete material. For the purposes of this Specification, references to bituminous concrete apply to all of its sub-categories, for instance those defined on the basis of production and placement temperatures, such as hot-mix asphalt (HMA) or warm-mix asphalt (WMA), or those defined on the basis of composition, such as those containing polymer-modified asphalt (PMA).

Course: A lift or multiple lifts comprised of the same bituminous concrete mixture placed as part of the pavement structure.

Density Lot: All material placed in a single lift and as defined in Article 4.06.03.

Disintegration: Wearing away or fragmentation of the pavement. Disintegration will be evident in the following forms: Polishing, weathering-oxidizing, scaling, spalling, raveling, potholes or loss of material.

Dispute Resolution: A procedure used to resolve conflicts resulting from discrepancies between the Engineer and the Contractor's density results that may affect payment.

Hot Mix Asphalt (HMA): A bituminous concrete mixture typically produced at 325°F.

Lift: An application of a bituminous concrete mixture placed and compacted to a specified thickness in a single paver pass.

Polymer Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer modified asphalt binder in accordance with contract specifications. All PMA mixtures shall incorporate a qualified warm mix technology.

Production Lot: All material placed during a continuous daily paving operation.

Quality Assurance (QA): All those planned and systematic actions necessary to provide confidence that a product or facility will perform as designed.

Quality Control (QC): The sum total of activities performed by the vendor (Producer, Manufacturer, and Contractor) to ensure that a product meets contract specification requirements.

Superpave: A bituminous concrete mix design used in mixtures designated as "S*" Where "S" indicates Superpave and * indicates the sieve related to the nominal maximum aggregate size of the mix.

Segregation: A non-uniform distribution of a bituminous concrete mixture in terms of gradation, temperature, or volumetric properties.

Warm Mix Asphalt (WMA): A bituminous concrete mixture that can be produced and placed at reduced temperatures than HMA using a qualified additive or technology.

4.06.02—Materials: All materials shall conform to the requirements of Section M.04.

1. Materials Supply: The bituminous concrete mixture must be from one source of supply and originate from one Plant unless authorized by the Engineer. Bituminous Concrete plant QCP requirements are defined in Section M.04.

2. Recycled Materials: Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Recycled Asphalt Shingles (RAS), or crumb rubber (CR) from recycled tires may be incorporated in bituminous concrete mixtures in accordance with Section M.04 and Project Specifications. CRCG and RAS shall not be used in the surface course.

4.06.03—Construction Methods:

1. Material Documentation: All vendors producing bituminous concrete must have their truck-weighing scales, storage scales, and mixing plant automated to provide a detailed ticket.

Delivery tickets shall include the following information:

a. State of Connecticut printed on ticket.
b. Name of producer, identification of plant, and specific storage bin (silo) if used.
c. Date and time of day.
d. Mixture Designation; Mix type and level Curb mixtures for machine-placed curbing must state "curb mix only".

e. If RAP is used, the plant printouts shall include the RAP dry weight, percentage and daily moisture content.
f. If RAS is used, the plant printouts shall include the RAS dry weight and percentage daily moisture content.
g. The delivery ticket for all mixes produced with Warm Mix Technology must indicate the additive name, and the injection rate (water or additive) incorporated at the HMA plant. The delivery ticket for all mixes produced with pre-blended WMA additive must indicate the name of the WMA Technology.
h. Net weight of mixture loaded into truck (When RAP and/or RAS is used the moisture content shall be excluded from mixture net weight).
i. Gross weight (Either equal to the net weight plus the tare weight or the loaded scale weight).
j. Tare weight of truck – Daily scale weight.
k. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
l. Truck number for specific identification of truck.
m. Individual aggregate, Recycled Materials, and virgin asphalt high/target/low weights. For drum plants and silo loadings, the plant printouts shall be produced at 5 minute intervals maintained by the vendor for a period of three years after the completion of the project.
n. For every mixture designation the running daily total delivered and sequential load number.

The net weight of mixture loaded into the truck must be equal to the cumulative measured weight of its components.

The Contractor must notify the Engineer immediately if, during the production day, there is a malfunction of the weighing or recording system in the automated plant or truck-weighing scales. Manually written tickets containing all required information will be allowed for one hour, but for no longer, provided that each load is weighed on State-approved scales. At the Engineer's sole discretion, trucks may be approved to leave the plant if a State inspector is present to monitor weighing. If such a malfunction is not fixed within forty-eight hours, mixture will not be approved to leave the plant until the system is fixed to the Engineer's satisfaction. No damages will be considered should the State be unable to provide an inspector at the plant.

The State reserves the right to have an inspector present to monitor batching and /or weighing operations.

2. Transportation of Mixture: Trucks with loads of bituminous concrete being delivered to State projects must not exceed the statutory or permitted load limits referred to as gross vehicle weight (GVW). The Contractor shall furnish a list of all vehicles and allowable weights transporting mixture.

The State reserves the right to check the gross and tare weight of any delivery truck. A variation of 0.4 percent or less in the gross or tare weight shown on the delivery ticket and the certified scale weight shall be considered evidence that the weight shown on the delivery ticket is correct.

If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall take action to correct discrepancy to the satisfaction of the Engineer.

If a truck delivers mixture to the project and the ticket indicates that the truck is overweight, the load will not be rejected but a "Measured Weight Adjustment" will be taken in accordance with Article 4.06.04.

The mixture shall be transported from the mixing plant in trucks that have previously been cleaned of all foreign material and that have no gaps through which mixture might inadvertently escape. The Contractor shall take care in loading trucks uniformly so that segregation is minimized. Loaded trucks shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The front and rear of the cover must be fastened to minimize air infiltration. The Contractor shall assure that all trucks are in conformance with this specification. Trucks found not to be in conformance shall not be allowed to be loaded until re-inspected to the satisfaction of the Engineer.

Truck body coating and cleaning agents must not have a deleterious effect on the transported mixture. The use of solvents or fuel oil, in any concentration, is strictly prohibited for the coating of the inside of truck bodies. When acceptable coating or agents are applied, truck bodies shall be raised immediately prior to loading to remove any excess agent in an environmentally acceptable manner.

3. Paving Equipment: The Contractor shall have the necessary paving and compaction equipment at the project site to perform the work. All equipment shall be in good working order and any equipment that is worn, defective or inadequate for performance of the work shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. During the paving operation, the use of solvents or fuel oil, in any concentration, is strictly prohibited as a release agent or cleaner on any paving equipment (i.e., rollers, pavers, transfer devices, etc.).

Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to be paved area; and they shall not be returned for use until after they have been allowed to dry.

Pavers: Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with and use a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. Automatic screed controls for grade and slope shall be used at all times unless otherwise authorized by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper

transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam.

Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete. Rollers types shall include steel-wheeled, pneumatic or a combination thereof and may be capable of operating in a static or dynamic mode. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. The vibratory system achieves compaction through vertical amplitude forces. Rollers with this system shall be equipped with indicators that provide the operator with amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. The oscillatory system achieves compaction through horizontal shear forces. Rollers with this system shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.

Pneumatic tire rollers shall be self-propelled and equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence regarding tire size; pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure is uniform for all wheels.

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with approved lighting fixtures of equivalent light output characteristics. Lighting shall maximize the illumination on each task and minimize glare to passing traffic. The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish electric power to operate the specified lighting equipment. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2:

TABLE 4.06-1: Paver Lighting

Option	Fixture Configuration	Fixture Quantity	Requirement
1	Type A	3	Mount over screed area
	Type B (narrow) or Type C (spot)	2	Aim to auger and guideline
	Type B (wide) or Type C (flood)	2	Aim 25 feet behind paving machine
2	Type D Balloon	2	Mount over screed area

TABLE 4.06-2: Roller Lighting

Option	Fixture Configuration*	Fixture Quantity	Requirement
1	Type B (wide)	2	Aim 50 feet in front of and behind roller
	Type B (narrow)	2	Aim 100 feet in front of and behind roller
2	Type C (flood)	2	Aim 50 feet in front of and behind roller
	Type C (spot)	2	Aim 100 feet in front of and behind roller
3	Type D Balloon	1	Mount above the roller

*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy-duty industrial type. Each fixture shall have a minimum output of 8,000 lumens. The fixtures shall be mounted horizontally, and be designed for continuous row installation.

Type B: Each floodlight fixture shall have a minimum output of 18,000 lumens.

Type C: Each fixture shall have a minimum output of 19,000 lumens.

Type D: Balloon light: Each balloon light fixture shall have a minimum output of 50,000 lumens, and emit light equally in all directions.

Material Transfer Vehicle (MTV): A MTV shall be used when placing a bituminous concrete surface course as indicated in the contract documents. A surface course is defined as the total thickness of the same bituminous concrete mix that extends up to and includes the final wearing surface whether it is placed in a single or multiple lifts, and regardless of any time delays between lifts.

The MTV must be a self-propelled vehicle specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery truck to the paver. The MTV must continuously remix the bituminous concrete mixture throughout the placement process.

The use of a MTV will be subject to the requirements stated in Article 1.07.05- Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at time of pre-construction the following information:

- The make and model of the MTV to be used.
- The individual axle weights and axle spacing for each separate piece of paving equipment (haul vehicle, MTV and paver).
- A working drawing showing the axle spacing in combination with all three pieces of equipment that will comprise the paving echelon.

4. Test Section: The Engineer may require the Contractor to place a test section whenever the requirements of this specification or Section M.04 are not met.

The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and acceptance by the Engineer. The equipment used in the construction of a passing test section shall be used throughout production.

If a test section fails to meet specifications, the Contractor shall stop production, make necessary adjustments to the job mix formula, plant operations, or procedures for placement and compaction. The Contractor shall construct test sections, as allowed by the Engineer, until all the required specifications are met. All test sections shall also be subject to removal as set forth in Article 1.06.04.

5. Transitions for Roadway Surface: Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall conform to the criteria below unless otherwise specified.

Permanent Transitions: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

a) Posted speed limit is greater than 35 MPH: 30 feet per inch of vertical change (thickness)
b) Posted speed limit is 35 MPH or less: 15 feet per inch of vertical change (thickness).
c) Bridge Overpass and underpass transition length will be 75 feet either
    (1) Before and after the bridge expansion joint, or
    (2) Before or after the parapet face of the overpass.

In areas where it is impractical to use the above described permanent transition lengths the use of a shorter permanent transition length may be permitted when approved by the Engineer.

Temporary Transitions: A temporary transition is defined as a transition that does not remain a permanent part of the work. All temporary transitions shall meet the following length requirements:

a) Posted speed limit is greater than 50 MPH
    (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
    (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)
b) Posted speed limit is 40, 45, or 50 MPH
    (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)
c) Posted speed limit is 35 MPH or less
    (1) Leading and Trailing = 3 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period or during extended periods of inactivity (more than 14 calendar days) shall conform to the greater than 50 MPH requirements shown above.

6. Spreading and Finishing of Mixture: Prior to the placement of the bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by sweeping or by other means acceptable to the Engineer. The bituminous concrete mixture shall not be placed whenever the surface is wet or frozen. The Engineer will verify the mix temperature by means of a probe or infrared type of thermometer. A probe type thermometer, verified by the Department on an annual basis, must be used in order to reject a load of mixture based on temperatures outside the range stated in the placement QCP.

Placement: The bituminous concrete mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications.

When unforeseen weather conditions prevent further placement of the mix, the Engineer is not obligated to accept or place the bituminous concrete mixture that is in transit from the plant.

In advance of paving, traffic control requirements shall be set up daily, maintained throughout placement, and shall not be removed until all associated work including density testing is completed.

The Contractor shall inspect the newly placed pavement for defects in the mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

Where it is impractical due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a thickness that will result in a completed pavement meeting the designed grade and elevation.

Placement Tolerances: Each lift of bituminous concrete placed at a uniform specified thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of specified non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

a) Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

TABLE 4.06-3: Thickness Tolerances

Mixture Designation	Lift Tolerance
S1	+/- ⅜ inch
S0.25, S0.375, S0.5	+/- ¼ inch

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

b) Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating the adjustment in Article 4.06.04.

c) Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

Transverse Joints: All transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement or bituminous concrete driveways to expose the full thickness of the lift. A brush of tack coat shall be used on any cold joint immediately prior to additional bituminous concrete mixture being placed.

Tack Coat Application: Immediately before application, the area to be tacked shall be cleaned by sweeping or by other means acceptable to the Engineer. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set) prior to any paving equipment or haul vehicles driving on it. All surfaces in contact with the bituminous concrete that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.

Compaction: The Contractor shall compact the mixture to meet the density requirements as stated in Article 4.06.03 and eliminate all roller marks without displacement, shoving, cracking, or aggregate breakage.

When placing a lift with a specified thickness less than one and one-half (1 ½) inches, or a wedge course, the Contractor shall provide a minimum rolling pattern as determined by the development of a compaction curve. The procedure to be used shall be documented in the Contractor's QCP for placement and demonstrated on the first day of placement.

The use of the vibratory system on concrete structures is prohibited. When approved by the Engineer, the Contractor may operate a roller using an oscillatory system at the lowest frequency setting.

If the Engineer determines that the use of compaction equipment in the dynamic mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting.

Rollers operating in the dynamic mode shall be shut off when changing directions.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements: The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.

a) Smoothness- Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts of bituminous concrete, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.

b) Uniformity- The paved surface of the mat and joints shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

7. Longitudinal Joint Construction Methods: The Contractor shall use Method I- Notched Wedge Joint (see Figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches, except for S1mixes. Method II Butt Joint (see Figure 4.06-2) shall be used for lifts less than 1½ inches or greater than 3 inches, and S1mixes. During placement of multiple lifts of bituminous concrete, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length. The difference in elevation between the two faces of any completed longitudinal joint shall not exceed ¼ of an inch in any location.

Method I - Notched Wedge Joint:

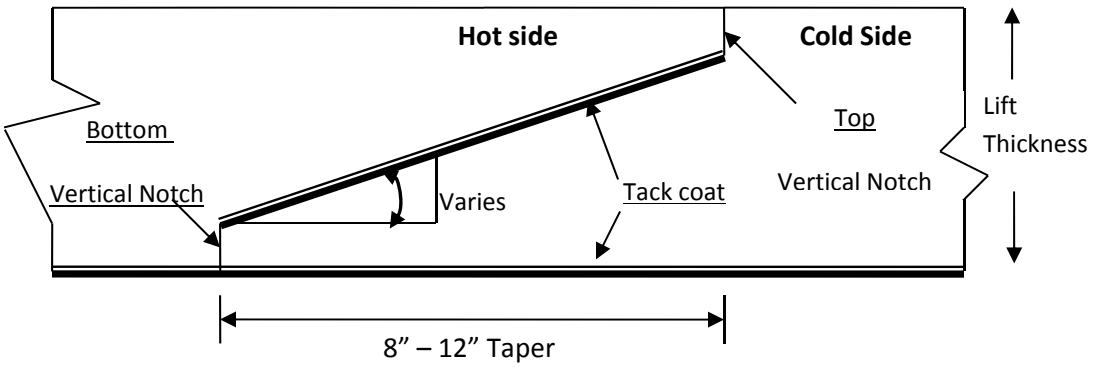

FIGURE 4.06-1: Notched Wedge Joint

A notched wedge joint shall be constructed as shown in Figure 4.06-1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches. The device shall have an integrated vibratory system.

The taper portion of the wedge joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II may be waived if addressed in the QC plan and approved by the Engineer.

The taper portion of the wedge joint shall be evenly compacted using equipment other than the paver or notch wedge joint device.

The taper portion of the wedge joint shall not be exposed to traffic for more than 5 calendar days.

The pavement surface under the wedge joint must have an application of tack coat material. Prior to placing the completing pass (hot side), an application of tack coat must be applied to the exposed surface of the tapered section; regardless of time elapsed between paver passes. The in-place time allowance described in Sub article 4.06.03-7 does not apply to joint construction.

Any exposed wedge joint must be located to allow for the free draining of water from the road surface.

The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

If Method I, Notched Wedge Joint cannot be used on lifts between 1.5 and 3 inches, Method III Butt Joint may be substituted according to the requirements below for "Method III – Butt Joint with Hot Pour Rubberized Asphalt Treatment."

Method II - Butt Joint:

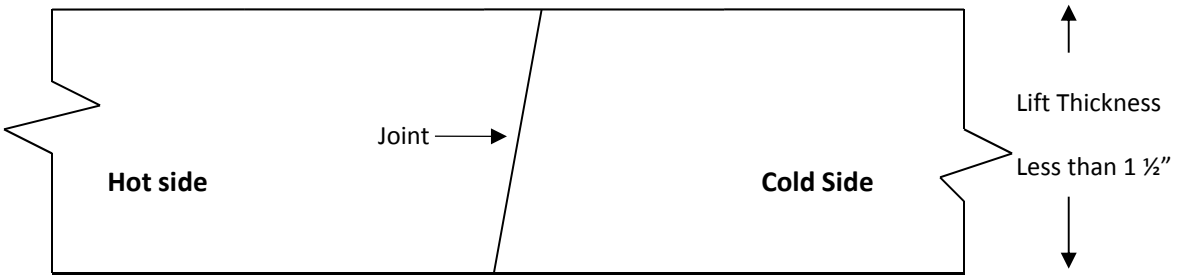

FIGURE 4.06-2: Butt Joint

When adjoining passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to Figure 4.06-2). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

The Contractor shall not allow any butt joint to be incomplete at the end of a work shift unless otherwise allowed by the Engineer. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width "curb to curb."

Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment: If Method I Wedge Joint cannot be used due to physical constraints in certain limited locations; the contractor may submit a request in writing for approval by the Engineer, to utilize Method III Butt Joint as a substitution in those locations. There shall be no additional measurement or payment made when the Method III Butt Joint is substituted for the Method I Notched Wedge Joint. When required by the contract or approved by the Engineer, Method III (see Figure 4.06-3) shall be used.

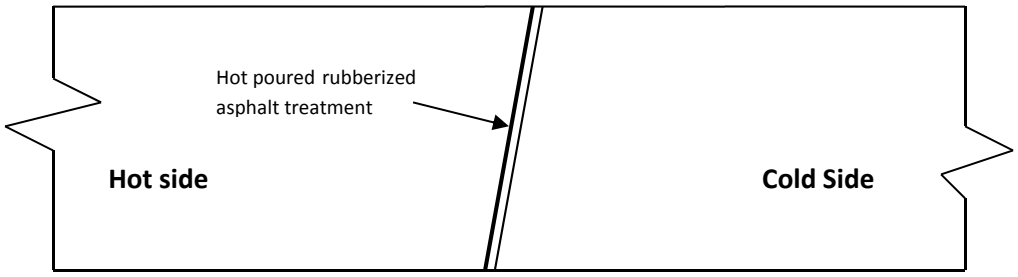

FIGURE 4.06-3: Butt Joint with Hot Poured Rubberized Asphalt Treatment

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a rubberized joint seal material meeting the requirements of ASTM D 6690, Type 2. The joint sealant shall be placed on the face of the "cold side" of the butt joint as shown above prior to placing the "hot side" of the butt joint. The joint seal material

shall be applied in accordance with the manufacturer's recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

8. Contractor Quality Control (QC) Requirements:
The Contractor shall be responsible for maintaining adequate quality control procedures throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

This effort must be documented in Quality Control Plans and address the actions, inspection, or sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation in a timely fashion.

The Standard QCP for production shall consist of the quality control program specific to the production facility.

There are three components to the QCP for placement: a Standard QCP, a Project Summary Sheet that details project specific information, and if applicable a separate Extended Season Paving Plan as required in Section 9 "Temperature and Seasonal Requirements".

The Standard QCP for both production and placement shall be submitted to the Department for approval each calendar year and.at a minimum of 30 days prior to production or placement.

Production or placement shall not occur until all QCP components have been approved by the Engineer.

Each QCP shall include the name and qualifications of a Quality Control Manager (QCM). The QCM shall be responsible for the administration of the QCP, and any modifications that may become necessary. The QCM shall have the ability to direct all Contractor personnel on the project during paving operations. All Contractor sampling, inspection and test reports shall be reviewed and signed by the QCM prior to submittal to the Engineer. The QCPs shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor.

Approval of the QCP does not relieve the Contractor of its responsibility to comply with the project specifications. The Contractor may modify the QCPs as work progresses and must document the changes in writing prior to resuming operations. These changes include but are not limited to changes in quality control procedures or personnel. The Department reserves the right to deny significant changes to the QCPs.

QCP for Production: Refer to Section M.04.03-1.

QCP for Placement: The Standard QCP, Project Summary Sheet, and Extended Season Paving Plan shall conform to the format provided by the Engineer. The format is available at

http://www.ct.gov/dot/lib/dot/documents/dconstruction/pat/qcp_outline_hma_placement.pdf.

The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that bituminous concrete placement conforms to the requirements as outlined in its QCP during all phases of the work. The Contractor shall document these activities for each day of placement.

The Contractor shall submit complete field density testing and inspection records to the Engineer within 48 hours in a manner acceptable to the Engineer.

The Contractor may obtain one (1) mat core and one (1) joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department determinations from the acceptance cores. The Contractor shall submit the location of each process control core to the Engineer for approval prior to taking the core. The core holes shall be filled to the same requirements described in Sub article 4.06.03-10.

9. Temperature and Seasonal Requirements: Paving, including placement of temporary pavements, shall be divided into two seasons, "In-Season" and "Extended-Season". In-Season paving occurs from May 1 – October 14, and Extended Season paving occurs from October 15-April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- Bituminous concrete mixes shall not be placed when the air or sub base temperature is below 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor must submit an Extended Season Paving Plan for the project that addresses minimum delivered mix temperature considering WMA, PMA or other additives, maximum paver speed, enhanced rolling patterns and the method to balance mixture delivery and placement operations. Paving during Extended Season shall not commence until the Engineer has approved the plan.

10. Density Testing of Bituminous Concrete Utilizing Core Samples: This procedure describes the frequency and the method the Contractor shall use to obtain pavement cores for acceptance from the project.

Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more. All material placed in a lift shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10. The density of each core will be determined using the production lot's average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the plant. When there was no testing of the parent material or any Gmm exceeds the specified tolerances in the Department's current QA Program for Materials, the Engineer will determine the maximum theoretical density value to be used for density calculations. Bituminous concrete HMA S1 mixes are excluded from the longitudinal joint density requirements.

The Contractor shall extract cores (4 or 6 inch diameter for S0.25, S0.375 and S0.5 mixes, 6 inch diameter for S1.0 mixtures -wet sawed) from sampling locations determined by the Engineer. The Engineer must witness the extraction and labeling of cores, as well as the filling of the core holes. The cores shall be labeled by the Contractor with the project number, lot number, and sub-lot number on the top surface of the core. When labeling the core lot number, include whether the core is from a mat lot or joint lot by using an "M" for a mat core and "J" for a joint core. For example, a core from the first sub-lot of the first mat lot shall be labeled with "Lot M1 – 1". The first number refers to the lot and the second number refers to the sub-lot. Refer to Figure 4.06-4. The side of the cores shall be labeled with the core lot number and date placed. The project inspector shall fill out a MAT-109 containing the same information to accompany the cores. The Contractor shall deliver the cores and MAT-109 to the Department's Central Testing Lab in a safe manner to ensure no damage occurs to the cores. The Contractor shall use a container approved by the Engineer. In general the container shall consist of an attached lid container made out of plastic capable of being locked shut and tamper proof. The Contractor shall use foam, bubble wrap, or another suitable material to prevent the cores from being damaged during transportation. Once the cores and MAT-109 are in the container the Engineer will secure the lid using a security seal. The security seal's identification number must be documented on the MAT-109. The Central Lab will break the security seal and take possession of the cores upon receipt.

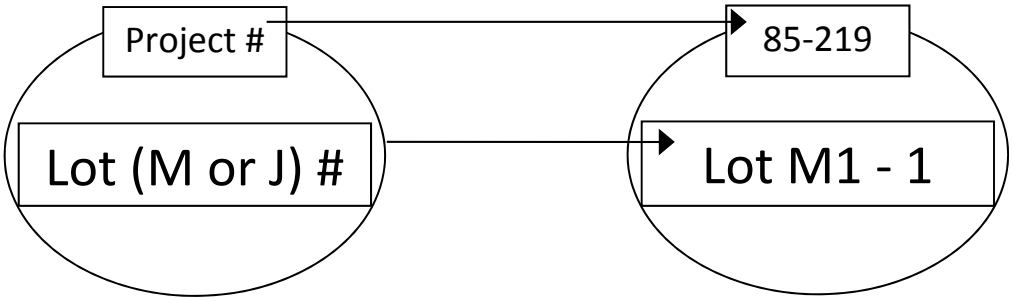

FIGURE 4.06-4: Labeling of Cores

Frequency of sampling is in accordance with the following tables:

TABLE 4.06-4: Testing Requirement for Bridge Density Lot

Length of Each Structure (Feet)	MAT – No. of Cores	JOINT - No. of cores
≤ 500'	See Table 4.06-5(A or B)	See Table 4.06-5(A or B)
501' – 1500'	3	3
1501' – 2500'	4	4
2501' and greater	5	5

All material placed on structures less than or equal to 500 feet in length shall be included as part of a standard lot as follows:

TABLE 4.06-5A: Testing requirement for Density Lots ≥ 500 Tons

Lot Type	No. of Mat Cores		No. of Joint Cores		Target Lot Size (Tons)
Lot Without Bridge[1]	4		4		2000
Lot With Bridge(s)[1][2]	4 plus	1 per structure (≤ 300')	4 plus	1 per structure (≤ 300')	2000
		2 per structure (301' – 500')		2 per structure (301' – 500')	

TABLE 4.06-5B: Testing requirement for Density Lots < 500 Tons

Lot Type	No. of Mat Cores	No. of Joint Cores	Lot Size (Tons)
Lot Without Bridge[1]	3	3	1 per lift
Lot With Bridge(s)[1][2]	3	3	1 per lift

Notes:
[1] The number of "Required Paver Passes for Full Width" shall be used to determine the sub-lot sizes within the lot. The number of paver passes for full width is determined by the contractor.
[2] If a non-bridge mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

A density lot will be complete when the full designed paving width of the established lot length has been completed and shall include all longitudinal joints that exist between the curb lines regardless of date(s) paved. Quantity of material placed on structures less than or equal to 500 feet long is inclusive of the standard lot. Prior to paving, the total length of the project to be paved shall be split up into lots that contain approximately 2000 tons each. Areas such as highway ramps may be combined to create one lot. In general, combined areas should be set up to target a 2000 ton lot size. One adjustment will apply for each lot. The tons shall be determined using the yield calculation in Article 4.06.04. The last lot shall be the difference between the total payable tons for the project and the sum of the previous lots.
After the compaction process has been completed, the material shall be allowed to cool sufficiently to allow the cutting and removal of the core without damage. The Contractor shall core to a depth that allows extraction so that the uppermost layer being tested for density will not be affected.

A mat core shall not be taken any closer than one foot from the edge of a paver pass. If a random number locates a core less than one foot from any edge, locate the core so that the sample is one foot from the edge.

Method I, Notched Wedge Joint cores shall be taken so that the center of the core is 5 inches from the visible joint on the hot mat side. Refer to Figure 4.06-5.

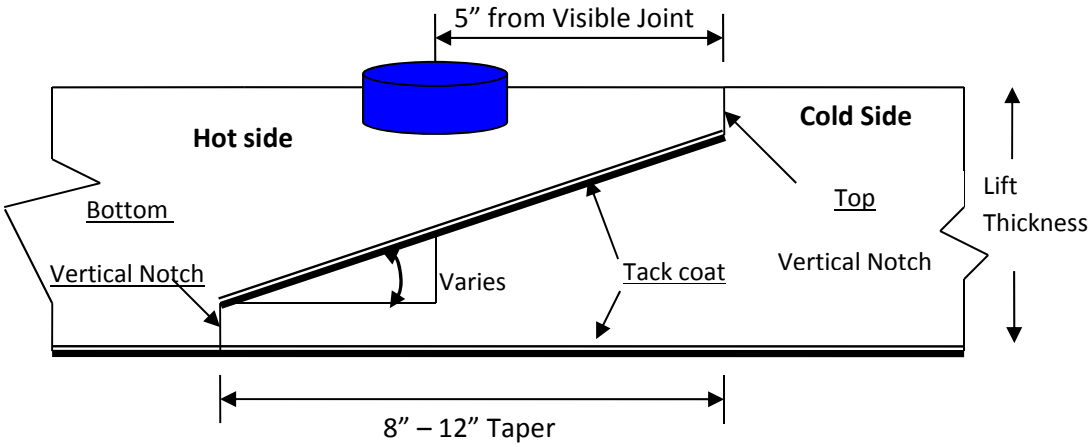

FIGURE 4.06-5: Notched Wedge Joint Cores

When Method III Butt Joint is utilized, cores shall be taken from the hot side so the edge of the core is within 1 inch of the longitudinal joint.

All cores must be cut within 5 calendar days of placement. Any core that is damaged or obviously defective while being obtained will be replaced with a new core from a location within 2 feet measured in a longitudinal direction.

Each core hole shall be filled within four hours upon core extraction. Prior to being filled, the hole shall be prepared by removing any free water and applying tack coat using a brush or other means to uniformly cover the cut surface. The core hole shall be filled using a bituminous concrete mixture at a minimum temperature of 240ºF containing the same or smaller nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete fill shall be compacted to ⅛ inch above the finished pavement.

11. Acceptance Inspection, Sampling and Testing: Inspection, sampling, and testing to be used by the Engineer shall be performed at the minimum frequency specified in Section M.04 and stated herein.

Sampling for acceptance shall be established using ASTM D 3665, or a statistically based procedure of random sampling approved by the Engineer.

Plant Material Acceptance: The Contractor shall provide the required acceptance sampling, testing and inspection during all phases of the work in accordance with Section M.04. The Department will perform verification testing on the Contractor’s acceptance test results. Should binder content, theoretical maximum density (Gmm), or air void results exceed the specified tolerances in the Department’s current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures, the Department will investigate to determine an assignable cause. Contractor test results for a subject lot or sub lot may be replaced with the Department’s

results for the purpose of assessing adjustments. The verification procedure is included in the Department's current QA Program for Materials.

Density Acceptance: The Engineer will perform all acceptance testing on the cores in accordance with AASHTO T 331.

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 7 calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results within the timeframe described in Sub article 4.06.03-9 supporting its position. No request for Dispute Resolution will be allowed for a Density Lot in which any core was not taken within the required 5 calendar days of placement. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain a new set of core samples per disputed lot. The core samples must be extracted no later than 14 calendar days from the date of Engineer's authorization.

The number and type (mat, joint, or structure) of the cores taken for dispute resolution must reflect the number and type of the cores taken for acceptance. The location of each core shall be randomly located within the respective original sub lot. All such core samples shall be extracted and filled using the procedure outlined in Article 4.06.03. The results from the dispute resolution cores shall be added to the results from the acceptance cores and averaged for determining the final in-place density value.

13. Corrective Work Procedures: Any portion of the completed pavement that does not meet the requirements of the specification shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall match the specified lift thickness after compaction.

If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:

a) Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
   - Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
   - Proposed work schedule.
   - Construction method and sequence of operations.
   - Methods of maintenance and protection of traffic.
   - Material sources.
   - Names and telephone numbers of supervising personnel.

b) Perform all corrective work in accordance with the Contract and the approved corrective procedure.

14. Protection of the Work: The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project. Prior to the Engineer's authorization to open the pavement to traffic, the Contractor is responsible to protect the pavement from damage.

15. Cut Bituminous Concrete Pavement: Work under this item shall consist of making a straight-line cut in the bituminous concrete pavement to the lines delineated on the plans or as directed by the Engineer. The cut shall provide a straight, clean, vertical face with no cracking, tearing or breakage along the cut edge.

4.06.04—Method of Measurement:

1. HMA S* or PMA S*: The quantity of bituminous concrete measured for payment will be determined by the documented net weight in tons accepted by the Engineer in accordance with this specification and Section M.04.

2. Adjustments: Adjustments may be applied to bituminous concrete quantities and will be measured for payment using the following formulas:

Yield Factor for Adjustment Calculation = 0.0575 Tons/SY/inch

Actual Area = [(Measured Length (ft)) x (Avg. of width measurements (ft))]

Actual Thickness (t) = Total tons delivered / [Actual Area (SY) x 0.0575 Tons/SY/inch]

a) Area: If the average width exceeds the allowable tolerance, an adjustment will be made using the following formula. The tolerance for width is equal to the specified thickness (in.) of the lift being placed.

Tons Adjusted for Area (T_A) = $[(L \times W_{adj})/9] \times (t) \times 0.0575$ Tons/SY/inch = (-) Tons

Where: L = Length (ft)
(t) = Actual thickness (inches)
W_{adj} = (Designed width (ft) + tolerance /12) - Measured Width)

b) Thickness: If the actual thickness is less than the allowable tolerance, the Contractor shall submit a repair procedure to the Engineer for approval. If the actual thickness exceeds the allowable tolerance, an adjustment will be made using the following formula:

Tons Adjusted for Thickness (T_T) = $A \times t_{adj} \times 0.0575$ = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}
t_{adj} = Adjusted thickness = [(Dt + tolerance) - Actual thickness]

Dt = Designed thickness (inches)

c) Weight: If the quantity of bituminous concrete representing the mixture delivered to the project is in excess of the allowable gross vehicle weight (GVW) for each vehicle, an adjustment will be made using the following formula:

Tons Adjusted for Weight (T_W) = GVW – DGW= (-) Tons

Where: DGW = Delivered gross weight as shown on the delivery ticket or measured on a certified scale.

d) Mixture Adjustment: The quantity of bituminous concrete representing the production lot will be adjusted based on test results and values listed in Tables 4.06-6 and 4.06-7 , . The Department's Division of Material Testing will calculate the daily adjustment value for T_{SD}.

The adjustment values in Table 4.06-6 and 4.06-7 shall be calculated for each sub lot based on the Air Void and Liquid Binder Content test results for that sub lot. The total adjustment for each day's production (lot) will be computed using tables and the following formulas:

Tons Adjusted for Superpave Design (T_{SD}) = $[(AdjAV_t + AdjPB_t) / 100]$ X Tons

Percent Adjustment for Air Voids = $AdjAV_t = [AdjAV_1 + AdjAV_2 + AdjAV_i + \ldots + AdjAV_n)] /n$

Where: $AdjAV_t$ = Total percent air void adjustment value for the lot
$AdjAV_i$ = Adjustment value from Table 4.06-7 resulting from each sub lot or the average of the adjustment values resulting from multiple tests within a sub lot, as approved by the Engineer.
n = number of sub lots based on Table M.04.03-1

TABLE 4.06-6: Adjustment Values for Air Voids

Adjustment Value ($AdjAV_i$) (%)	S0.25, S0.375, S0.5, S1 Air Voids (AV)
+2.5	3.8 - 4.2
+3.125*(AV-3)	3.0 - 3.7
-3.125*(AV-5)	4.3 – 5.0
20*(AV-3)	2.3 – 2.9
-20*(AV-5)	5.1 – 5.7
-20.0	$\leq$ 2.2 or $\geq$ 5.8

Positive air void adjustment values will not be calculated for any test that fails to meet gradation or binder content tolerances of the JMF in Table M.04.03– 5.

Percent Adjustment for Liquid Binder = $AdjPB_t = [(AdjPB_1 + AdjPB_2 + AdjPB_i + \ldots + AdjPB_n)] / n$

Where: $AdjPB_t$= Total percent liquid binder adjustment value for the lot
$AdjPB_i$ = Adjustment value from Table 4.06-7 resulting from each sub lot
n = number of binder tests in a production lot

TABLE 4.06-7: Adjustment Values for Binder Content

Adjustment Value ($AdjAV_i$) (%)	**S0.25, S0.375, S0.5, S1 Pb (refer to Table M.04.02-5)**
0.0	Equal to or above the min. liquid content
- 10.0	Below the min. liquid content

e) Density Adjustment: The quantity of bituminous concrete measured for payment in a lift of pavement specified to be 1½ inches or greater may be adjusted for density. Separate density adjustments will be made for each lot and will not be combined to establish one density adjustment. If either the Mat or Joint adjustment value is "remove and replace", the density lot shall be removed and replaced (curb to curb).

No positive adjustment will be applied to a Density Lot in which any core was not taken within the required 5 calendar days of placement.

Tons Adjusted for Density (T_D) = [{(PA_M x .50) + (PA_J x .50)} / 100] X Density Lot Tons

Where: T_D = Total tons adjusted for density for each lot
PA_M = Mat density percent adjustment from Table 4.06-9
PA_J = Joint density percent adjustment from Table 4.06-10

TABLE 4.06-9: Adjustment Values for Pavement Mat density

Average Core Result Percent Mat Density	**Percent Adjustment (Bridge and Non-Bridge) (1)(2)**
97.1 - 100	-1.667*(ACRPD-98.5)
94.5 – 97.0	+2.5
93.5 – 94.4	+2.5*(ACRPD-93.5)
92.0 – 93.4	0
90.0 – 91.9	-5*(92-ACRPD)
88.0 – 89.9	-10*(91-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

TABLE 4.06-10: Adjustment Values for Pavement Joint Density

Average Core Result Percent Joint Density	Percent Adjustment (Bridge and Non-Bridge) [(1)(2)]
97.1 – 100	-1.667*(ACRPD-98.5)
93.5 – 97.0	+2.5
92.0 – 93.4	+1.667*(ACRPD-92)
91.0 – 91.9	0
89.0 – 90.9	-7.5*(91-ACRPD)
88.0 – 88.9	-15*(90-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

[(1)] ACRPD = Average Core Result Percent Density
[(2)] All Percent Adjustments to be rounded to the second decimal place. For example, 1.667 is to be rounded to 1.67.

3. Transitions for Roadway Surface: The installation of permanent transitions shall be measured under the appropriate item used in the formation of the transition.

The quantity of material used for the installation of temporary transitions shall be measured for payment under the appropriate item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is not measured for payment.

4. Cut Bituminous Concrete Pavement: The quantity of bituminous concrete pavement cut will be measured in accordance with Article 2.02.04.

5. Material for Tack Coat: The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer. No tack coat material shall be included that is placed in excess of the tolerance described in Article 4.06.03.

Method of Measurement:

a. Container Method- Material furnished in a container will be measured to the nearest ½ gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container capable of measuring the volume to the nearest ½ gallon. The container in which the material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.

b. Truck Method- The Engineer will establish a weight per gallon of the tack coat based on the density at 60ºF for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor, or from the automated metering system on the delivery vehicle.

6. Material Transfer Vehicle (MTV): The furnishing and use of a MTV will be measured separately for payment based on the actual number of surface course tons delivered to a paver using the MTV.

4.06.05—Basis of Payment:

1. HMA S* or PMA S*: The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for "HMA S*" or "PMA S*".

- All costs associated with providing illumination of the work area are included in the general cost of the work.
- All costs associated with cleaning the surface to be paved, including mechanical sweeping, are included in the general cost of the work. All costs associated with constructing longitudinal joints are included in the general cost of the work.
- All costs associated with obtaining cores for acceptance testing and dispute resolution are included in the general cost of the work.

2. Bituminous Concrete Adjustment Costs: The adjustment will be calculated using the formulas shown below if all of the measured adjustments in Article 4.06.04 are not equal to zero. A positive or negative adjustment will be applied to monies due the Contractor.

Production Lot: $[T_T + T_A + T_W + (T_{MD} \text{ or } T_{SD})]$ x Unit Price = Est. (P)

Density Lot: T_D X Unit Price = Est. (D)

Where: Unit Price = Contract unit price per ton per type of mixture

T_* = Total tons of each adjustment calculated in Article 4.06.04

Est. ( ) = Pay Unit represented in dollars representing incentive or disincentive.

The Bituminous Concrete Adjustment Cost item if included in the bid proposal or estimate is not to be altered in any manner by the Contractor. If the Contractor should alter the amount shown, the altered figure will be disregarded and the original estimated cost will be used for the Contract.

3. Transitions for Roadway Surface: The installation of permanent transitions shall be paid under the appropriate item used in the formation of the transition. The quantity of material used for the installation of temporary transitions shall be paid under the appropriate pay item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is included in the general cost of the work.

4. The cutting of bituminous concrete pavement will be paid in accordance with Article 2.02.05.

5. Material for tack coat will be paid for at the Contract unit price per gallon for "Material for Tack Coat".

6. The Material Transfer Vehicle (MTV) will be paid at the Contract unit price per ton for a "Material Transfer Vehicle".

Pay Item*	**Pay Unit***
HMA S*	TON
PMA S*	TON
BITUMINOUS CONCRETE ADJUSTMENT COST	EST.
MATERIAL FOR TACK COAT	GAL.
MATERIAL TRANSFER VEHICLE	TON

*For contracts administered by the State of Connecticut, Department of Administrative Services, the pay items and pay units are as shown in contract award price schedule.

SECTION M.04 - BITUMINOUS CONCRETE

Section M.04 is being deleted in its entirety and replaced with the following:

M.04.01—Bituminous Concrete Materials and Facilities
M.04.02—Mix Design and Job Mix Formula (JMF)
M.04.03—Production Requirements

M.04.01—Bituminous Concrete Materials and Facilities: Each source of material, and facility or plant used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. Test Procedures and Specifications referenced herein are in accordance with the latest AASHTO and ASTM Standard Test Procedures and Specifications. Such references when noted with an (M) have been modified by the Engineer and are detailed in Table M.04.03-7.

The Contractor shall submit to the Engineer all sources of coarse aggregate, fine aggregate, mineral filler, PG binder, and if applicable any additives such as but not limited to anti-strip, warm mix, and polymer modifiers. The Contractor shall submit a Safety Data Sheet (SDS) for each grade of binder, and additive to be used on the Project. The Contractor shall not change any material sources without prior approval of the Engineer.

An adequate quantity of each size aggregate, mineral filler, bitumen, and additives, shall be maintained at the bituminous concrete plant site at all times while the plant is in operation to ensure that the plant can consistently produce bituminous concrete mixtures that meet the job mix formula (JMF) as specified in Article M.04.02. The quantity of such material shall be reviewed by the Engineer on an individual plant basis and is dependent upon the plant's daily production capacity. A total quantity of any material on site that amounts to less than one day's production capacity may be cause for the job mix formula to be rejected.

1. Coarse Aggregate:

a. Requirements: The coarse aggregate shall consist of clean, hard, tough, durable fragments of crushed stone or crushed gravel of uniform quality. Aggregates from multiple sources of supply must not be mixed or stored in the same stockpile.

b. Basis of Approval: The request for approval of the source of supply shall include a washed sieve analysis in accordance with AASHTO T 27. The Gsa, Gsb, and Pw_a shall be determined in accordance with AASHTO T 85. The coarse aggregate must not contain more than 1% crusher dust, sand, soft disintegrated pieces, mud, dirt, organic and other injurious materials. When tested for abrasion using AASHTO T 96, the aggregate loss must not exceed 40%. When tested for soundness using AASHTO T 104 with a magnesium sulfate solution, the coarse aggregate must not have a loss exceeding 10% at the end of 5 cycles.

For all bituminous mixtures, materials shall also meet the coarse aggregate angularity criteria as specified in Tables M.04.02-2 thru M.04.02-4 for blended aggregates retained on the #4 sieve when tested according to ASTM D 5821. The amount of aggregate particles of the coarse aggregate blend retained on the #4 sieve that are flat and elongated shall be determined in accordance with ASTM D 4791 and shall not exceed 10% by weight when tested to a 5:1 ratio, as shown in Tables M.04.02-2 thru M.04.02-4.

2. Fine Aggregate:

a. Requirements: The fine aggregate from each source quarry/pit deposit shall consist of clean, hard, tough, rough-surfaced and angular grains of natural sand; manufactured sand prepared from washed stone screenings; stone screenings, slag or gravel; or combinations thereof, after mechanical screening or manufactured by a process approved by the Engineer. The Contractor is prohibited from mixing two or more sources of fine aggregate on the ground for the purpose of feeding into a plant.

All fine aggregate shall meet the listed criteria shown in items #1 thru #7 of Table M.04.01-1. Table M.04.01-1 indicates the quality tests and criteria required for all fine aggregate sources. Individually approved sources of supply shall not be mixed or stored in the same stockpile. The fine aggregates must be free from injurious amounts of clay, loam, and other deleterious materials.

For Superpave mixtures, in addition to the above requirements, the fine aggregate angularity shall be determined by testing the materials passing the #8 sieve in accordance with AASHTO T 304, Method A. Qualification shall be based on the criteria listed in Tables M.04.02-2 thru M.04.02-4. The fine aggregate shall also be tested for clay content as a percentage contained in materials finer than the #8 sieve in accordance with AASHTO T 176.

TABLE M.04.01-1: Fine Aggregate Criteria by Pit/Quarry Source

Item	Title	AASHTO Protocol(s)	Criteria
1	Grading	T 27 & T 11	100% Passing 3/8 inch 95% Passing the #4 min.
2	Absorption	T 84	3% maximum
3	Plasticity limits	T 90	0 or not detectable
4	L.A. Wear	T 96	50% maximum(fine agg. particle size # 8 and above)
5	Soundness by Magnesium Sulfate	T 104	20% maximum @ 5 cycles
6	Clay Lumps and Friable Particles	T 112	3% maximum
7	Deleterious Material	As determined by the Engineer	Organic or inorganic calcite, hematite, shale, clay or clay lumps, friable materials, coal-lignite, shells, loam, mica, clinkers, or organic matter (wood, etc). -Shall not contain more than 3% by mass of any individual listed constituent and not more than 5% by mass in total of all listed constituents.
8	Petrographic Analysis	ASTM C 295	Terms defined in Section M.04.01-2c.

b. Basis of Approval: A Quality Control Plan for Fine Aggregate (QCPFA) provided by the Contractor shall be submitted for review and approval for each new source documenting how conformance to Items 1 through 7 as shown in Table M.04.01-1 is monitored. The QCPFA must be resubmitted any time the process, location or manner of how the fine aggregate (FA) is manufactured changes, or as requested by the Engineer. The QCPFA must include the locations and manufacturing processing methods. The QCPFA for any source may be suspended by the Engineer due to the production of inconsistent material.

The Contractor shall submit all test results to the Engineer for review. The Contractor shall also include a washed sieve analysis in accordance with AASHTO T 27/T 11. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch sieve and a minimum of 95% passing the # 4. The Gsa, Gsb, and Pw_a shall be determined in accordance with AASHTO T 84.

The Contractor will be notified by the Engineer if any qualified source of supply fails any portion of Table M.04.01-1. One retest will be allowed for the Contractor to make corrections and/or changes to the process. If, upon retest, the material does not meet the requirements of items 1-7, additional testing will be required in accordance with item 8.

The Contractor may provide a Petrographic analysis of the material performed by a third party acceptable to the Engineer at its' own expense. The Contractor shall submit the results of the analysis with recommended changes to the manufacturing process to the Engineer. The Contractor shall submit fine aggregate samples for testing by the Engineer after the recommended changes have been made.

The Contractor may request the use of such fine aggregate on select project(s) for certain applications of bituminous concrete pavement. Such material will be monitored for a period no less than 48 months, at no cost to the State. Terms of any evaluation and suitable application will be determined by the Engineer.

3. Mineral Filler:

a. Requirements: Mineral filler shall consist of finely divided mineral matter such as rock dust, including limestone dust, slag dust, hydrated lime, hydraulic cement, or other accepted mineral matter. At the time of use it shall be freely flowing and devoid of agglomerations. Mineral filler shall be introduced and controlled at all times during production in a manner acceptable to the Engineer.

b. Basis of Approval: The request for approval of the source of supply shall include the location, manufacturing process, handling and storage methods for the material. Mineral filler shall conform to the requirements of AASHTO M 17.

4. Performance Graded Asphalt Binder:

a. General:
   i Liquid PG binders shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binders shall be properly heated and stored to prevent damage or separation.
   ii. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R 26(M). The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the binder specific gravity at 77ºF; rotational viscosity at 275ºF and 329ºF and the mixing and compaction viscosity-temperature chart for each shipment.
   iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder materials. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment (tanker truck) is accompanied by a statement certifying

that the transport vehicle was inspected before loading and was found acceptable for the material shipped and that the binder will be free of contamination from any residual material, along with two (2) copies of the bill of lading.

iv. Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R 26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R 26(M) will be allowed to supply PG binders to Department projects.

b. Neat Performance Grade (PG) Binder:

i. PG binder shall be classified by the supplier as a "Neat" binder for each lot and be so labeled on each bill of lading. Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and certified test report.

ii. The asphalt binder shall be PG 64S-22.

c. Modified Performance Grade (PG) Binder:

Unless otherwise noted, the asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^*/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

d. Warm Mix Additive or Technology:

i. The warm mix additive or technology must be listed on the NEAUPG Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at http://www.neaupg.uconn.edu/wma_info.html.

ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.

iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

5. Emulsified Asphalts:

a. General:

i. Emulsified asphalts shall be homogeneous and be free of contaminants such as fuel oils and other solvents. Emulsions shall be properly stored to prevent damage or separation.

ii. The blending at mixing plants of emulsified asphalts from different suppliers is strictly prohibited. Contractors who blend emulsified asphalts will be classified as a supplier and will be required to certify the emulsion in accordance with AASHTO PP 71. The emulsified asphalt shall meet the requirements of AASHTO M 140(M) or AASHTO M 208 as applicable.

b. Supplier Approval:

i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO PP 71. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO PP 71 will be allowed to supply emulsified asphalt to Department projects.

ii. The supplier shall submit to the Division Chief a Certified Test Report representing each lot in accordance with AASHTO PP 71. The Certified Test Report shall include test results for each specified requirement for the grade delivered and shall also indicate the density at 60ºF. Additionally, once a month one split sample for each emulsified asphalt grade shall be submitted.

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c. Basis of Approval

i. Each shipment of emulsified asphalt delivered to the project site shall be accompanied with the corresponding SDS and Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 60°F.

ii. Anionic emulsified asphalts shall conform to the requirements of AASHTO M-140(M). Materials used for tack coat shall not be diluted and meet grade RS-1 or RS-1H. When ambient temperatures are 80˚F and rising, grade SS-1 or SS-lH may be substituted if permitted by the Engineer.

iii. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80˚F and rising, grade CSS-1 or CSS-lh may be substituted if permitted by the Engineer.

6. Reclaimed Asphalt Pavement (RAP):

a. Requirements: RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous concrete mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.

b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:
   i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a materials certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
   ii. When the RAP material source or quality is not known, the Contractor shall test the material and provide the following information along with a request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a material certificate stating that the RAP consists of aggregates that meet the specification requirements of sub articles M.04.01-1 through 3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:

      1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
      2. A 25-pound sample of the extracted aggregate from the RAP.
      3. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

7. Crushed Recycled Container Glass (CRCG):

a. Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.

b. Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic and metal and conform to the following gradation:

CRCG Grading Requirements	
Sieve Size	Percent Passing
3/8-inch	100
No. 4	35-100
No. 200	0.0-10.0

8. Joint Seal Material:

a. Requirements: Joint seal material shall be a hot-poured rubber compound intended for use in sealing joints and cracks in bituminous concrete pavements. Joint seal material must meet the requirements of ASTM D 6690 – Type 2.

9. Recycled Asphalt Shingles (RAS)

a. Requirements: RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The producer shall take necessary action to prevent contamination of RAS stockpiles.

10. Plant Requirements:

a. Mixing Plant and Machinery: The mixing plant used in the preparation of the bituminous concrete shall comply with AASHTO M 156/ASTM D 995 for a Batch Plant or a Drum Dryer Mixer Plant, and be approved by the Engineer.

b. Storage Silos: For all mixes, the Contractor may use silos for short-term storage of Superpave mixtures with prior notification and approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. Prior approval must be obtained for storage times greater than those indicated. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos is not permitted.

Type of silo cylinder	Maximum storage time for all classes (hr)	
	HMA	WMA/PMA
Open Surge	4	Mfg Recommendations
Unheated – Non-insulated	8	Mfg Recommendations
Unheated – Insulated	18	Mfg Recommendations
Heated – No inert gas	TBD by the Engineer	

c. Documentation System: The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each delivery ticket, as specified herein. Material feed controls shall be automatically or manually adjustable to provide proportions within the tolerances listed below for any batch size.

An asterisk (*) shall be automatically printed next to any individual batch weight(s) exceeding the tolerances in ASTM D 995 section 8.7.3. The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.

There must be provisions so that scales are not manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the truck and batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning. For each day's production, each project shall be provided a clear, legible copy of these recordings on each delivery ticket.

d. Aggregates: The Contractor shall ensure that aggregate stockpiles are managed to provide uniform gradation and particle shape, prevent segregation and cross contamination in a manner acceptable to the Engineer. For drum plants only, the Contractor shall determine the percent moisture content at a minimum, prior to production and half way through production.

e. Mixture: The dry and wet mix times shall be sufficient to provide proper coating (minimum 95% as determined by AASHTO T 195(M)) of all particles with bitumen and produce a uniform mixture.

The Contractor shall make necessary adjustments to ensure all types of bituminous concrete mixtures contain no more than 0.5% moisture throughout when tested in accordance with AASHTO T 329.

f. RAP: The Contractor shall indicate the percent of RAP, the moisture content (as a minimum determined twice daily prior to production and halfway through production), and the net dry weight of RAP added to the mixture on each delivery ticket. For each day of production, the production shall conform to the job mix formula and RAP percentage and no change shall be made without the prior approval of the Engineer.

g. Asphalt Binder: The last day of every month, a binder log shall be submitted when the monthly production for the Department exceeds 5000 tons. Blending of PG binders from different suppliers or grades at the bituminous concrete production facility is strictly prohibited.

h. Warm mix additive: For mechanically foamed WMA, the maximum water injection rate shall not exceed 2.0% water by total weight of binder and the water injection rate shall be constantly monitored during production.

i. Field Laboratory: The Contractor shall furnish the Engineer an acceptable field laboratory at the production facility to test bituminous concrete mixtures during production. The field laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have a high speed internet connection with a minimum upstream of 384 Kbps and a functioning web browser with unrestricted access to https://ctmail.ct.gov. This equipment shall be maintained in clean and good working order at all times and be made available for use by the Engineer.

   The laboratory shall be equipped with a suitable heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Windows shall be installed to provide sufficient light and ventilation. During summer months adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature. Light fixtures and outlets shall be installed at convenient locations, and a telephone shall be within audible range of the testing area. The laboratory shall be equipped with an adequate workbench that has a suitable length, width, and sampling tables, and be approved by the Engineer.

   The field laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35, *Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA)* and AASHTO M 323, *Standard Specification for Superpave Volumetric Mix Design*. In addition, the quantity of all equipment and supplies necessary to perform the tests must be sufficient to initiate and complete the number of tests identified in Table M.04.03-2 for the quantity of mixture produced at the facility on a daily basis. The Contractor shall ensure that the

Laboratory is adequately supplied at all times during the course of the project with all necessary testing materials and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R 18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the field laboratory. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

M.04.02—Mix Design and Job Mix Formula (JMF)

1. Curb Mix:

a. Requirements: When curb mix is specified, the Contractor shall develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation, binder content and air voids as shown in Table M.04.02-1. The Contractor may use RAP in 5% increments up to a maximum of 30% provided a new JMF is accepted by the Engineer.

b. Basis of Approval: The Contractor shall submit to the Engineer a request for approval of the JMF annually in accordance with one of the methods described herein. Prior to the start of any paving operations, the JMF must be accepted by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

The Contractor shall test the mixture for compliance with the submitted JMF and Table M.04.02-1. The maximum theoretical density (Gmm) will be determined by AASHTO T 209. If the mixture does not meet the requirements, the JMF shall be adjusted within the ranges shown in Table M.04.02-1 until an acceptable mixture is produced.

An accepted JMF from the previous operating season may be acceptable to the Engineer provided that there are no changes in the sources of supply for the coarse aggregate, fine aggregate, recycled material (if applicable) and the plant operation had been consistently producing acceptable mixture.

The Contractor shall not change sources of supply after a JMF has been accepted. Before a new source of supply for materials is used, a new JMF shall be submitted to the Engineer for approval.

TABLE M.04.02 – 1:

Master Ranges for Curb Mix Mixtures

Notes: (a) Compaction Parameter 50gyration N_{des}. (b) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder determined by AASHTO T 164 or AASHTO T 308.		
Mix	Curb Mix	Production Tolerances from JMF target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
# 200	3.0 – 8.0 (b)	2.0
# 50	10 - 30	4
# 30	20 - 40	5
# 8	40 - 70	6
# 4	65 - 87	7
¼"		
3/8 "	95 - 100	8
½ "	100	8
¾"		8
1"		
2"		
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350° F	
Mixtures	265-325° F	
Mixture Properties		
VOIDS %	0 – 4.0 (a)	

2. Superpave Design Method – S0.25, S0.375, S0.5, and S1

a. Requirements: The Contractor or its representative shall design and submit Superpave mix designs annually for approval. The design laboratory developing the mixes shall be approved by the Engineer. The mix design shall be based on the specified Equivalent Single-Axle Loads (ESAL). Each bituminous concrete mix type must meet the requirements shown in Tables M.04.02-2 thru Table M.04.02-5 and in accordance with AASHTO M 323 and AASHTO R 35. The mix design shall include the nominal maximum aggregate size and a JMF consisting of target values for gradation and bitumen content for each bituminous concrete mix type designated for the project.

The contractor shall provide test results with supporting documentation from an AASHTO Materials Reference Laboratory (AMRL) with the use of NETTCP Certified Technicians for the following tests:

1. Aggregate consensus properties for each type & level, as specified in Table M.04.02-3 and the specific gravity data.

2. Extracted aggregates from RAP aggregate, when applicable, consensus properties for each type & level, as specified in Table M.04.02-3 and the specific gravity data.

3. New mixes shall be tested in accordance with AASHTO T 283(M) *Standard Method of Test for Resistance of Compacted Hot-Mix Asphalt (HMA) to Moisture-Induced Damage*, (TSR). The compacted specimens may be fabricated at a bituminous concrete facility and then tested at an AMRL accredited facility.

   The AASHTO T 283(M) test results, specimens, and corresponding JMF sheet (Form MAT-429s) shall be submitted by the Contractor for review.

In addition, minimum binder content values apply to all types of bituminous concrete mixtures, as stated in Table M.04.02-5. For mixtures containing RAP, the virgin production and the anticipated proportion of binder contributed by the RAP cannot be less than the total permitted binder content value for that type nor the JMF minimum binder content.

i. Superpave Mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Tables M.04.02-2 thru Table M.04.02-5 apply. The Contractor shall submit a JMF, on a form provided by the Engineer, with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials to the Engineer for approval. The JMF shall indicate the corrected target binder content and applicable binder correction factor (ignition oven or extractor) for each mix type by total weight of mix. The mineral filler (dust) shall be defined as that portion of blended mix that passes the #200 sieve by weight when tested in accordance with AASHTO T 30. The dust-to-effective asphalt (D/Pbe) ratio shall be between 0.6 and 1.2 by weight. The dry/wet mix times and hot bin proportions (batch plants only) for each type shall be included in the JMF.

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all bituminous concrete mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the

specified control points as shown in Tables M.04.02-2 thru Table M.04.02-5. A change in the JMF requires that a new chart be submitted.

ii. Superpave Mixtures with RAP: Use of approved RAP may be allowed with the following conditions:

- RAP amounts up to 15% may be used with no binder grade modification.
- RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Two representative samples of RAP shall be obtained. Each sample shall be split and one split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance AASHTO T 308.

Unless approved by the Engineer, RAP material shall not be used with any other recycling option.

iii. Superpave Mixtures with RAS: Use of RAS may be allowed solely in HMA S1 mixtures with the following conditions:

- RAS amounts up to 3% may be used.
- RAS total binder replacement up to 15% may be used with no binder grade modification.
- RAS total binder replacement up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance to AASHTO M 323 appendix X1 or by test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations. The RAS asphalt binder availability factor (F) used in AASHTO PP 78 Equation 2 shall be 0.85.

iv. Superpave Mixtures with CRCG: In addition to the requirements in M.04.02 – 2 a through c, for bituminous concrete mixtures that contain CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the CRCG complies with requirements stated in Article M.04.01, as applicable. Additionally, 1% hydrated lime, or other accepted non-stripping agent, shall be

added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

b. Basis of Approval: On an annual basis, the Contractor shall submit to the Engineer any bituminous concrete mix design, and JMF anticipated for use on Department projects. Prior to the start of any paving operations, the mix design and JMF must be approved by the Engineer. Bituminous concrete mixture supplied to the project without an approved mix design and JMF will be rejected. The following information must be included in the mix design submittal:

i. Gradation, consensus properties and specific gravities of the aggregate, RAP, and RAS.
ii. Average asphalt content of the RAP and RAS by AASHTO T 164.
iii. Source of RAP and RAS and percentage to be used.
iv. Warm mix Technology and manufacturer's recommended additive rate and tolerances.
v. TSR test report, and, if applicable, anti-strip manufacturer and recommended dosage rate.
vi. Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
vii. JMF ignition oven correction factor by AASHTO T 308.

The JMF shall be accepted if the Plant mixture and materials meet all criteria as specified in Tables M.04.02-2 thru Table M.04.02-5. If the mixture does not meet the requirements, the contractor shall adjust the JMF within the ranges shown in Tables M.04.02-2 thru Table M.04.02-5 until an acceptable mixture is produced. All equipment, tests, and computations shall conform to the latest AASHTO R 35 and AASHTO M 323.

Any JMF, once approved, shall only be acceptable for use when it is produced by the designated plant, it utilizes the same component aggregates and binder source, and it continues to meet all criteria as specified herein, and component aggregates are maintained within the tolerances shown in Table M.04.02-2.

The Contractor shall not change any component source of supply including consensus properties after a JMF has been accepted. Before a new source of materials is used, a revised JMF shall be submitted to the Engineer for approval. Any approved JMF applies only to the plant for which it was submitted. Only one mix with one JMF will be approved for production at any one time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

c. Mix Status: Each facility will have each type of bituminous concrete mixture evaluated based on the previous year of production, for the next construction paving season, as determined by the Engineer. Based on the rating a type of mixture receives it will

determine whether the mixture can be produced without the completion of a PPT. Ratings will be provided to each bituminous concrete producer annually prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-3: *Superpave Master Range for Bituminous Concrete Mixture Production*, and are as follows:

Criteria A: Based on Air Voids. Percentage of acceptance results with passing air voids.

Criteria B: Based on Air Voids and VMA. The percentage of acceptance results with passing VMA, and the percentage of acceptance results with passing air voids, will be averaged.

The final rating assigned will be the lower of the rating obtained with Criteria A or Criteria B.

Ratings are defined as:

"A" – Approved:

A rating of "A" is assigned to each mixture type from a production facility with a current rating of 70% passing or greater.

"PPT" – Pre-Production Trial:

Rating assigned to each mixture type from a production facility when:

1. there are no passing acceptance production results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components from the JMF on record by more than 10% by weight;
3. there is a change in RAP percentage;
4. the mixture has a rating of less than 70% from the previous season;
5. a new JMF not previously submitted.

Bituminous concrete mixtures rated with a "PPT" cannot be shipped or used on Department projects. A passing "PPT" test shall be performed with NETTCP certified personnel on that type of mixture by the bituminous concrete producer and meet all specifications (Table M.04.02-2 Table M.04.02-5) before production shipment may be resumed.

Contractors that have mix types rated as "PPT" may use one of the following methods to change the rating to an "A."

Option A: Schedule a day when a Department inspector can be at the facility to witness a passing "PPT" test or,

Option B: When the Contractor or their representative performs a "PPT" test without being witnessed by an inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete for binder and gradation determination, and 5,000 grams of cooled loose bituminous concrete for Gmm determination for verification testing and approval. Passing verifications will designate the bituminous concrete type to be on an "A" status. Failing verifications will require the contractor to submit additional trials.

Option C: When the Contractor or their representative performs a "PPT" test without being witnessed by a Department inspector, the Engineer may verify the mix in the Contractor's laboratory. Passing verifications will designate the bituminous concrete type to be an "A" status. Failing verifications will require the Contractor to submit additional trials.

When Option (A) is used and the "PPT" test meets all specifications, the "PPT" test is considered a passing test and the rating for that mix is changed to "A". When the "PPT" test is not witnessed, the "PPT" Option (B) or (C) procedure must be followed. If the "PPT" Option (B) procedure is followed, the mixtures along with the test results must be delivered to the Materials Testing Lab. The test results must meet the "C" tolerances established by the Engineer. The tolerance Table is included in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

"U" – No Acceptable Mix Design on File:

Rating assigned to a type of mixture that does not have a JMF submitted, or the JMF submitted has not been approved, or is incomplete. A mix design or JMF must be submitted annually seven (7) days prior in order to obtain an "A," or "PPT" status for that mix. A "U" will be used only to designate the mix status until the mix design has been approved, and is accompanied with all supporting data as specified. Bituminous concrete mixtures rated with a "U" cannot be used on Department projects.

TABLE M.04.02– 2: Superpave Master Range for Bituminous Concrete Mixture Design Criteria

Notes: (1) Minimum Pb as specified in Table M.04.02-5. (2) Voids in Mineral Aggregates shall be computed as specified in AASHTO R 35. (3) Control point range is also defined as the master range for that mix. (4) Dust is considered to be the percent of materials passing the #200 sieve. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and PMA, the mix temperature shall meet manufacturer's recommendations.

	S0.25		S0.375		S0.5		S1	
Sieve	CONTROL POINTS (3)		CONTROL POINTS(3)		CONTROL POINTS(3)		CONTROL POINTS(3)	
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
2.0	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	100	-
1.0	-	-	-	-	-	-	90	100
3/4	-	-	-	-	100	-	-	90
1/2	100	-	100	-	90	100	-	-
3/8	97	100	90	100	-	90	-	-
#4	-	90	-	90	-	-	-	-
#8	32	67	32	67	28	58	19	45
#16	-	-	-	-	-	-	-	-
#30	-	-	-	-	-	-	-	-
#50	-	-	-	-	-	-	-	-
#100	-	-	-	-	-	-	-	-
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
Pb (1)	-	-	-	-	-	-	-	-
VMA (2) (%)	16.0 ± 1		16.0 ± 1		15.0 ± 1		13.0 ± 1	
VA (%)	4.0 ± 1		4.0 ± 1		4.0 ± 1		4.0 ± 1	
Gse	JMF value		JMF value		JMF value		JMF value	
Gmm	JMF ± 0.030		JMF ± 0.030		JMF ± 0.030		JMF ± 0.030	
Dust/Pbe(4)	0.6 – 1.2		0.6 – 1.2		0.6 – 1.2		0.6 – 1.2	
Agg. Temp(5)	280 – 350°F		280 – 350°F		280 – 350°F		280 – 350°F	
Mix Temp(6)	265 – 325°F		265 – 325°F		265 – 325°F		265 – 325°F	
Design TSR	≥ 80%		≥ 80%		≥ 80%		≥ 80%	
T-283 Stripping	Minimal, as determined by the Engineer							

TABLE M.04.02–3: Superpave Master Range for Consensus Properties of Combined Aggregate Structures

Notes: (1) If less than 25 % of a given layer is within 4 inches of the anticipated top surface, the layer may be considered to be below 4 inches for mixture design purposes.					
Traffic Level	Design ESALs (80 kN)	Coarse Aggregate Angularity (1) ASTM D 5821	Fine Aggregate Angularity (7) AASHTO T 304	Flat and Elongated Particles ASTM D 4791	Sand Equivalent AASHTO T 176
-----	(million)			>#4	-----
1*	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45
	Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the actual expected design life of the roadway.	Criteria presented as minimum values. 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.	Criteria presented as minimum percent air voids in loosely compacted fine aggregate passing the #8 sieve.	Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the #4 sieve, determined at 5:1 ratio.	Criteria presented as minimum values for fine aggregate passing the #8 sieve.

*** NOTE: Level 1 for use by Towns and Municipalities ONLY.**

TABLE M.04.02– 4: Superpave Master Range for Traffic Levels and Design Volumetric Properties

Traffic Level	Design ESALs	Number of Gyrations by Superpave Gyratory Compactor			Percent Density of Gmm from HMA/WMA specimen			Voids Filled with Asphalt (VFA) Based on Nominal mix size – inch			
	(million)	Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5	1
1*	< 0.3	6	50	75	≤ 91.5	96.0	≤ 98.0	70 - 80	70 - 80	70 - 80	67 - 80
2	0.3 to < 3.0	7	75	115	≤ 90.5	96.0	≤ 98.0	65 - 78	65 - 78	65 - 78	65 - 78
3	≥ 3.0	8	100	160	≤ 90.0	96.0	≤ 98.0	73 – 76	73 - 76	65 - 75	65 - 75

*** NOTE: Level 1 for use by Towns and Municipalities ONLY.**

TABLE M.04.02– 5:

Superpave Minimum Binder Content by Mix Type and Level

Mix Type	Level	Binder Content Minimum [1]
S0.25	1*	5.6
S0.25	2	5.5
S0.25	3	5.4
S0.375	1*	5.6
S0.375	2	5.5
S0.375	3	5.4
S0.5	1*	5.0
S0.5	2	4.9
S0.5	3	4.8
S1	1*	4.6
S1	2	4.5
S1	3	4.4

*** NOTE: Level 1 for use by Towns and Municipalities ONLY.**

M.04.03— Production Requirements:

1. Standard Quality Control Plan (QCP) for Production:

The QCP for production shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the production process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must detail the inspection, sampling and testing protocols to be used, and the frequency for each.

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts: percent

passing #4 sieve, percent passing #200 sieve, binder content, air voids, Gmm and VMA. The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications.

The Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

The QCP shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QCP must also include a list of sampling & testing methods and frequencies used during production, and the names of all Quality Control personnel and their duties.

Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of bituminous concrete that complies with these specifications. The Contractor shall submit any changes to the QCP as work progresses.

2. Acceptance Sampling & Testing Methods:

i. General:

Acceptance samples of mixtures shall be obtained from the hauling vehicles and tested by the Contractor at the facility during each day's production.

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor. Verification testing will be performed by the Engineer in accordance with the Department's QA Program for Materials. Labeled Acceptance test specimens shall be retained at the production facilities and may be disposed of with the approval of the Engineer. All Quality Control specimens shall be clearly labeled and separated from the Acceptance specimens.

Should the Department be unable to verify the Contractor's acceptance test result(s) due to a failure of the Contractor to retain acceptance test specimens or supporting documentation, the Contractor shall review its quality control plan, determine the cause of the nonconformance and respond in writing within 24 hours to the Engineer describing the corrective action taken at the

plant. In addition, the Contractor must provide supporting documentation or test results to validate the subject acceptance test result(s). The Engineer may invalidate any positive adjustments for material corresponding to the acceptance test(s). Failure of the Contractor to adequately address quality control issues at a facility may result in suspension of production for Department projects at that facility.

Contractor personnel performing acceptance sampling and testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present.

Technicians found by the Engineer to be non-compliant with NETTCP or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Anytime during production that testing equipment becomes inoperable, production can continue for a maximum of 1 hour. The Contractor shall obtain box sample(s) in accordance with Table M.04.03-1 to satisfy the daily acceptance testing requirement for the quantity shipped to the project. The box sample(s) shall be tested once the equipment issue has been resolved to the satisfaction of the Engineer. Production beyond 1 hour may be considered by the Engineer. Production will not be permitted beyond that day until the subject equipment issue has been resolved.

ii. Curb Mix Acceptance Sampling and Testing Procedures:

Curb Mixes shall be tested by the Contractor at a frequency of one test per every 250 tons of cumulative production, regardless of the day of production.

When these mix designs are specified, the following acceptance procedures and AASHTO test methods shall be used:

TABLE M.04.03 – 2: Curb Mix Acceptance Test Procedures

Protocol	Reference	Description
1	**AASHTO T 30(M)**	Mechanical Analysis of Extracted Aggregate
2	**AASHTO T 168**	Sampling of Bituminous Concrete
3	**AASHTO T 308**	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	**AASHTO T 209(M)**	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
5	**AASHTO T 312**	Superpave Gyratory molds compacted to N_{des}
6	**AASHTO T 329**	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

a. Determination of Off-Test Status:

i. The test results of AASHTO T 308 and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. Curb Mixtures are considered "off test" when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1 for that mixture. If the mix is "off test", the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.

ii. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the "off test" status.

iii. The Engineer may cease supply from the plant when test results from three consecutive samples are not within the JMF tolerances or the test results from two consecutive samples not within the master range indicated in Table M.04.02-1 regardless of production date.

b. JMF Changes

i. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change as allowed by the Engineer prior to any additional testing. A JMF change shall include the date and name of the Engineer that allowed it. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.

ii. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.

iii. Superpave Mix Acceptance Sampling and Testing Procedures:

The hauling vehicle from which samples are obtained shall be selected using stratified – random sampling based on the total estimated tons of production in accordance with ASTM D 3665, except that the first test shall be randomly taken from the first 151 tons or as directed by the Engineer. The Engineer may request a second acceptance test within the first sub lot. One acceptance test shall always be performed in the last sub-lot based on actual tons of material produced.

The number of sub lots/acceptance tests is based on the total production per day as indicated in Table M.04.03-1. Quantities of the same type/level mix per plant may be combined daily for multiple state projects to determine the number of sub lots. The Engineer may direct that additional acceptance samples be obtained to represent materials actually being delivered to the project.

The payment adjustment for air voids and liquid binder will be calculated per sub lot as described in Section 4.06.

An acceptance test shall not be performed within 150 tons of production from a previous acceptance test unless approved by the Engineer. Quality Control tests are not subject to this restriction. Unless otherwise tested, a minimum of one (1) acceptance test shall be performed for every four days of production at a facility for each type/level mix (days of production may or may not be consecutive days).

TABLE M.04.03 – 1:
Superpave Acceptance Testing Frequency per Type/Level/Plant

Daily quantity produced in tons (lot)	Number of Sub Lots/Tests
0 to 150	0, Unless requested by the Engineer
151 to 600	1
601 to 1,200	2
1,201 to 1,800	3
1,801 or greater	1 per 600 tons or portions thereof

When the Superpave mix design is specified, the following acceptance and AASHTO test procedures shall be used:

TABLE M.04.03– 3: Superpave Acceptance Testing Procedures

Protocol	Reference	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	AASHTO T 30	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	(1)Superpave Gyratory molds compacted to N_{des}
6	AASHTO T 166	(2)Bulk specific gravity of bituminous concrete
7	AASHTO R 35	(2)Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of two tests)
9	AASHTO T 329	Moisture content of Production bituminous concrete

Notes: (1) One set equals two six-inch molds. Molds to be compacted to Nmax for PPTs and to Ndes for production testing. The first sublot of the year will be compacted to N_{max}
(2) Average value of one set of six-inch molds.

If the average corrected Pb content differs by 0.3% or more from the average bituminous concrete facility production delivery ticket in five (5) consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause and correct the issue. When two consecutive moving average differences are 0.3% or more, the Engineer may require a new aggregate correction factor.

The test specimen must be ready to be placed in an approved ignition furnace for testing in accordance with AASHTO T 308 within thirty minutes of being obtained from the hauling vehicle and the test shall start immediately after.

The Contractor shall perform moisture susceptibility (TSR) testing annually for all design levels of HMA-, WMA-, and PMA- S0.5 plant-produced mixtures, in accordance with the latest version of AASHTO T 283(M).

If any material source changes from the previous year, or during the production season, a mix design TSR as well as a production TSR is required for the new mixture. The AASHTO T 283(M) test shall be performed at an AASHTO Materials Reference Laboratory (AMRL) by

NETTCP Certified Technicians. The test results and specimens shall be submitted to the Engineer for review. This shall be completed within 30 days from the start of production. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer. In addition, compaction of samples shall be accomplished utilizing an accepted Superpave Gyratory Compactor (SGC), supplied by the Contractor. The SGC shall be located at the facility supplying mixture to the project.

a. Determination of Off-Test Status:

   i. Superpave mixes shall be considered *"off test"* when any Control Point Sieve, VA, VMA, and Gmm values are outside of the limits specified in Table M.04.03-4 and the computed binder content (Pb) established by AASHTO T308 or as documented on the vehicle delivery ticket is below the minimum binder content stated in sub article M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.

   ii. Any time the bituminous concrete mixture is considered Off-test:

      1. The Contractor shall notify the Engineer (and project staff) when the plant is *"off test"* for a type of mixture. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the *"off test"* determination.

      2. The Contractor must take immediate actions to correct the deficiency, minimize *"off test"* production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

b. Cessation of Supply for Superpave Mixtures with no Payment Adjustment: Production of bituminous concrete shall cease for the Project from any plant that consistently fails to produce mixture that meets the JMF and volumetric properties. The quantity of Superpave mixtures shipped to the project that is "off-test" will not be adjusted for deficient mixtures.

   A Contractor shall cease to supply mixture from a plant when:

      1. Bituminous concrete mixture is "off test" on three (3) consecutive tests for any combination of VMA or Gmm, regardless of date of production.

2. Bituminous concrete mixture is "off test" on two (2) consecutive tests for the Control Point sieves in one day's production.

Following cessation, the Contractor shall immediately make necessary material or process corrections and run a Pre-Production Trial (PPT) for that type of mixture. Use of that type of mixture from that plant will be prohibited on the Project until the Contractor has demonstrated the ability to produce acceptable mixture from that facility. When the Contractor has a passing test and has received approval from the Engineer, the use of that mixture to the Project may resume.

c. Cessation of Supply for Superpave Mixtures with Payment Adjustment: Production of bituminous concrete shall cease for the Project from any plant that consistently fails to produce mixture that meets the Superpave minimum binder content by mix type and level listed in Table M.04.02-5. The quantity of Superpave mixtures shipped to the project that is "off-test" will be adjusted for deficient mixtures in accordance with Section 4.06.

A Contractor shall cease to supply mixture from a plant when:

1. The binder content (Pb) is below the requirements of Table M.04.02-5 on the ignition oven test result after two (2) consecutive tests, regardless of the date of production.

2. The air voids (VA) is outside the requirements of Table M.04.03-4 after three (3) consecutive tests, regardless of the date of production.

Following cessation, the Contractor shall immediately make necessary material or process corrections and run a Pre-Production Trial (PPT) for that type of mixture. Use of that type of mixture from that plant will be prohibited on the Project until the Contractor has demonstrated the ability to produce acceptable mixture from that facility. When the Contractor has a passing test and has received approval from the Engineer, the use of that mixture to the Project may resume.

d. JMF Changes for Superpave Mixture Production: It is understood that a JMF change is effective from the time it was submitted forward and is not retroactive to the previous test or tests. JMF changes are permitted to allow for trends in aggregate and mix properties but every effort shall be employed by the Contractor to minimize this to ensure a uniform and dense pavement. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

JMF changes are only permitted prior to or after a production shift for all bituminous-concrete types of mixtures and only when they:

i. Are requested in writing and pre-approved by the Engineer.
ii. Are based on a minimum of a two test trend.
iii. Are documented with a promptly submitted revised JMF on the form provided by the Engineer.
iv. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

No change will be made on any aggregate or RAP consensus property or specific gravity unless the test is performed at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians.

A JMF change shall be submitted every time the plant target RAP and/or bin percentage deviates by more than 5% and/or the plant target binder content deviates by more than 0.15% from the active JMF.

TABLE M.04.03– 4: Superpave Master Range for Bituminous Concrete Mixture Production

Notes: (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.02-5 (3) Control point range is also defined as the master range for that mix. (4) JMF tolerances shall be defined as the limits for production compliance. VA & Pb payment is subject to adjustments, as defined in sub-article 4.06.04 - 2. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and/or polymer modified asphalt, the mix temperature shall meet manufacturer's recommendations. In addition, for WMA, the maximum mix temperature shall not exceed 325°F once the WMA technology is incorporated.

	S0.25		S0.375		S0.5		S1		Tolerances
Sieve	CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		From JMF Targets (4)
inches	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	±Tol
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
#4	-	90	-	90	-	-	-	-	
#8	32	67	32	67	28	58	19	45	
#16	-	-	-	-	-	-	-	-	
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb(2)	-	-	-	-	-	-	-	-	note (2)
VMA (%)	16.0		16.0		15.0		13.0		1.0
VA (%)	4.0		4.0		4.0		4.0		1.0
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Agg. Temp (5)	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp (6)	265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		
Prod. TSR	N/A		N/A		≥80%		N/A		
T-283 Stripping	N/A		N/A		Minimal as determined by the Engineer		N/A		

TABLE M.04.03– 5:
JMF Tolerances for Application of Positive Adjustments

Notes: (1) Only for S1 mixes. (2) Only for S0.5 and S1 mixes.	
Sieve	Tolerances From JMF Targets
inches	±Tol
3/4	9 (1)
1/2	9 (1)
3/8	9 (2)
#4	8
#8	7
#16	6
#200	3
Pb	0.4

TABLE M.04.03– 6:
Superpave Master Range for Traffic Levels and Design Volumetric Properties

Traffic Level	Design ESALs (million)	Number of Gyrations by Superpave Gyratory Compactor	
		Nini	Ndes
1*	< 0.3	6	50
2	0.3 to < 3.0	7	75
3	≥3.0	8	100

* NOTE: Level 1 for use by Towns and Municipalities ONLY.

TABLE M.04.03-7:

Modifications to Standard AASHTO and ASTM Test Specifications and Procedures

AASHTO Standard Specification	
Reference	**Modification**
M 140	Emulsified Asphalt grade RS-1H shall meet all the requirements of the emulsified asphalt grade RS-1 except for the penetration requirement of the residue that will change from 100 to 200 penetration units (0.1 mm) to 40 to 90 penetration units (0.1 mm).
AASHTO Standard Method of Test	
Reference	**Modification**
T 30	Section 7.2 thru 7.4 Samples are not routinely washed for production testing
T 168	Samples are taken at one point in the pile. Samples from a hauling vehicle are taken from only one point instead of three as specified. Selection of Samples: Sampling is equally important as the testing, and the sampler shall use every precaution to obtain samples that are truly representative of the bituminous mixture. Box Samples: In order to enhance the rate of processing samples taken in the field by construction or maintenance personnel the samples will be tested in the order received and data processed to be determine conformance to material specifications and to prioritize inspections by laboratory personnel.
T 195	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
T 209	Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements. 8.3 Omit Pycnometer method.
T 283	When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufactures recommended compaction temperature prior to fabrication of the specimens.
T 331	6.1 Cores are dried to a constant mass prior to testing using a core-dry machine.

AASHTO Standard Recommended Practices	
Reference	**Modification**
R 26	Quality Control Plans must be formatted in accordance with AASHTO R 26, certifying suppliers of performance-graded asphalt binders, Section 9.0, Suppliers Quality Control Plan, and "NEAUPG Model PGAB QC Plan." 1. The Department requires that all laboratory technician(s) responsible for testing PG-binders be certified or Interim Qualified by the New England Transportation Technician Certification Program (NETTCP) as a PG Asphalt Binder Lab Technician. 2. Sampling of asphalt binders should be done under the supervision of qualified technician. NECTP "Manual of Practice," Chapter 2 Page 2-4 (Key Issues 1-8). 3. A copy of the Manual of Practice for testing asphalt binders in accordance with the Superpave PG Grading system shall be in the testing laboratory. 4. All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL). 5. Sources interested in being approved to supply PG-binders to the Department by use of an "in-line blending system," must record properties of blended material, and additives used. 6. Each source of supply of PG-binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders etc., shall disclose the type of additive, percentage and any handling specifications/limitations required. 7. All AASHTO M 320 references shall be replaced with AASHTO M 332. 8. Each year, in April and September, the supplier shall submit test results for two BBR testing at two different temperatures in accordance with AASHTO R 29. Suppliers shall provide AASHTO M 332 testing results and split samples at a minimum of once per lot.

ITEM #0202452A - TEST PIT

DESCRIPTION:
The Contractor shall excavate test pits to located or examine utilities, subsurface structures, soils, groundwater, drains, pipes, rock, or any other obstacles or conditions when ordered by the Engineer or indicated on the Contract Drawings.

The Contractor shall notify the Engineer when test pits will be made in a specific area, for any purpose.

This work shall consist of the satisfactory removal of all materials including pavements and water within the limits of the test pit as necessary. Also included is the satisfactory stockpiling or disposal of surplus or unsuitable material, backfilling, and compacting of the test pit with suitable material as approved by the Engineer. Work shall be done in conformance with all applicable safety codes and applicable sections of these specifications.

CONSTRUCTION METHODS:
Unless otherwise specified, the Contractor shall dig the test pits as indicated on the Contract Drawings or as directed by the Engineer, and notify the Engineer of the results prior to the start of ANY excavation work. The Contractor shall notify the Engineer of any conflicts which may require design revisions, relocations and/or adjustment. No work shall be started within these areas of conflict until authorized by the Engineer.

The Contractor shall measure and record the sizes, configurations, exact horizontal and vertical locations of all utilities, pipes or other obstacles uncovered in the various pits dug under this section. Existing utility information determined by the test pits shall be added to the as-built drawings.

Test pit excavations shall have neat, clean-cut and vertical sides; hand-digging shall be employed when required by the Engineer. Excavation of test pits shall be accomplished by such means as are required to ensure that any underground utilities or structures may be encountered are not damaged. It shall be the Contractor's sole responsibility for any damages incurred during the excavation operations. Any such damages shall be repaired or replaced by the Contractor (if permitted) to the satisfaction of the Engineer at the Contractor's own expense. Where the repair and/or replacement must be done by the Owner, any and all costs thereof shall be borne by the Contractor.

Protect each pit with steel plates, other coverings, fences, barriers or other appropriate materials as deemed necessary. Do not backfill test pits until authorized. Compact backfill materials to 95% to the subgrade elevation or as otherwise directed. The surface of the test pit area shall be restored as directed by the Engineer.

METHOD OF MEASUREMENT:
Test pits will be measured for payment by the number of each test pit dug within the limits and to the depths as ordered and approved by the Engineer.

Test pits will only be measured for payment where:

The location of the test pit is such that said pit will never be incorporated into any excavation being dug for proposed work under this contract.

The test pit will ultimately be within the limits of an excavation required for proposed work under this contract, but said pit must be backfilled for safety or other reasons, as approved by the Engineer, prior to the excavation reaching the location of the pit.

If any pit is not backfilled and subsequently incorporated into the excavation, said pit will not be measured for payment under the Item "Test Pit" but will be measured under the appropriate item.

BASIS OF PAYMENT:
Payment for this work shall be made at the contract unit price per each "Test Pit" performed to the satisfaction of the Engineer. This price shall include pavement removal, excavation of all materials as required, sheeting, shoring, dewatering, backfill, compaction, restoration of the surface of the "test pit", (including pavement repair if necessary) and all other materials, equipment, tools, labor and work incidental to or necessary for the completion of the work

PAY ITEM	**PAY UNIT**
TEST PITS	EA

ITEM #0219011A - SEDIMENT CONTROL SYSTEM AT CATCH BASIN

DESCRIPTION:
This work shall consist of furnishing, installing, cleaning maintaining, replacing, and removing sediment control systems at catch basins at the locations and as shown on plans and as directed by the engineer.

MATERIALS
Sack shall be manufactured from a specially designed woven polypropylene geotextile sewn by a double needle machine, using a high strength nylon thread. Sack shall be manufactured by one of the following or an approved equal:

Siltsack®
SI Geosolutions:
www.sigeosolutions.com
(800)621-0444

Dandy Sack ™
Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284 Fax: 740-881-2791
Email: dlc@dandyproducts.com
Website: www.dandyproducts.com

FLeXstorm Inlet Filters
Inlet & Pipe Protection
24137 W. I11th St -Unit A
Naperville, IL 60564
Telephone: (866) 287-8655
Fax: (630) 355-3477

The sack will be manufactured to fit the opening of the catch basin or drop inlet. Sack will have the following features: two dump straps attached at the bottom to facilitate the emptying of sack and lifting loops as an integral part of the system to be used to lift sack from the basin. The sack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this cord is also a visual means of indicating when the sack should be emptied. Once the strap is covered with sediment, the sack should be emptied, cleaned and placed back into the basin.

CONSTRUCTION METHODS:
Installation, removal, and maintenance shall be per manufacturer instructions and recommendations.

METHOD OF MEASUREMENT:
Sediment control system at catch basin will be measured as each installed, maintained, accepted, and removed. There will be no separate measurement for maintenance or replacement associated with this item.

BASIS OF PAYMENT:
All work associated with this item will be paid for at the contract unit price each for "Sediment Control System at Catch Basin," complete in place and accepted, which price shall include all maintenance throughout construction and all materials, equipment, tools, and labor incidental thereto.

PAY ITEM	**PAY UNIT**
SEDIMENT CONTROL SYSTEM AT CATCH BASIN	EA.

ITEM #0406267A - MILLING OF HOT MIX ASPHALT (HMA) – (0- 4 INCHES)

DESCRIPTION:
This work shall consist of the milling, removal, and disposal of existing HMA pavement.

MATERIALS:
The existing HMA surface shall be disposed of offsite by the Contractor unless otherwise stated in the contract documents.

CONSTRUCTION METHODS:
The Contractor shall remove the HMA material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or directed by the Engineer.
The equipment for milling the pavement surface shall be designed and built for milling flexible pavements. It shall be self-propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing HMA pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The rotary drum of the machine shall utilize carbide tip tools spaced not more than 5/8 inches apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture. The Contractor may request to perform a test strip to demonstrate that the same surface tolerance can be attained at an increased forward speed. The test strip shall be a maximum length of 500 feet and shall have the same criteria for surface tolerance as noted in this specification. The final decision for implementing the increased forward speed will be at the discretion of the Engineer.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.
Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

Surface Tolerance:

The milled surface shall provide a riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the inspector, shall perform random spot-checks with a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 3/8 inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed 3/8 inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking a measurement every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between HMA layers or a surface delamination of HMA on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted +/- ½ inch or until delamination is eliminated.

When removing a HMA pavement entirely from an underlying Portland cement concrete pavement, all of the HMA pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic. If any vertical face is formed in an area exposed to traffic a temporary paved transition will be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to, Section 4.06 – Bituminous Concrete, "Transitions for Roadway Surface", the requirements shown on the plans, or as directed by the Engineer. At all permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.

The milling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications, or other contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper. The sweeper shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. Other sweeping equipment may be provided in lieu of the sweeper where acceptable by the Engineer.

METHOD OF MEASUREMENT:

This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for

minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures. The depth of removal will be calculated by taking a measurement at a minimum every 250 feet per each pass of the milling machine, or as directed by the Engineer. The average depth of each section will determine which payment item is applicable.

BASIS OF PAYMENT:

This work will be paid for at the contract unit price per square yard for "Milling of HMA, (0 to 4 inches)." This price shall include all equipment, tools, labor, and materials incidental thereto.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractors negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled transition; removal and disposal of millings; furnishing a sweeper and sweeping after milling. The costs for these items shall be included in the contract unit price.

PAY ITEM	**PAY UNIT**
MILLING OF HMA – (0 -4 INCHES)	SY

ITEM #0406999A - ASPHALT ADJUSTMENT COST

The Asphalt Price is available on the Department of Transportation web site at: http://www.ct.gov/dotlasphaltadjustment

The asphalt adjustment cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), Polymer Modified Asphalt (PMA), and Ultra-Thin Bonded Hot-Mix Asphalt mixtures completed and accepted in the contract.
An asphalt adjustment cost will be applied only if all of the following conditions are met:

1. For HMA and PMA mixtures:

a. The HMA or PMA mixture in which the adjustment is being applied is listed as a contract item with a pay unit of tons or metric tons.

b. The total quantity for all HMA and PMA mixtures in a contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or more.

c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than $5.00.

II. For Ultra-Thin Bonded HMA mixtures:

a. The Ultra-Thin Bonded HMA mixture in which the adjustment is being applied is listed as a contract item.

b. The total quantity for Ultra-Thin Bonded HMA mixture in a contract exceeds:

   i. 800 tons (727 metric tons) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of tons or metric tons.

   ii. 30,000 square yards (25,080 square meters) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of square yards or square meters.

   Note: The quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA Special Provision.

c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than $5.00.

d. No Asphalt Adjustment Cost shall be applied to the liquid emulsion that IS specified as part of the Ultra-Thin Bonded HMA mixture system.

ITEM# 0406298A – REMOVAL OF BITUMINOUS CONCRETE PAVEMENT

DESCRIPTION:
The work under this item shall consist of the removal of existing pavement structure at locations shown on the plans. These areas shall then be replaced with a bituminous concrete pavement roadway section in accordance with the plans and details. The work for this item includes saw cutting of existing pavement, excavation and disposal of pavement material.

CONSTRUCTION METHODS:
Excavation and grading shall be performed in accordance with the provisions of Article 2.02.03 of the Standard Specifications.

METHOD OF MEASUREMENT:
This work will be measured by the actual number of square yards of completed bituminous concrete pavement removal.

BASIS OF PAYMENT:
This work will be paid for at the contract unit price per square yard for "Pavement Removal," complete in place, which shall include all saw cutting, excavation, removal of existing pavement, and disposal thereof including all equipment, tools labor and materials incidental thereto.

PAY ITEM	PAY UNIT
REMOVAL OF BITUMINOUS CONCRETE PAVEMENT	SY

ITEM #0507001A - TYPE "C" CATCH BASIN- 2FT – SUMPS
ITEM #0507007A – REPLACE TYPE "C"CATCH BASIN TOP
ITEM #0507714A - SPECIAL TYPE "C" CATCH BASIN

All of the provisions of Section 5.07 of the Standard Specifications shall apply, except as amended and/or supplemented herein:

DESCRIPTION: Add the following:
This item shall also include saw cutting and removal of pavement, earth/trench structure excavation, bedding and backfill for the catch basin, pavement repair and connections of the new catch basin to existing storm drainage piping, where required and the replacement of existing catch basin tops with new tops, frams and grates all as shown on the contract plans and details. Additionally, this item shall include protection of existing structures during removal of existing catch basins, protection of the concrete slab above the existing manholes and rebuilding of existing manholes as required during installation of special type catch basin and the removal and legal off-site disposal of existing storm drainage structures or structures, as shown on the plans or directed by the Engineer.

MATERIALS: Add the following:
Bedding material shall conform to Section M.08.21.

METHOD OF MEASUREMENT: Replace with the following:
This work shall be measured for payment per each catch basin of the type specified, furnished and installed complete.

BASIS OF PAYMENT: Replace with the following:
The cost for this work shall be paid for at the contract unit price per each Type "C" Catch Basin, Type "C" Catch Basin Top and Special Type "C" Catch Basin. Included in the cost of this work shall be all materials, labor and equipment necessary for saw cutting concrete pavement, all excavation, bedding, backfill, pavement repair, protection of existing structures, rebuilding of existing manholes, disposal of existing structures and complete installation of the storm drainage catch basins, complete in place as shown on the plans, and described herein.

PAY ITEM	**PAY UNIT**
ITEM #0507001A - TYPE "C" CATCH BASIN	EA
ITEM #0507007A – REPLACE TYPE "C"CATCH BASIN TOP	EA
ITEM #0507714A - SPECIAL TYPE "C" CATCH BASIN	EA

ITEM #0507890A – RAIN GARDEN BASIN

All of the provisions of Section 5.07 of the Standard Specifications shall apply, except as amended and/or supplemented herein:

Article 5.07.01 – Description: Add the following:
Add "and rain garden basins" after the words "drop inlets" wherever it is found in the section.
This item shall also include earth excavation, bedding, and backfill for the rain garden basin.

Article 5.07.02 – Materials: Add the following:
Rain Garden Basin shall be as detailed on the plans and manufactured by:

Nyloplast
3130 Verona Ave
Buford, GA 30518
(866) 888-8479
(770) 932-2443
Fax: (678) 244-0034

Or

APPROVED EQUAL

Bedding material shall conform to Section M.08.21. Backfill material shall conform to Articles 2.16.02 and 2.16.03 of Section 2.17 - Pervious Structure Backfill.

Article 5.07.03 – Construction Methods: Add the following:
Add the words "and "rain garden basin" after the words "drop inlets" wherever it is found in the section.
Shop Drawings: prior to fabrication and delivery, the contractor shall submit shop drawings of the precast structure including reinforcing steel and frame and cover for approval.

Article 5.07.04 – Method of Measurement: Replace with the following: Add the words "and "rain garden basin" after the words "drop inlets" in the first paragraph. This work shall be measured for payment per each yard drain furnished and installed complete.

Article 5.07.05 – Basis of Payment: Add: **10 – Rain Garden Basin** will be paid for at the contract unit price per each "Rain Garden Basin." Included in the cost of this work shall be all materials, equipment, tools, and labor necessary for the complete installation of the yard drain as shown on the plans, and described herein.

PAY ITEM	**PAY UNIT**
RAIN GARDEN BASIN	EA.

ITEM #0608001A - BRICK MASONRY WALLS
ITEM #0608002A - BRICK MASONRY COLUMNS

DESCRIPTION:
This item will consist of constructing brick columns at the location, grades, and to the dimensions and details shown on the plans, and in accordance with these specifications.

REQUIRED SUBMITTALS:
Shop Drawings showing the dimensions, details and finishes of components, accessories, detailed construction methods, and mix designs for all elements including foundation, concrete bases, and pre-cast concrete capstones.

Provide samples for initial selection for the following:

1. Unit masonry samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.

2. Colored mortar samples showing the full range of colors available.

3. Precast concrete capstone color samples in small-scale form showing the full range of colors and textures available.

4. Precast concrete capstone joint sealant color samples in small-scale form showing the full range of colors available.

Provide samples for verification for the following:

1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

2. Colored mortar samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on project. Label samples to indicate types and amounts of pigments used.

Provide material certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Each type of masonry unit required.

    1. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
    2. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
    3. Each cement product required for mortar and grout, including name of manufacturer, brand, and type.

4. Each material and grade indicated for reinforcing bars.
5. Each type and size of joint reinforcement.
6. Each type and size of anchor, tie, and metal accessory.

Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required. Color: To be determined by Landscape Architect

Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

Concrete Block shall conform to article M.08.02 of State of Form 816, State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction.

Brick shall be clay sized to the dimensions on the plans. Samples of the brick showing type, texture, and color shall be submitted to the engineer for approval. The Engineer will reject any brick not meeting the quality for its intended purpose.

MATERIALS:
This section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units;
2. Pre-cast concrete capstones;
3. Face brick;
4. Mortar and grout;
5. Reinforcing steel;
6. Masonry joint reinforcement
7. Miscellaneous masonry accessories
8. Concrete for foundations and footings.

CONCRETE MASONRY UNITS:

1. General:

   a. Provide units without cores or frogs and with exposed surfaces finished.
   b. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314.For Brick Unit Masonry: f'm = 3000 psi.

2. Face Brick: ASTM C 216, Grade SW, Type FBS, and as follows:

1. Manufacturer: To be provided by the Landscape Architect
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
3. Initial Rate of Absorption: Less than 20 g/30 sq. in. per minute when tested per ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Surface Coloring: Brick with surface coloring, other than flashed or sand-finished brick, shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.
6. Size: Manufactured to the following actual dimensions:
    1. Modular: 3-1/2 to 3-5/8 inches wide by 2-1/4 inches high by 7-1/2 to 7-5/8 inches long.
7. Application: Use where brick is exposed, unless otherwise indicated.
8. Color and Texture: To be determined by the Landscape Architect

MORTAR AND GROUT MATERIALS:

1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

2. Hydrated Lime: ASTM C 207, Type N.

3. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.

4. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

a. Colored-Mortar Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

5. Aggregate for Grout: ASTM C 404.

6. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

7. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.

8. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use

with concrete masonry units, containing integral water repellent by same manufacturer.

9. Water: Potable.

10. Products: Subject to compliance with requirements, provide one of the following:

    a. Mortar Pigments:

        1. True Tone Mortar Colors; Davis Colors.
        2. Centurion Pigments; Lafarge Corporation.
        3. SGS Mortar Colors; Solomon Grind-Chem Services, Inc.

    b. Cold-Weather Admixture, if needed:

        1. Accelguard 80; Euclid Chemical Co.
        2. Morseled; W. R. Grace & Co., Construction Products Division.
        3. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.

    c. Water-Repellent Admixture:

        1. Mortar Tite; Addiment Inc.
        2. Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.
        3. Rheopel; Master Builders.

11. Mortar Colors: As selected from manufacturers full color range

REINFORCING STEEL:

1. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

2. Masonry Reinforcing Ladder: ASTM A 641; 9 gauge deformed, mill galvanized

MORTAR AND GROUT MIXES:

1. General: Mortar shall conform to Article M.11.04 of Form 816, State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction.

2. Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

    1. Do not use calcium chloride in mortar or grout.

2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

3. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.

4. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.

3. Extended-Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above, at Contractor's option.
4. Limit cementitious materials in mortar to portland cement, and lime.
5. For masonry below grade, in contact with earth, and where indicated, use Type N.
6. For reinforced masonry and where indicated, use Type N.
7. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

5. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Limit pigments to the following percentages of cement content by weight:

8. For mineral-oxide pigments and portland cement-lime mortar, not more than 10 percent.
9. For carbon-black pigment and portland cement-lime mortar, not more than 2 percent.

6. Grout for Unit Masonry: Comply with ASTM C 476.

10. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
11. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

CONCRETE FOOTINGS:

1. Concrete for the footings shall be Class "A" in conformance with section 6.01 of Form 816, State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction.

2. Leveling pad material shall consist of an eight-inch gravel base as indicated in construction details.

3. Concrete for the capstone shall be Portland cement meeting the requirements of ASTM C 150. The aggregates shall meet ASTM C 33 requirements. Lightweight aggregates shall

meet ASTM C 330 and water shall be potable. Air –Entraining Admixtures shall meet ASTM C 260 and Water-Reducing Admixture shall meet ASTM C 494. Compressive strength for the concrete capstones shall not be less than 4,000 psi at 28 days and the total air content shall not be less than four (4) percent or more than six (6) percent. Submit shop drawings prepared by the pre-cast manufacturer.

DELIVERY, STORAGE, AND HANDLING:

1. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

    a. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.

2. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

3. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

4. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
5. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PROJECT CONDITIONS:

1. Protection of Masonry: During construction, cover tops of walls and projections, with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

    a. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.

    a. Protect ledges and projections from mortar droppings.

3. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry

damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

4. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg. F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

5. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.

   a. When ambient temperature exceeds 100 deg. F, or 90 deg. F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

CONSTRUCTION METHODS:

1. Cold-Weather Procedures: If requested, provide a detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements

2. Excavation for the "Brick Columns" shall conform to the requirements of Article 2.03.03 Form 816, State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction.

3. The foundation for the structure shall be graded level for a width equal to or exceeding the length and width of the "Brick Column" foundation, or as shown on the plans. If rock is encountered in the excavation, it shall be removed to provide a level area, but not greater than the pay limits shown on the plans.

4. Prior to construction, the granular base shall be compacted or supplemented with 8" of compacted gravel. Any foundation soils found to be unsuitable shall be removed and replaced.

5. A reinforced concrete foundation shall be provided as shown on the plans. The foundation shall have dimensions as shown on the details and shall be cast using minimum 3,000 psi 28-day compressive strength concrete.

6. All concrete above the concrete foundation shall be reinforced with steel conforming to the requirements of the plans and details.
7. The materials for the "Brick Columns" shall be handled carefully and installed in accordance with plans and specifications. Special care shall be taken in setting the bottom course of blocks to true line and grade.

8. To avoid damaging the brick veneer, fill shall be placed and compacted carefully after the mortar joints have sufficiently cured. Any materials, which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer.

INSTALLATION - GENERAL:

1. Thickness: Build walls and other masonry construction to the full thickness shown.

2. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

2. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

CONSTRUCTION TOLERANCES:

1. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

2. Do not vary from plumb by more than 1/8 inch in 10 feet, nor ½ inch maximum.

3. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to ½ inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

MORTAR BEDDING AND JOINTING:

1. Lay hollow masonry units as follows: With full mortar coverage on horizontal and vertical face shells.

2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.

3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.

4. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

5. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

REPAIRING, POINTING, AND CLEANING:

1. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

2. Pointing: During the tooling of joints, enlarge voids and holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.

3. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

    1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

    2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

    3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.

    4. Clean brick by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20, using job-mixed detergent solution.

    5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

MASONRY WASTE DISPOSAL:

1. Excess Masonry Waste: Remove excess masonry and waste, and legally dispose of off Owner's property

METHOD OF MEASUREMENT:
This item shall be measured for payment by the square foot of face for Brick Walls and each for Brick Columns installed complete measured from bottom of footing where indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:
Payment for this item shall be at the contract unit price bid per each "Brick Masonry Wall" complete in place, which price shall include excavation, backfill, material, equipment, tools, and labor incidental thereto.

PAY ITEM	**PAY UNIT**
BRICK MASONRY WALLS	SF
BRICK MASONRY COLUMNS	EA

ITEM #0813012A – 5" x 18" GRANITE STONE CURBING
ITEM #0813013A - 5" x 18" GRANITE CURVED STONE CURBING

Work under this item shall conform to the requirements of Section 8.16 of the Standard Specifications amended as follows:

DESCRIPTION: Add the following**:**
This work shall also consist of the removal and satisfactory disposal of all existing curbing, regardless of type, from the locations shown on the plans and directed by the Engineer.

MATERIALS: Add the following**:**
for joints shall be Class "C" in accordance with Section M.03 of the Standard Specifications.

CONSTRUCTION METHODS: Add the following:

5. Removal of Existing Curbing: All existing curbing which is to be removed and which the City wishes to retain shall be transported to a specific City yard site to be determined, as ordered by the Engineer. All other existing curbing not to be retained by the City shall be disposed of by the Contractor in a proper manner.

6. Concrete At Joints: Class "C" Concrete shall be placed at the joints as shown on the Contract Drawings.

BASIS OF PAYMENT: Add the following:
There will be no direct payment for removal of existing curbing, regardless of type, and transporting to a specific City yard site or properly disposing of, as required, nor for concrete at joints along the curb, but the cost of this work shall be considered as included in the general cost of the item.

PAY ITEM	**PAY UNIT**
ITEM #0813012A – 5" x 18" GRANITE STONE CURBING	LF
ITEM #0813013A - 5" x 18" GRANITE CURVED STONE CURBING	LF

ITEM #0901005A - REMOVABLE BOLLARD

DESCRIPTION: The work covered under this item includes furnishing all labor, equipment, materials, and installation of removable cast aluminum bollards as shown on the plans.

REQUIRED SUBMITTALS:

1. Material cut sheets showing the dimensions, catalogue numbers, details, and finishes of components and accessories required for installation.

MATERIALS:

1. Bollard Cover: Edgewater Removable "Type R2" cast aluminum bollard (ABDEDG-16-3.5-R2-CB) with galvanized concrete anchor, black painted by Spring City Electrical MFG., One South Main Street; Spring City, PA 19475. 610-948-4000

2. Concrete: Shall comply with Item section 6.01.

3. Pad Lock: Provide tamper proof padlock for fixing bollard. Turn over keys to owner at project completion.

CONSTRUCTION METHOD:

1. The diameter of the concrete footing shall be equal or slightly larger than the diameter of the bollard galvanized concrete anchor and no greater than 1/2 inch on any side.
2. When pouring the footing, the center galvanized anchor perfectly within the footing so once the bollard is installed there is a consistent footing reveal around the perimeter of the bollard.
3. The anchor must be vertically plumb and perpendicular to the finished surface of the footing so the bollard sits flush with the concrete surface.
4. Set the elevation of the pipe above the footing surface as per the manufacturer's specifications.
5. Once the galvanized pipe has been set, embed the bollard mount as per the manufacturers specifications within the pipe taking care to center and set the mount vertically plumb within the pipe.

METHOD OF MEASUREMENT:

This item shall be measured for payment by each Removable Bollard installed as indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:

Payment for this item shall be at the contract unit price bid per each "Removable Bollard" complete in place, which price shall include excavation, backfill, material, equipment, tools, and labor incidental thereto.

PAY ITEM	PAY UNIT
REMOVABLE BOLLARD	EA

ITEM #0901006A - FIXED BOLLARD

DESCRIPTION:
The work covered under this item includes furnishing all labor, equipment, materials, and installation of removable cast aluminum bollards as shown on the plans.

REQUIRED SUBMITTALS:

1. Material cut sheets showing the dimensions, catalogue numbers, details, and finishes of components and accessories required for installation.

MATERIALS:

1. Bollard Cover: Edgewater Fixed cast aluminum bollard (ABDEDG-16-3.5-CB) with galvanized concrete anchor, black painted by Spring City Electrical MFG., One South Main Street; Spring City, PA 19475. 610-948-4000

2. Galvanized Anchors: Galvanized "J" Bolt as specified by the manufacturer.

3. Concrete: Shall comply with Section 6.01.

CONSTRUCTION METHOD:
1. The diameter of the concrete footing shall be equal or slightly larger than the diameter of the bollard galvanized concrete anchor and no greater than 1/2 inch on any side.
2. When pouring the footing, center the bolt template and galvanized anchors perfectly within the footing so once the bollard is installed there is a consistent footing reveal around the perimeter of the bollard.
3. The anchors must be vertically plumb and perpendicular to the finished surface of the footing so the bollard sits flush with the concrete surface.
4. Once the concrete is fully cured, attach the bollard mounting plate and bollard as per the manufacturer's specifications.

METHOD OF MEASUREMENT:
This item shall be measured for payment by each Fixed Bollard installed as indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:

Payment for this item shall be at the contract unit price bid per each "Fixed Bollard" complete in place, which price shall include excavation, backfill, material, equipment, tools, and labor incidental thereto.

PAY ITEM	PAY UNIT
FIXED BOLLARD	EA

ITEM #0921005A - CONCRETE SIDEWALK RAMP

Concrete sidewalk ramps shall be constructed in accordance with Article 9.21 of the Standard Specifications, supplemented as follows:

DESCRIPTION:

Add the following:

Concrete sidewalk ramp shall include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

This work shall also consist of the removal and satisfactory disposal of all existing curbing, regardless of type, as required during construction of the concrete sidewalk ramps.

MATERIALS:

Add the following:

The Detectable Warning Strip shall be a prefabricated detectable warning surface tile as manufactured from Engineered Plastics Inc. 300 International Drive, Suite 100 Williamsville, NY 14221, telephone number (800) 682-2525 or the approved equal from ADA Fabricators, INC. P.O Box 179 North Billerica, MA 01862 telephone number (978) 262-9900. The tile shall conform to the dimensions shown on the plans and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

Article 9.21.03 – Construction Methods:

Add the following:

The Detectable Warning Strip for new construction shall be set directly in poured concrete according to the plans and the manufacturer's specifications or as directed by the Engineer. The contractor shall place two 25 pound concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete.

All existing curbing which is to be removed and which the City wishes to retain shall be transported to a specific City yard site to be determined, as ordered by the Engineer. All other existing curbing not to be retained by the City shall be disposed of by the Contractor in a proper manner.

METHOD OF MEASUREMENT:

Add the following:

The Detectable Warning Strip will not be measured for payment. All materials, equipment, tools and labor incidental thereto shall be included in the bid price for" Concrete Sidewalk Ramp".

There will be no direct payment for removal of existing curbing, regardless of type, and transporting to a specific City yard site or properly disposing of, as required, but the cost of this work shall be considered as included in the general cost of the item.

ITEM #0921024A - CONCRETE PAVERS

DESCRIPTION:
Concrete pavers installed as part of this project are in addition to existing pavers to remain in place. Pavers shall match in manufacturer, color, texture, dimensions, and installation. The existing paver curb ramp shall be salvaged and reinstalled in the location indicated on the site plans.

REQUIRED SUBMITTALS:

A. Concrete Pavers:
   1. Samples for verification: Three representative full-size samples of each paver type, thickness, color and finish that indicate the range of color variation and texture expected upon project completion.
   2. Accepted samples become the standard of acceptance for the product produced.
   3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.
   4. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.

B. Joint and Setting Bed Sand:
   1. Provide three representative one pound samples in containers of Joint Sand materials.
   2. Provide three representative one pound samples in containers of Setting Bed Sand materials.
   3. Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.

C. Polymeric Joint Sand:
   1. Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.
   2. Samples for Initial Selection: Provide three representative samples in containers of Polymeric Joint Sand material, cured and dried, for color selection.
   3. Samples for Verification: Provide three one pound samples in containers of Polymeric Joint Sand.

D. Base and Subbase Aggregate:
   1. Test results from an independent testing laboratory for sieve analysis per ASTM C 136.

E. Paving Installation Contractor:
   1. Job references from a minimum of three projects similar in size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.

METHODS:

1. QUALITY ASSURANCE
   A. Utilize a Manufacturer having at least ten years of experience manufacturing concrete pavers on projects of similar nature or project size.
   B: Source Limitations:
      1. Obtain Concrete Pavers from one source location with the resources to provide products of consistent quality in appearance and physical properties.

2. Obtain Joint and Setting Bed Sands from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.
3. Obtain Polymeric Joint Sand from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.

C. Paving Contractor Qualifications:
1. Utilize an installer having successfully completed concrete paver installation similar in design, material, and extent indicated on this project.

D. Mockups:
1. Install a 5 ft. x 5 ft. paver area per each paving pattern.
2. Use this area to determine surcharge of the Setting Bed Sand layer, joint sizes, lines, laying pattern(s) and levelness. This area will serve as the standard by which the workmanship will be judged.
3. Subject to acceptance by owner, mock-up may be retained as part of finished work.
4. If mock-up is not retained, remove and dispose legally.

2. DELIVERY, STORAGE & HANDLING

A. Deliver Concrete Pavers in manufacturer's original, unopened and undamaged container packaging with identification labels intact.
1. Coordinate delivery and paving schedule to minimize interference with normal use of streets and sidewalks adjacent to paver installation.
2. Deliver Concrete Pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
3. Unload Concrete Pavers at job site in such a manner that no damage occurs to the product or adjacent surfaces.

B. Store and protect materials free from mud, dirt and other foreign materials.

C. Prevent Joint and Setting Bed Sand from exposure to rainfall or removal by wind with secure, waterproof covering.

D. Store Polymeric Joint Sand on elevated platforms, under a cover and/or in a dry location.

3. PROJECT/SITE CONDITIONS

A. Environmental Requirements:
1. Install Concrete Pavers only on unfrozen and dry Setting Bed Sand.
2. Install Setting Bed Sand only on unfrozen and dry Base or Subbase Aggregate materials.
3. Install Base or Subbase Aggregates only over unfrozen subgrade.
4. Install Setting Bed Sand or Concrete Pavers when no heavy rain or snowfall are forecast within 24 hours.

B. Weather Limitations for Polymeric Jointing Sand:
1. Install Polymeric Joint Sand only when ambient temperature is above 40°F (5°C), under dry conditions with no rain forecast for 24 hours and when surface of pavement is completely dry.

4. CONCRETE PAVER OVERAGE AND ATTIC STOCK
   A. Provide a minimum of 5% additional material for overage to be used during construction.
   B. Contractor to provide 100 square feet of each product and size used to owner for maintenance and repair. Furnish Pavers from the same production run as installed materials.
   C. Manufacture to supply maintenance and reinstatement manuals for Concrete Paver units.

MATERIALS:

1. CONCRETE PAVERS

   A. Basis-of-Design Product: The Concrete Paver shapes are based on:
      1. Unilock:
         a. Umbriano
      2. As manufactured by:
         Unilock
         35 Commerce Drive
         Uxbridge, MA 01569
      3. Substitutions: No substitutions permitted as pavers shall match existing.
   B. Product requirements:
      1. Concrete Paver Type 1: Umbriano
         a. Color: Winter Marvel
         b. Finish: (Select finish type from below and insert here. Finish type will affect product pricing).
            1. Granite appearance (Umbriano) – this is a face mix finish.
         c. Size: Manufacture the sizes indicated with a maximum tolerance of plus or minus 1/16 in all directions.
            1. 16 inches by 16 inches x 2-3/4 inches, to match existing
   C. Provide pavers meeting the minimum material and physical properties set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units. Efflorescence is not a cause for rejection.
      1. Average compressive strength 8000 psi (55MPa) with no individual unit under 7,200 psi (50 MPa).
      2. Average absorption of 5% with no unit greater than 7% when tested according to ASTM C 140.
      3. Resistance to 50 freeze-thaw cycles, when tested according to ASTM C1645, with no breakage greater than 1.0% loss in dry weight of any individual unit. Conduct this test method not more than 12 months prior to delivery of units.

   D. Accept only pigments in concrete pavers conforming to ASTM C 979.
      Note: ACI Report No. 212.3R provides guidance on the use of pigments.
   E. Maximum allowable breakage of product is 5%.

2. JOINT SAND
   A. Provide natural Joint Sand as follows:
      1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.

2. Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to conform to the grading requirements of ASTM C 33.
4. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
5. Gradation as shown in Table 1 below:

TABLE 1 – JOINT SAND
GRADATION REQUIREMENTS FOR JOINT SAND

ASTM C 144		
Sieve Size	**Natural Sand Percent Passing**	**Manufactured Sand Percent Passing**
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 75
No. 50 (0.300 mm)	10 to 30	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075)	0 to 1	0 to 10

3. SETTING BED SAND
   A. Provide Setting Bed Sand as follows:
      1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
      2. Do not use limestone screenings, stone dust, or sand material that does not conform to conform to the grading requirements of ASTM C 33.
      3. Do not use mason sand or sand conforming to ASTM C 144.
      4. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
      5. Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 2 below:

TABLE 2 – SETTING BED SAND
GRADATION REQUIREMENTS FOR SETTING BED SAND

ASTM C 33	
Sieve Size	**Percent Passing**
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10

No. 200 (0.075)	0 to 1

Note: Coarser sand than that specified in Table 1 above may be used for joint sand including C 33 material as shown in Table 2. Use material where the largest sieve size easily enters the smallest joints. For example, if the smallest paver joints are 2 mm wide, use sand 2 mm and smaller in particle size. If C 33 sand is used for joint sand, extra effort may be required in sweeping material and compacting the pavers in order to completely fill the joints.

4. BASE AGGREGATE

A. Provide Base Aggregate materials conforming to ASTM D 2940 and gradation requirements as presented in Table 3.

TABLE 3
BASE AGGREGATE
GRADATION REQUIREMENTS

ASTM D 2940	
Sieve Size	**Percent Passing**
2 in (50 mm)	100
1-1/2 in (37.5 mm)	95 to 100
3/4 in (19 mm)	70 to 92
3/8 in (9.5 mm)	50 to 70
No. 4 (4.75 mm)	35 to 55
No. 30 (600 µm)	12 to 25
No. 200 (75 µm)	0 to 8*

* In order to prevent damage by frost heaving, it may be necessary to limit the percentages of material passing the No. 200 sieve to less than shown in the tables.

5. EDGE RESTRAINTS

A. New concrete pavers will be installed adjacent to concrete walks. The concrete walks shall act as edge restraints.

CONSTRUCTION METHOD:

A. EDGE RESTRAINTS

1. New concrete walls will serve as edge restraints.

D. SETTING BED SAND

1. Provide and spread Setting Bed Sand evenly over the Base Aggregate course and screed to a nominal thickness of 1 in. (25 mm).
   a. Protect screeded Setting Bed Sand from being disturbed by either pedestrian or vehicular traffic.
   b. Screed only the area which can be covered by pavers in one day.

c. Do not use Setting Bed Sand material to fill depressions greater in the base surface.

2. Keep moisture content constant and density loose and constant until Concrete Pavers are set and compacted.
3. Screed the Setting Bed Sand using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards.
4. Carefully maintain spread Setting Bed Sand in a loose condition, and protected against incidental compaction, both prior to and following screeding. Loosen any incidentally compacted sand or screeded sand left overnight before further paving units are placed.
5. Provide lightly screeded Setting Bed Sand in a loose condition to the predetermined depth, only slightly ahead of the paving units.
6. Fully protect screed Setting Bed Sand against incidental compaction, including compaction by rain. Remove any screeded Setting Bed Sand that is incidentally compacted prior to laying of the paving units.
7. Inspect the Setting Bed Sand course prior to commencing the placement of the Concrete Pavers. Acceptance of the Setting Bed Sand occurs with the initiation of Concrete Paver placement.

E. CONCRETE PAVERS

1. Replace Concrete Pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
2. Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colors and textures. (Color variation occurs with all concrete products. This phenomenon is influenced by a variety of factors, e.g. moisture content, curing conditions, different aggregates and, most commonly, from different production runs. By installing from a minimum of three (3) bundles simultaneously, variation in color is dispersed and blended throughout the project).
3. Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.
4. Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.
5. Use string lines or chalk lines on Setting Bed Sand to hold all pattern lines true.
6. Set surface elevation of pavers 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
7. Place units hand tight against spacer bars. Adjust horizontal placement of laid pavers to align straight.
   a. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
8. Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.
9. Prevent joint (bond) lines from shifting more than ±1/2 in. (±13 mm) over 50 ft. (15 m) from string lines.

10. Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
11. Cut Concrete Pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
12. Prevent all traffic on installed Concrete Pavers until Joint Sand has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint Sand material.
13. Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:
    a. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
    b. Compact installed Concrete Pavers to within 6 feet (2 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been compacted and leveling course on which pavers have not been placed, with nonstaining plastic sheets to prevent Setting Bed Sand from becoming disturbed.
14. Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.
15. Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.

F. JOINT SAND
1. Provide, spread and sweep dry Joint Sand into joints immediately after vibrating pavers into Setting Bed Sand course until full. Vibrate pavers and add Joint Sand material until joints are completely filled, then remove excess material. This will require at least 4 passes with a plate compactor.
2. Leave all work to within 3 ft. (1 m) of the laying face fully compacted with sand-filled joints at the completion of each day.
3. Remove excess Joint Sand broom clean from surface when installation is complete.

1. FIELD QUALITY CONTROL

A. Verify final elevations for conformance to the drawings after sweeping the surface clean.
1. Prevent final Concrete Paver finished grade elevations from deviating more than ±3/8 in. (±10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.

B. Lippage: No greater than 1/32 in. (0.8 mm) difference in height between Concrete Pavers and adjacent paved surfaces.

2. REPAIRING, CLEANING AND SEALING
A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to

match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean.
   1. Clean Concrete Pavers in accordance with the manufacturer's written recommendations.

3. PROTECTION
   A. Protect completed work from damage due to subsequent construction activity on the site.

METHOD OF MEASUREMENT:
This item shall be measured for payment by square foot of concrete pavers installed as indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:
Payment for this item shall be at the contract unit price bid per square foot "Concrete Pavers" complete in place, which price shall include material, equipment, tools, and labor incidental thereto.

PAY ITEM	**PAY UNIT**
CONCRETE PAVERS	SF

ITEM #0944000A - FURNISHING AND PLACING TOPSOIL

DESCRIPTION: Amend as follows: The topsoil shall be placed to a depth of 8 inches unless stated otherwise in the contract. Compost shall be placed to a depth of 2 inches unless stated otherwise in the contract.

REQUIRED SUBMITTALS:

1. Soil Test Results from a qualified soil testing laboratory.

MATERIALS: Amend as follows:
All proposed and existing topsoil shall be sent to a qualified soil testing laboratory for analysis. Soil must meet the following requirements:

1. Percentage of Organic Matter: Minimum 3 percent max 6 percent by volume.
2. Soil Reaction: pH of 5.5 to 7
3. CEC of Total Soil: Minimum 10 meq/100 mL at pH of 6.5
4. Soluble-Salt Content: 0.4 to 0.8 mmho/cm
5. Bulk Density: 1.0 g/cu. cm to 1.4 g/cu. cm at 85% compaction.
6. Total Porosity: Minimum 35 percent at 85% compaction.
7. In "Fertility" Subparagraph below, insert single nutrient or a list of nutrients and amounts to suit Project according to testing laboratory's recommendations.
8. Fertility: Optimal levels for Phosphorus, Potassium, Magnesium and Calcium shall be tested for and amendments added per the recommendations of the testing laboratory for the intended soil use.
9. Microbiological Content: Optimal levels for Zinc, Copper, Boron, Iron and Manganese shall be tested for by the testing laboratory for the intended soil use.
10. Sources: Top soil shall come from unammended soils from locations that are naturally well drained where top soil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.
11. Soils shall be completely free of the following: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth. Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 1 inch in any dimension.

Amendments: Soil amendments shall be applied based on recommendations from soil testing laboratory to achieve and optimal planting media.

Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
USCC permits compost to be produced from several feedstocks or raw materials, specifically including, but not limited to, agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated municipal solid waste.

1) Feedstock: Limited to leaves
2) Reaction: pH of 5.0 to 8.5.
3) Soluble-Salt Concentration: Less than 2.0 mmho/cm

4) Moisture Content: 35 to 55 percent by weight
5) Organic-Matter Content: 30 to 40 percent of dry weight
6) Particle Size: Minimum of 98 percent passing through a 1/2 inch sieve

Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5.0 mmho/cm

Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

The following textural classes shall be acceptable:
Sandy loam
Loam

Rain Garden Soil: Soil composed of planting soil, coarse angular washed sand, and organic compost blended to a sandy loam soil according to USDA textures and yielding a viable planting soil which drains freely. Blend soils and materials specified in other articles of this Section to become rain garden soil complying with the following requirements:

1. Sand: 50% of rain garden soil volume, clean, angular, washed free of fines.
2. Planting Soil: 30% of rain garden soil volume, no clay.
3. Compost: 20% of rain garden soil volume, fully decomposed.

ITEM #0949003A - FURNISHING, PLANTING AND MULCHING, SHRUBS, VINES AND GROUND COVER PLANTS
ITEM #0949004A - FURNISHING, PLANTING AND MULCHING, TREES

DESCRIPTION:
Plant material shall be furnished and installed in accordance with 9.49 and supplemented as follows:

SUMMARY

B. Section Includes:
Plants.
Tree-watering devices.
Edging.

1.2 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See item #0944001A furnishing and placing topsoil.

D. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples of each type of mulch.

1.5 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Certificate of warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

B. Warranty Certificate

1.7 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their

natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

B. Handle planting stock by root ball.

C. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

D. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.9 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

Failures include, but are not limited to, the following:

Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance.

Structural failures including plantings falling or blowing over.

Installer is not liable for the following:

Vandalism or theft

B. Warranty Periods: From date of Substantial Completion.

Substantial completion is considered to be the date when all plant material has been installed per the construction drawings. When the contractor feels the planting is substantially complete, the Landscape Architect shall be notified to conduct a punch list to ensure all material has been installed correctly and quantities of plant materials are accurate per the planting schedule found within the construction drawings and or substitutions submitted by the contractor and approved by the Landscape Architect due to plant availability. The contractor is responsible to replace missing and or deceased plants, and complete any corrective measures indicated by the Landscape Architect. A second check will be made by the Landscape Architect to confirm all items have been corrected and shall issue a written approval of the planting confirming Substantial Completion. The date of this letter shall be the start of the warranty period. Plants shall be warranted for the following length of time:

Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
Annuals: Three months.

C. Final Acceptance: At the end of each warranty period, the Landscape Architect shall conduct a punch list to ensure all plant material previously approved at the time of substantial completion are acceptably healthy and well established. The contractor is responsible to replace plants that are dead or are in poor health as described is section 1.9 A Special Warranty. A second check will be made by the Landscape Architect to confirm all items have been corrected and shall issue a written approval of the planting confirming Final Acceptance of the planting.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

C. Annuals: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

Size: 5-gram tablet for ground covers, perennials and annuals; 10-gram tablet for Shrubs, 21-gram tablet for deciduous and evergreen trees.

Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Agritab Corporation

2.3 MULCHES

A. Organic Mulch: Shredded hardwood free of dyes, soil, plastic, rocks, stumps and other debris.

2.4 PESTICIDES AND HERBICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicides: Selective pre-emergence herbicide for the control of certain broadleaf weeds and annual grasses may be applied in ornamental beds. Apply at a rate recommended by the manufacturer to planting beds at the time of mulching.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Dow AgroScience LLC.

C. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period; manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

PART 3 - EXECUTION

3.1 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to item #0944001A furnishing and placing topsoil.

B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

Excavate approximately three times as wide as ball diameter where planting occurs in undisturbed soil.

Excavate approximately one and one half times as wide as ball diameter where planting occurs in project fill.

Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

B. Backfill Soil: Subsoil removed from excavations may not be used as backfill soil unless otherwise indicated.

3.3 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

Backfill: Planting soil.

Balled and Burlapped Stock: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.

Container-Grown Stock: Carefully remove root ball from container without damaging root ball or plant. Scarify/loosen pot bound roots.

Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 4 inches from root tips; do not place tablets in bottom of the hole.

Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.4 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.5 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.6 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

Trees in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.

Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.7 EDGING INSTALLATION

A. Shovel-Cut Edging: Separate mulched areas from turf areas with a 45-degree, 4- to 6-inch deep, shovel-cut edge as indicated on Drawings.

3.8 INSTALLING SLOW-RELEASE WATERING DEVICE

A. Provide one device for each tree.

3.9 TREE ANCHORING WITHIN TREE GRATE

A. Provide one earth anchor duckbill root ball anchor kit for each tree within tree pits. 3 duckbill anchors per tree with webbing strap encircling base of trunk. Install per manufacturer's instructions.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Foresight Products, Inc.

3.10 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

D. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.11 MAINTENANCE SERVICE

A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than warranty period listed under "1.9 WARRANTY" Article.

METHOD OF MEASUREMENT:

Item #0949003A shall be measured for payment by lump sum for all plantings and accessory items not associated with trees and planted in the areas indicated on the plans or ordered by the Engineer.

Item #0949004A shall be measured for payment by each Tree and accessory items planted in the areas indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:

Item #0949003A - Payment for this item shall be at the contract unit price bid as a lump sum for "Furnishing, Planting and Mulching, Shrubs, Vines, and Ground Cover Plants" complete in place, which price shall include excavation, backfill, material, equipment, tools, and labor incidental thereto.

Item #0949004A - Payment for this item shall be at the contract unit price bid per each "Furnishing, Planting and Mulching, Trees" complete in place, which price shall include excavation, backfill, material, equipment, tools, and labor incidental thereto.

PAY ITEM	PAY UNIT
FURNISHING PLANTING AND MULCHING, SHRUBS, VINES AND GROUND COVER PLANTS	LS
FURNISHING PLANTING AND MULCHING, TREES	EA

ITEM #0951002A - TREE GRATE

DESCRIPTION:
This item will consist of installing aluminum tree grates with steel frames at the location, grades, and to the dimensions and details shown on the plans, and in accordance with these specifications.

REQUIRED SUBMITTALS:

1. Material Cut Sheets showing the dimensions, catalogue numbers, details, and finishes of components and accessories required for installation.

MATERIALS:

1. Tree grate: Via Rizo 48 Inch Square (model 4854) with 12" tree opening, cast aluminum with pilfer proof bolts, natural finish, by Ironsmith, Inc., 41-701 Corporate Way, Unit 3, Palm Desert, CA 92260; 1-800-338-4766.

2. Frame: Steel Angle Frame (model 4800F-2) with welded bolt tabs for anchoring, galvanized finish by Ironsmith, Inc., 41-701 Corporate Way, Unit 3, Palm Desert, CA 92260; 1-800-338-4766.

3. Stainless Steel Anchor Bolts: 316 Stainless Steel Threaded Rod and 304 Stainless Steel Sleeve Anchor as indicated in detail.

4. Epoxy: Hilti HIT-HY 200 Adhesive or approved equal.

CONSTRUCTION METHOD:
1. Ensure site is properly prepared. Concrete sidewalk edges shall have a minimum 6" thickened edge. Stone curbing shall be set and concrete encasement structurally sound and unforgiving.

2. Install grates and frames where indicated on plans flush and leveled with surrounding paved surface.

3. Install steel angle frame.

    a. Flush and leveled with surrounding paved surface, maintain flush and leveled at all times. Frames **MUST NOT** slope in more than one direction.
    b. Use spreaders or stakes to keep frame from being distorted.
    c. Install frames per details on plans and manufacturers recommendations.
4. Clean concrete debris from frame prior to tree grate installation
5. If needed, grind pads on underside of tree grate to level and prevent a rocking frame.
6. Pilfer Proof Bolt Installation:
    a. Position tree grates to meet in the center of tree well and have uniform spacing around outside edges of castings. Drill through counter bored holes in the grates and install pilfer proof bolts per the manufacturer's instructions.

METHOD OF MEASUREMENT:
This item shall be measured for payment by each Tree Grate installed as indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:
Payment for this item shall be at the contract unit price bid per each "Tree Grate" complete in place, which price shall include material, equipment, tools, and labor incidental thereto.

PAY ITEM	**PAY UNIT**
TREE GRATE	EA

ITEM #0951010A – STRUCTURED SOIL CELL SYSTEM

DESCRIPTION:
This item will consist of installing Silva cell systems around tree pits and under the concrete sidewalks to the grades, and to the dimensions and detail shown on the plans, and in accordance with these specifications.

REFERENCES:

1. Definitions:

    a. AGGREGATE BASE COURSE: Stone material between the paving and the top of the Silva Cell deck below, designed to distribute loads across the top of the deck.

    b. AGGREGATE SUBBASE: Stone material between the bottom of the Silva Cell base and the compacted subgrade below, designed to distribute loads from the Silva Cell bases to the subgrade.

    c. BACKFILL: The earth used to replace or the act of replacing earth in an excavation beside the Silva Cell system to the excavation extents.

    d. FINISH GRADE: Elevation of finished surface of planting soil or paving.

    e. PLANTING SOIL: Soil as defined in ITEM #0944000A - FURNISHING AND PLACING TOPSOIL, intended to fill the Silva Cell system and other planting spaces.

    f. SILVA CELL SYSTEM:

        1. Silva Cell: One assembled unit made up of 1 base, 6 post assemblies, and 1 Silva Cell deck.

        2. Silva Cell System: Two or more Silva Cells used in combination with each other and with required accessories.

    g. SUBGRADE: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill.

    h. WALK-THROUGH: A process for light compaction of soils by walking through the soil following placement.

2. Reference Standards:

    1. American Association of State Highway and Transportation Officials (AASHTO):
        a. AASHTO H-20

    2. ASTM International (ASTM):
        a. ASTM D448-12, Standard Classification for Sizes of Aggregate for Road and Bridge Construction

b. ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 [600 kN-m/m^3])
c. ASTM D1241-07, Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
d. ASTM D3786/D3786M-13, Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
e. ASTM D4491-99a(2014)e1, Standard Test Methods for Water Permeability of Geotextiles by Permittivity
f. ASTM D4533-D4533M-15, Standard Test Method for Trapezoid Tearing Strength of Geotextiles
g. ASTM D4632-D4632M-15, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
h. ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile
i. ASTM D4833/D4833M-07(2013)e1, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
j. ASTM D5262-07(2012), Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics
k. ASTM D6241-14, Standard Test Method for Static Puncture Strength of Geotextile and Geotextile-Related Products Using a 50mm Probe
l. ASTM D6637-11, Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

REQUIREMENTS:

Preinstallation Conference: Prior to installation of the Silva Cell system and associated Work, meet at Project site with the Contractor, Silva Cell system installer and their field supervisor, manufacturer's technical representative, the Landscape Architect, the Owner at the Owner's discretion, and other entities concerned with the Silva Cell system performance.

1. Provide at least 72 hours advance notice to participants prior to convening preinstallation conference.
2. Introduce and provide a roster of individuals in attendance with contact information.
3. The preinstallation conference agenda will include, but is not limited to the review of:
    a. Required submittals both completed and yet to be completed.
    b. The sequence of installation and the construction schedule.
    c. Coordination with other trades.
    d. Details, materials and methods of installation.
        1) Review requirements for substrate conditions, special details, if any, installation procedures.
        2) Installation layout, procedures, means and methods.
    e. Mock-up requirements.

REQUIRED SUBMITTALS:

Submit these to the [**Landscape Architect**] [**Architect**] [**Engineer**] for review and acceptance not less than 45 days prior to start of installation of materials and products specified in this Section.

1. Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these specifications.
2. Test and Evaluation Reports:
    a. Submit results of compaction testing required by the Specifications for approval.
    b. Include analysis of bulk materials including soils and aggregates, by a recognized laboratory that demonstrates that the materials meet the Specification requirements.
3. Samples:
    a. One full size sample of an assembled Silva Cell.
    b. One 6-inch (150-mm) square piece of geogrid.
    c. One 6-inch (150-mm) square piece of geotextile.
4. Manufacturer's Report: Submit Silva Cell system manufacturer's letter of review and approval of the Project, including Drawings and Specifications, Addenda, Clarifications and Modifications, and for compliance with product installation requirements.
5. Qualification Statements:
    a. Manufacturer:
        1) Submit list of completed projects demonstrating durability and longevity of in-place systems.
            a) Include project name, location, and date of completion.
    b. Installer:
        1) Submit documentation of the qualifications of the Silva Cell system installer and their field supervisor, sufficient to demonstrate that both meet the requirements specified in Article QUALITY ASSURANCE.
        2) Submit list of completed projects of similar scope and scale demonstrating capabilities and experience.
6. Closeout Submittals: Submit these to the Landscape Architect at completion of installation.
7. Warranty: Submit manufacturer's warranty, fully executed.

METHODS:

1. Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary permits/approvals from these authorities.

2. Manufacturer Qualifications:

    a. A manufacturer whose product is manufactured in an ISO/TS 16949 compliant and ISO 9001 - 2008 registered factory.
    b. A manufacturer with not less than 100 Silva Cell systems in-place, each system in use for not less than 3 years, confirming durability and longevity of the system.
    c. A manufacturer with documented written approval of their product for use as a stormwater treatment device by a minimum of 3 governmental jurisdictions.
    d. A manufacturer with an established and demonstrated utility service and repair process, including written procedure and photographs demonstrating work.
3. Installer Qualifications: A qualified installer with not less than 5 years of successful experience installing Silva Cell systems or related products and materials, and whose work has resulted in successful installation of underground piping, chambers and vault structures, planting soils, and planter drainage systems of a similar scope and scale in dense urban areas.

4. Installer's Field Supervisor: A full-time supervisor employed by the installer with not less than 5 years of successful experience similar to that of the installer and present at the Project site when Work is in progress. Utilize the same field supervisor throughout the Project, unless a substitution is submitted to and approved in writing by the Landscape Architect.
5. Mock-Up: Prior to the installation of the Silva Cell system, construct a mock-up of the complete installation at the Project site in the presence of the Landscape Architect.
    a. Size and Extent: Minimum of 100 sq. ft. (9.29 sq. m.) in area and including the complete Silva Cell system installation with subbase, aggregate subbase, drainage installation, Silva Cell decks, posts, and bases, base course aggregate, geotextile, geogrid, backfill, planting soil, and necessary accessories.

    b. The mock-up area may remain as part of the installed Work at the end of the Project provided that it remains undamaged and meets the requirements of the Drawings and Specifications.

DELIVERY, STORAGE, AND HANDLING

1. Silva Cell System: Protect Silva Cell system components from damage during delivery, storage and handling.
    a. Store components on smooth surfaces, free from dirt, mud and debris. Store under tarp to protect from sunlight when time from delivery to installation exceeds one week.

    b. Perform handling with equipment appropriate to the size (height) of Silva Cells and site conditions; equipment may include, hand, handcart, forklifts, extension lifts, or small cranes, with care given to minimize damage to Silva Cell bases, posts, decks and adjacent assembled Silva Cells.

2. Packaged Materials: Deliver packaged materials in original, unopened containers indicating weight, certified analysis, name and address of manufacturer, and indication of conformance with State and Federal laws, if applicable. Protect materials from deterioration during delivery and while on the Project site.

3. Bulk Materials:
    a. Do not deliver or place backfill, soils, or soil amendments in frozen, wet, or muddy conditions.

    b. Provide protection including tarps, plastic and/or matting between bulk materials and finished surfaces sufficient to protect the finish material.

    c. Bring planting soil to the site using equipment and methods that do not overly mix and further damage soil peds within the soil mix.

4. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain

excavated material, backfill, soil amendments and planting mix within the Project limits as needed.

FIELD CONDITIONS

1. Existing Conditions: Do not proceed with Work when subgrades, soils and planting soils are in a wet, muddy or frozen condition.

WARRANTY

1. The Contractor shall warrant the Silva Cell system to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by manufacturer's written warranty against defects in materials and workmanship as follows:
   a. DeepRoot® warrants to the original purchaser of its Silva Cell™ product that such product will be free from defects in materials and workmanship, and perform to DeepRoot's written specifications for the warranted product, when installed and used as specifically provided in the product's installation guidelines for a period of 20 years from the date of purchase. This warranty does not cover wear from normal use, or damage caused by abuse, mishandling, alterations, improper installation and/or assembly, accident, misuse, or lack of reasonable care of the product. This warranty does not apply to events and conditions beyond DeepRoot's control, such as ground subsidence or settlement, earthquakes and other natural events, acts of third parties, and/or Acts of God. If this warranty is breached, DeepRoot® will provide a replacement product. Incurred costs, such as labor for removal of the original product, installation of replacement product, and the cost of incidental or other materials or expenses are not covered under this warranty.
   b. Deeproot® makes no other warranties, express or implied, and specifically disclaims the warranty of merchantability or fitness for a particular purpose. Deeproot® shall not be liable either in tort or in contract for any direct, incidental or consequential damages, lost profits, lost revenues, loss of use, or any breach of any express or implied warranty.

MATERIALS:

1. **MANUFACTURER**
   a. Acceptable Manufacturers:

      1. DeepRoot Green Infrastructure, LLC
         101 Montgomery Street, Suite 2850
         San Francisco, CA, 94104
         800.458.7668

   b. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual.

2. **DESCRIPTION**
   A. The term Silva Cell shall be used to refer to a single Silva Cell or a stack of Silva Cells.
   B. Silva Cells shall be designed for the purpose of growing healthy trees and providing stormwater management.

C. Silva Cells shall be modular, structural systems.

D. Each Silva Cell shall be structurally-independent from all adjacent Silva Cells for incorporating utilities and other site features as well as for future repairs.

E. Silva Cells shall be capable of supporting loads up to and including AASHTO H-20 (United States) or CSA-S6 87.5 kN (Canada) when used in conjunction with approved pavement profiles.

F. Silva Cells shall be open on all vertical faces and horizontal planes and shall have no interior walls or diaphragms.

G. Silva Cells shall be capable of providing a large, contiguous, continuous volume of planting soil that does not inhibit or prevent the following:

1. Placement of planting soil
2. Compaction testing of planting soil, once in place
3. Movement and growth of roots
4. Movement of water within the provided soil volume, including lateral capillary movement
5. Installation and maintenance of utilities placed within, adjacent to, or below the Silva Cell.

H. Silva Cells shall be able capable of being filled with a variety of soil types and soils that include peds 2 inches (50 mm) or larger in diameter as is appropriate for the application, location of the installation, and tree species.

3. SILVA CELL MATERIALS AND ACCESSORIES

A. Silva Cell System Components: Each "Silva Cell 2" soil cell module (hereafter Silva Cell or "cell") is composed of one base, 6 post assemblies, and one deck.

B: 3x Silva Cell 2 System:

1. Components: One base, six 3x posts (a combination of six 1x posts and six 2x posts), and one deck.
2. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 43 inches high (1200 mm long by 600 mm wide by 1092.2 mm high).]

C. Silva Cell Materials and Fabrication:

1. Bases and Posts: Homopolymer polypropylene.
2. Decks: Fiberglass reinforced, chemically-coupled, impact modified polypropylene.

D. Manufacturer's Related Silva Cell Installation Accessories:

1. Strongbacks: An accessory designed to stabilize the Silva Cell posts temporarily, during soil placement, and removed for reuse prior to placing decks.
2. Anchoring Pins: Threaded pins and crossbar for securing assembled Silva Cells to subbase.

4. RELATED PRODUCTS

A. Root Barrier: Recyclable, black, injection molded panels manufactured with a minimum 50 percent post-consumer recycled polypropylene plastic with UV inhibitors, and integrated

zipper joining system which allows instant assembly by sliding one panel into another; for redirecting tree roots down and away from hardscapes.

1. Panel Sizes:
   a. No. UB12-2: 24 inches long by 12 inches deep by 0.080 inches thick (61 cm long by 30 cm deep by 2.03 mm thick); for use with 1x systems and for pavement profiles less than 12 inches (30 cm) deep.
2. Products meeting this specification:
   a. DeepRoot Tree Root Barrier (DeepRoot Green Infrastructure, LLC)

B. Geogrid: Net-shaped woven polyester fabric with PVC coating, uniaxial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids; used to provide a stabilizing force within soil structure as the fill interlocks with the grid .

1. Tensile strength at ultimate (ASTM D6637): 1850 lbs/ft (27.0 kN/m) minimum
2. Creep reduced strength (ASTM D5262): 1000 lbs/ft (14.6 kN/m) minimum
3. Long term allowable design load (GRI GG-4): 950 lbs/ft (13.9 kN/m) minimum
4. Grid aperture size (MD): 0.8 inch (20 mm) minimum
5. Grid aperture size (CD): 1.28 inch (32 mm) maximum
6. Roll size: 6-foot (1.8-m) width is preferred, up to 18-foot (5.4-m).

7. Products meeting this specification:
   a. Stratagrid SG 150, (Strata Systems, Inc.); Cumming, GA; http://www.geogrid.com
   b. Miragrid 2XT (TenCate Nicolon); Norcross, GA; http://www.tencate.com
   c. Fortrac 35 Geogrid (Huesker, Inc.); Charlotte, NC; http://www.hueskerinc.com
   d. SF 20 Biaxial Geogrid (Synteen); Lancaster, SC; http://www.synteen.com

C. Geotextile: Nonwoven polypropylene fibers, inert to biological degradation and resistant of naturally occurring chemicals, alkalis and acids; applied to either the soil surface or between materials, providing filtration, separation, or stabilization properties.

1. Grab tensile strength (ASTM D4632): 200 lbs (900 N) minimum
2. Elongation (ASTM D4632): 50 percent minimum
3. Trapezoid tear strength (ASTM D4533): 80 lbs (350 N) minimum
4. Mullen burst strength (ASTM D3786): 350 psi (2400 kPa)
5. Puncture strength (ASTM D4833): 110 lbs (490 N) minimum
6. CBR puncture strength (ASTM D6241): 500 lbs (2225 N) minimum
7. Apparent opening size (ASTM D4751): 80 sieve (0.18 mm) maximum
8. Flow rate (ASTM D4491): 90 gal/min/ft^2 (3870 l/min/m^2) minimum
9. UV Resistance (at 500 hours): 70 percent strength retained

10. Products meeting this specification:
    a. ADS Geosynthetics 0801T (ADS Geosynthetics); http://www.ads-pipe.com
    b. Mirafi 180 N (TenCate Nicolon); Norcross, GA; http://www.tencate.com
    c. Geotex 801 (Propex Geosynthetics); Chattanooga, TN: http://www.geotextile.com

D. Plastic Cable Ties: A tensioning device or tool used to tie similar or different materials together with a specific degree of tension.

5. **OTHER RELATED MATERIALS**

A. Wood Blocking: Nominal dimensioned untreated lumber used for spacing assembled Silva Cells.
B. Aggregate Subbase (Below Silva Cell Base):
   1. Aggregate meeting one of the following specifications:
      a. Complying ASTM D1241, Type I, Gradation B; Type I mixtures shall consist of stone, gravel, or slag with natural or crushed sand and fine mineral particles passing a No. 200 sieve.

Sieve	Percent Passing
1-1/2 inches (37.5 mm)	100
1 inch (25 mm)	75 to 95
3/8 inch (9.5 mm)	40 to75
No 4 (4.75 mm)	30 to 60
No 10 (2 mm)	20 to 45
No 40 (425 µm)	15 to 30
No 200 (75 µm)	5 to 15

D. Aggregate Base Course (Above Silva Cell Deck):
   1. Same as aggregate subbase specified above.

E. Backfill Material (Adjacent to Silva Cells): Clean, compactable, coarse grained fill soil free of organic material, trash and other debris, and free of toxic material injurious to plant growth.
F. Planting Soil: Imported top soil in full compliance with ITEM #0944000A

CONSTRUCTION METHOD:

1. **EXAMINATION**

A. Examine the conditions under which the Silva Cells are to be installed.
   1. Carefully check and verify dimensions, quantities, and grade elevations.
   2. Carefully examine the Drawings to become familiar with the existing underground conditions before digging. Verify the location of aboveground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system.
   3. Notify the Contractor and the Landscape Architect in writing in the event of conflict between existing and new improvements, of discrepancies, and other conditions detrimental to proper and timely completion of the installation.
   4. Obtain written approval of changes to the Work prior to proceeding. Proceed with installation only after changes have been made and unsatisfactory conditions have been corrected.

2. **PREPARATION**

A. Take proper precautions as necessary to avoid damage to existing improvements and plantings.

B. Prior to the start of Work, layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the complete Silva Cell system.
C. Coordinate installation with other trades that may impact the completion of the Work.

3. TEMPORARY PROTECTION

A. Protect open excavations and Silva Cell system from access and damage both when Work is in progress and following completion, with highly visible construction tape, fencing, or other means until related construction is complete.
B. Do not drive vehicles or operate equipment over the Silva Cell system until the final surface material has been installed.

4. EXCAVATION

A. General: Excavate to the depths and shapes indicated on the Drawings. Provide smooth and level excavation base free of lumps and debris.
B. Confirm that the depth of the excavation is accurate and includes the full section of materials required to place the subbase aggregate, Silva Cell, and pavement profile as indicated on the Drawings.
C. Over-excavate beyond the perimeter of the Silva Cell to allow for:
    1. The extension of aggregate subbase beyond the Silva Cell layout as shown on the Drawings.
    2. Adequate space for proper compaction of backfill around the Silva Cell system.
D. If unsuitable subgrade soils are encountered, consult the Owner's geotechnical consultants for directions on how to proceed.
E. If conflicts arise during excavation, notify the Landscape Architect in writing and make recommendations for action. Proceed with Work only when action is approved in writing.

5. SUBGRADE COMPACTION

A. Compact subgrade to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method, or as approved by the Owner’s geotechnical representative.
B. Do not exceed 7 percent slope for subgrade profile in any one direction. If the 7 percent slope is exceeded, contact manufacturer's representative for directions on how to proceed.

6. INSTALLATION OF GEOTEXTILE OVER SUBGRADE

A. Install geotextile over compacted subgrade.
    1. Lay geotextile flat with no folds or creases.
    2. Install the geotextile with a minimum joint overlap of 18 inches (450 mm).

7. INSTALLATION OF AGGREGATE SUBBASE BELOW SILVA CELL BASES

A. Install aggregate subbase to the depths indicated on the Drawings.
B. Extend subbase aggregate a minimum of 6 inches (150 mm) beyond the base of the Silva Cell layout.

C. Compact aggregate subbase to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method.
D. Do not exceed 7 percent slope on the surface of the subbase. Where proposed grades are greater than 7 percent, step the Silva Cells to maintain proper relation to the finished grade.

8. INSTALLATION OF SILVA CELL BASE

A. Install the Silva Cell system in strict accordance with manufacturer's instructions and as specified herein; where requirements conflict or are contradictory, follow the more stringent requirements.
B. Layout and Elevation Control:
    1. Provide layout and elevation control during installation of the Silva Cell system to ensure that layout and elevations are in accordance with the Drawings.
C. Establish the location of the tree openings in accordance with the Drawings. Once the trees are located, mark the inside dimensions of the tree openings on the prepared subbase.
D. Locate and mark other Project features located within the Silva Cell layout (e.g. light pole bases, utility pipes). Apply marking to identify the extent of the Silva Cell layout around these features. Follow the layout as shown on the Drawings to ensure proper spacing of the Silva Cell bases. Refer to the Drawings for offsets between these features and the Silva Cells.
E. Check each Silva Cell component for damage prior to placement. Reject cracked or chipped units.
F. Place the Silva Cell bases on the compacted aggregate subbase. Start at the tree opening and place Silva Cell bases around the tree openings as shown on the Drawings.
G. Working from tree opening to tree opening, place Silva Cell bases to fill in the area between tree openings.
    1. Maintain spacing no less than 1 inch (25 mm) and no more than 4 inches (100 mm) apart.
H. Follow the Silva Cell layout plan as shown on the Drawings.
I. Install Silva Cell bases around, over, or under existing or proposed utility lines, as indicated on the Drawings.
J. Level each Silva Cell base as needed to provide full contact with subbase. Adjust subbase material, including larger pieces of aggregate, so each base sits solidly on the surface of the subbase. Silva Cell bases that rock or bend over any stone or other obstruction protruding above the surface of the subbase material are not allowed. Silva Cell bases which bend into dips in the subbase material are not allowed. The maximum tolerance for deviations in the plane of the subbase material under the bottom of the horizontal beams of each Silva Cell base is 1/4 inch in 4 feet (6 mm in 1200 mm).
K. Anchor Silva Cell base with 2 crossbar/pin assemblies per base.
    1. For applications where Silva Cells are installed over waterproofed structures, use wood blocking or similar spacing system consistent with requirements of the waterproofing system to maintain required spacing.

9. INSTALLATION OF SILVA CELL POSTS

A. 3x Silva Cell 2 System:

1. Attach 2x posts to the installed Silva Cell base. Each base will receive six 2x posts. Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.
2. Following the placement of backfill and planting soil within the 2x posts, add a 1x post extension as described herein. A 2x post, used in combination with a 1x post is considered a 3x post assembly.

10. INSTALLATION OF STRONGBACKS, GEOGRID, BACKFILL AND PLANTING SOIL

A. Install strongbacks on top of the Silva Cell posts by snapping into place over installed posts prior to installing planting soil and backfill.
   1. Strongbacks are required only during the placement and compaction of the planting soil and backfill.
   2. Move strongbacks as the Work progresses across the installation.
   3. Remove strongbacks prior to the installation of the Silva Cell decks.

B. Install geogrid around the perimeter of the Silva Cell system where the compacted backfill and planting soil interface.
   1. Do not place geogrid between the edge of the Silva Cells and adjacent planting areas.
   2. Cut the geogrid to allow for a 6-inch (150-mm) overlap at the Silva Cell base and a 12-inch (300-mm) overlap at the Silva Cell deck.
   3. Provide a minimum 12-inch (300-mm) overlap between adjacent sheets of geogrid.
   4. Secure geogrid with cable ties below the top of the posts, along the post ridges.

C. Place the first lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation. Place backfill to approximately the midpoint of the Silva Cell post. Do not compact.
D. Place the first lift of planting soil in the Silva Cell system to approximately the midpoint of the Silva Cell post.
   1. Level the planting soil throughout the system.
   2. Walk-through the placed planting soil to remove air pockets and settle the soil. Do not compact greater than 80 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method.
   3. Check placed soil for compaction with a penetrometer or densitometer or similar.

E. Compact the first lift of backfill material, previously spread, to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method or in accordance with Project Specifications for hardscape areas, whichever is greater.
F. Add and compact additional backfill material so that the final finished elevation is at approximately the same level of the placed planting soil within the Silva Cells.
   1. Maintain the geogrid between the Silva Cell system and the backfill material at all times.

G. Place the second lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation so that the material is 2 to 3 inches below the top of the posts. Do not compact.
H. Place the second lift of planting soil inside of the Silva Cell to the bottom of the strongbacks. Walk through.

J. Remove strongbacks, place one 1x posts into each of the previously-installed 2x posts. Rotate clockwise to snap in place, forming a 3x post assembly.
K. Immediately reinstall strongbacks on top of the post assembly.
L. Repeat process of alternately placing backfill and planting soil so that elevation of the compacted backfill and the walked-through planting soil are just below the level of the strongbacks.

3.12 INSTALLATION OF SILVA CELL DECK

A. Obtain final approval by the Landscape Architect of planting soil installation prior to installation of the Silva Cell decks.
B. Remove strongbacks, level out the planting soil, and immediately install decks over the posts below. Place deck over the top of the posts. Push decks down until the deck clips lock into the posts, snapping the deck into place.
C. Fold the 12 inches (300 mm) of geogrid onto the top of the decks.

11. **FINAL BACKFILL PLACEMENT AND COMPACTION**

A. Place and compact final lift of backfill material to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method, such that the backfill is flush with the top of the installed deck. Do not allow compacting equipment to come in contact with the decks.

12. **INSTALLATION OF GEOTEXTILE AND AGGREGATE BASE COURSE OVER THE DECK**

A. Place geotextile over the top of the deck and extend to the edge of the excavation. Overlap joints a minimum of 18 inches (450 mm). Leave enough slack in the geotextile for the aggregate base course to push the geotextile down in the gaps in between the decks.
B. Install the aggregate base course (including aggregate setting bed if installing unit pavers) over the geotextile immediately after completing the installation of the fabrics. Work the aggregate from one side of the layout to the other so that the fabric and aggregate conform to the Silva Cell deck contours.
C. Maintain equipment used to place aggregate base course completely outside the limits of the Silva Cell excavation area to prevent damage to the installed system.
D. For large or confined areas, where aggregate cannot easily be placed from the edges of the excavated area, obtain approval for the installation procedure and types of equipment to be used in the installation from the Silva Cell manufacturer.
E. Compact aggregate base course(s) to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Utilize a vibration or plate compactor with a maximum weight of 800 lbs (362.87 kg).
F. Do not drive vehicles or operate equipment over the completed aggregate base course.

13. INSTALLATION OF CONCRETE CURBS AT TREE OPENINGS, AGGREGATE SUBBASE AND PAVEMENT ABOVE THE SILVA CELL SYSTEM

A. When staking concrete forms (e.g. curbs around the tree openings), prevent stakes from penetrating the Silva Cell decks.
B. Turn down edge of concrete paving to the Silva Cell deck along the edges of tree openings or planting areas to retain the aggregate base course material.
C. Place paving material over Silva Cell system in accordance with the Drawings.

1. The Silva Cell system does not fully meet loading strength until the final paving is installed. Do not operate construction equipment on top of the Silva Cell system until paving installation has been completed.

D. Use care when placing paving or other backfill on top of Silva Cell system to prevent damage to the Silva Cell system or its components.

14. **INSTALLATION OF ROOT BARRIERS**

A. Install root barrier in accordance with manufacturer's installation instructions.

15. **INSTALLATION OF PLANTING SOIL WITHIN THE TREE PLANTING AREA**

A. Remove rubble, debris, dust and silt from the top of the planting soil within the tree opening that may have accumulated after the initial installation of the planting soil within the Silva Cells.

B. Install additional planting soil within the tree openings, to the depths indicated on the Drawings.

1. Use the same soil used within the Silva Cells for planting soil within the tree openings.

C. Compact planting soil under the tree root ball to between 85 and 90 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method, to prevent settlement of the root ball.

D. Place trees in accordance with the Drawings.

16. **PROTECTION**

A. Keep construction traffic away from the limits of the Silva Cells until the final pavement profile is in place. The Silva Cell system does not fully meet loading strength until the final paving is installed.

1. Do not operate equipment directly on top of the Silva Cell system until paving installation has been completed.
2. Provide fencing and other barriers to prevent vehicles from entering into the Silva Cell area.

B. When the Silva Cell installation is completed and the permanent pavement is in place, limit traffic and construction related activities to only loads less than the design loads.

17. **CLEAN UP**

A. Perform clean up during installation and upon completion of the Work. Maintain the site free of soil, sediment, trash and debris. Remove excess soil materials, debris, and equipment from the site following completion of the Work of this Section.

B. Repair damage to adjacent materials and surfaces resulting from installation of this Work using mechanics skilled in remedial work of the construction type and trades affected.

METHOD OF MEASUREMENT:

This item shall be measured for payment by each Silva Cell installation per tree as indicated on the plans or ordered by the Engineer.

BASIS OF PAYMENT:

Payment for this item shall be at the contract unit price bid per each "Silva Cell System" complete in place, which price shall include material, equipment, tools, and labor incidental thereto.

PAY ITEM	**PAY UNIT**
STRUCTURED SOIL CELL SYSTEM	EA

ITEM #0970006A - TRAFFICPERSON (MUNICIPAL POLICE OFFICER) ITEM #0970007A - TRAFFICPERSON (UNIFORMED FLAGGER)

DESCRIPTION:

Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians. Traffic persons requested solely for the contractor's operational needs will not be approved for payment.

CONSTRUCTION METHOD:

Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency or firm, Engineer, and City Police, if applicable, to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project. A copy of the municipality's billing rates for Municipal Police Officers and vehicles, if applicable, will be provided to the Engineer prior to start of work.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required. In the event of an unplanned, emergency, or short term operation, the Engineer may approve the temporary use of properly clothed persons for traffic control until such time as an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficpersons, and such that Trafficperson services are no longer required, the Contractor will be responsible for payment at no cost to the Department of any show-up cost for any Trafficperson not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons assigned to a work site are to only take direction from the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches (50 millimeters). Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no cost to the State.

A Trafficperson shall assist in implementing the traffic control specified in the Maintenance and Protection of Traffic contained elsewhere in these specifications or as directed by the Engineer. Any situation requiring a Trafficperson to operate in a manner contrary to the Maintenance and Protection of Traffic specification shall be authorized in writing by the Engineer.

Trafficpersons shall consist of the following types:

1. Uniformed Law Enforcement Personnel: Law enforcement personnel shall wear the high visibility safety garment provided by their law enforcement agency. If no high visibility safety garment is provided, the Contractor shall provide the law enforcement personnel with a garment meeting the requirements stated below for the Uniformed Flaggers' garment.

Law Enforcement Personnel may be also be used to conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on non-limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer.

Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

2. Uniformed Flagger: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council (NSC) or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Uniformed Flaggers shall conform to Chapter 6E, Flagger Control, in the Manual of Uniformed Traffic Control Devices (MUTCD) and shall wear high-visibility safety apparel, use a STOP/SLOW paddle that is at least 18 inches (450 millimeters) in width with letters at least 6 inches (150 millimeters) high. The paddle shall be mounted on a pole of sufficient length to be 6 feet (1.8 meters) above the ground as measured from the bottom of the sign.

Uniformed Flaggers will only be used on non-limited access highways to control traffic operations when authorized in writing by the Engineer.

METHOD OF MEASUREMENT:

Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services approved by the Engineer. These services shall include, however, only such trafficpersons as are employed within the limits of construction, project right of way of the project or along detours authorized by the Engineer to assist the motoring public through the construction work zone. Services for continued use of a detour or bypass beyond the limitations approved by the Engineer, for movement of construction vehicles and equipment, or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

Trafficpersons shall not work more than twelve hours in any one 24 hour period. In case such services are required for more than twelve hours, additional Trafficpersons shall be furnished and measured for payment. In cases where the Trafficperson is an employee on the Contractor's

payroll, payment under the item "Trafficperson (Uniformed Flagger)" will be made only for those hours when the Contractor's employee is performing Trafficperson services.

Travel time will not be measured for payment for services provided by Uniformed Municipal Police Officers or Uniformed Flaggers.

Mileage fees associated with Trafficperson services will not be measured for payment.

Safety garments and STOP/SLOW paddles will not be measured for payment.

BASIS OF PAYMENT:
Trafficpersons will be paid in accordance with the schedule described herein.

There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

1. **Uniformed Law Enforcement Personnel**: The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount for the contract.

The Department will pay the Contractor its actual costs for "Trafficperson (Municipal Police Officer)" plus an additional 5% as reimbursement for the Contractor's administrative expense in connection with the services provided.

The invoice must include a breakdown of each officer's actual hours of work and actual rate applied. Mileage fees associated with Trafficperson services are not reimbursable expenses and are not to be included in the billing invoice. The use of a municipal police vehicle authorized by the Engineer will be paid at the actual rate charged by the municipality. Upon receipt of the invoice from the municipality, the Contractor shall forward a copy to the Engineer. The invoice will be reviewed and approved by the Engineer prior to any payments. *Eighty (80%) of the invoice will be paid upon completion of review and approval. The balance (20%) will be paid upon receipt of cancelled check or receipted invoice, as proof of payment.* The rate charged by the municipality for use of a uniformed municipal police officer and/or a municipal police vehicle shall not be greater than the rate it normally charges others for similar services.

2. Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)", which price shall include all compensation, insurance benefits and any other cost or liability incidental to the furnishing of the trafficpersons ordered.

PAY ITEM	**PAY UNIT**
TRAFFICPERSON (MUNICIPAL POLICE OFFICER)	EST.
TRAFFICPERSON (UNIFORMED FLAGGER)	HR.

ITEM #0971001A - MAINTENANCE AND PROTECTION OF TRAFFIC

Description is supplemented as follows:

The Contractor shall maintain and protect traffic as follows and as limited in the Special Provision "Prosecution and Progress".

EUGENE O'NEILL DRIVE – GREEN STREET AND SIDE STREETS

The Contractor shall maintain and protect the existing traffic operations. During stage construction, existing traffic operations will be considered to be as shown on the Construction Traffic Control Plans contained herein.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor will be permitted to maintain and protect at least an alternating one-way traffic operation on a paved travelpath not less than 12 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor will be allowed to halt traffic for a period of time not to exceed ten minutes. The Contractor shall allow all stored vehicles to proceed through the work area before halting traffic for another ten-minute period.

COMMERCIAL AND RESIDENTIAL DRIVEWAYS

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits unless the Contractor has first negotiated alternate arrangements with the property owners or business proprietors or as otherwise noted on the plans. Driveway construction shall be coordinated with the property owners. At a minimum, temporary graded surfaces shall consist of subbase, processed aggregate base, granular fill, or other suitable materials approved by the Engineer. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure. Maintaining temporary access will be especially important following the milling operation when the lip on driveway aprons may be excessive and additional temporary measures including bituminous concrete ramps may be needed. The cost for installation and maintenance of all such temporary access measures shall be included in the **Maintenance and Protection of Traffic item. Article 9.71.03 - Construction Method is supplemented as follows:**

SIGNING

The Contractor shall maintain all existing signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate existing signs and sign supports as many times as deemed necessary and install temporary sign supports and foundations if necessary and as directed by the Engineer. The temporary relocation of any existing signs and

supports, and the furnishing, installation and removal of any temporary supports and foundations, shall be paid for under the item "Maintenance and Protection of Traffic."

When all work is completed, the Contractor shall remove and relocate existing signs and install new signs as shown on the Signing and Pavement Marking Plans contained in the contract plans.

SIGNING PATTERNS

The Contractor shall erect and maintain all temporary signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

These signs shall be post-mounted on breakaway sign supports or installed on portable sign supports. These signs are to remain for two weeks, after which the signs and sign supports are to be removed. These signs, sign supports, and the installation and removal of these signs and supports are payable under item 1220013A.

PAVEMENTS MARKINGS - SECONDARY AND LOCAL ROADWAYS

During all phases of construction, the Contractor shall maintain pavement markings on all paved roadway surfaces throughout the project limits.

INTERIM PAVEMENT MARKINGS

The Contractor shall install painted pavement markings which shall include center lines, shoulder edge lines, lane lines, broken lines, lane-use arrows, and stop bars on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, shoulder edge lines are not required. The painted pavement markings will be paid under the appropriate items. If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines, broken lines and stop bars; shoulder edge lines will not be required. Centerlines shall consist of two 4-inch wide yellow markings, 2 ft. on length, side by side, 4 to 6-inches apart, at 40 foot intervals. Stop bars may consist of two 6-inch wide white markings or three 4-inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape immediately prior to installing another course of bituminous concrete pavement. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless otherwise directed by the Engineer.

FINAL PAVEMENT MARKINGS

In accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends," the Contractor should install permanent Epoxy Resin Pavement Markings on the final course of bituminous concrete pavement by the end of the work day/night. If the permanent pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the permanent Epoxy Resin Pavement Markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the permanent Epoxy Resin Pavement Markings are installed. The cost of furnishing and installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

Note: Painted pavement markings will not be allowed as a substitution for either the permanent Epoxy Resin Pavement Markings or the Temporary Plastic Pavement Marking Tape on the final course of bituminous concrete pavement.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS (English Version)

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS: Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

Speed and volume of traffic
Duration of operation
Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 20 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

PLACEMENT OF SIGNS: Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs may be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one- way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

Allowable Adjustment of Signs and Devices Shown on the Traffic Control Plans

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

SECTION 1. WORK ZONE SAFETY MEETINGS

1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of City of New London Engineering, DOT Construction, Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.

1.b) A Work Zone Safety Meeting Agenda, (see Section 10), shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction.

SECTION 2. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

2.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.

2.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.

2.c) Stopping traffic may be allowed:

- As per the contract for such activities as blasting, steel erection, etc.
- During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
- To move slow moving equipment across live traffic lanes into the work area.

2.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, State Police may use traffic slowing techniques, including the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the two TMAs and sign crew should continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.

2.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.

Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travelpath prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.

2.f) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

2.g) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 3. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

3.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).

3.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.

3.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.

3.d) The Flashing Arrow board display shall be in the "arrow" mode for lane closure tapers and in the "caution" mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the "caution" mode when it is positioned in the closed lane.

3.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

3.f) If the required number of Flashing Arrows is not available, the traffic control pattern shall not be installed.

SECTION 4. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

4.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.

4.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs. Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the "flashing arrow" mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, both TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the "caution" mode when traveling in the closed lane.

4.c) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs may be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the "caution" mode when in the closed lane.

4.d) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled "Type 'D' Portable Impact Attenuation System". Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.

4.e) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, then it should be paid at the specified hourly rate for "Type 'D' Portable Impact Attenuation System". When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for "High Mounted Internally Illuminated Flashing Arrow". If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a "Type 'D' Portable Impact Attenuation System" for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a "High Mounted Internally Illuminated Flashing Arrow".

4.f) If the required number of TMAs is not available, the pattern shall not be installed.

SECTION 5. USE OF STATE POLICE OFFICERS

On limited access highways, the Engineer may determine that State Police Officers will be utilized for regional work zone traffic safety and enforcement operations in addition to project-related work zone assignments. State Police Officers shall be uniformed off-duty sworn Connecticut State Police Officers. Their services will also include the use of official State Police vehicles and associated equipment. State Police Officers will be used on all limited access highways. State Police Officers will not be used on non-limited access highways unless specifically under their jurisdiction or authorized in writing by the Engineer. State Police Officers with official State Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites. State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction.

5.a) On a weekly basis, the Contractor shall submit to the Engineer the state police request form as an indication of their scheduled operations for the following week. This form shall be submitted no later than Wednesday morning of the week prior to the scheduled operations. The Engineer shall review this schedule and approve the type and number of Officers required by signing off under the "Completed by DOT's Authorized Representative" line on Department of Public Safety Form DPS-0691-C. Once the Engineer has approved the number of Officers requested the Engineer will fax the order to the Department of Public Safety's Overtime Office.

5.b) Prior to the start of operations, a meeting will be held with the Contractor, Trooper in charge and Engineer to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used for the scheduled work.

5.c) At least one Officer should be used per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed

medians, left lane closures can be implemented without State Police presence. Certain situations may require State Police presence, if one is available, even though the general guidelines above indicate otherwise. Examples of this include: nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur.

5.d) Once the pattern is in place, the State Police Officer should be positioned in a non-hazardous location at the beginning of the pattern or at one of the work areas not protected by a TMA. If traffic backs up beyond the beginning of the pattern, then the State Police Officer should be repositioned prior to the backup to give warning to the oncoming motorists. Where State Police Officer and TMA are in close proximity to each other, the TMA should be placed to protect the State Police Officer's vehicle from oncoming traffic.

5.e) Other functions of the State Police Officer(s) shall include:

- *Assisting entering/exiting construction vehicles within the work area.
- *Enhancing worker visibility/safety for workers in close proximity to the open travel lane(s).
- Speed control of traffic within the work area.
- Enforcement of speed and other motor vehicle laws within the work area.

Typically, the State Police Officer should be out of the vehicle for the function marked with an asterisk (*).

5.f) State Police Officers assigned to a work site are to only take direction from the Engineer. 5.h) There will be no separate payment to the Contractor for State Police Services. The direct cost of such services will be paid by the Department. Indirect costs associated with scheduling and coordinating State Police shall be included under the Item – Maintenance and Protection of Traffic.

SECTION 6. USE OF (REMOTE CONTROL) CHANGEABLE MESSAGE SIGNS

6.a) For lane closures on limited access roadways, one Changeable Message Sign shall be used in advance of the traffic control pattern. Prior to installing the pattern, the Changeable Message Sign shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The

Changeable Message Sign shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, then an additional Changeable Message Sign shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists of the lane closure and provide them an opportunity to take the exit.

6.b) On non-limited access roadways, the use of Changeable Message Signs for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Changeable Message Sign.

6.c) The advance Changeable Message Sign is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the Changeable Message Sign cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance Changeable Message Sign shall be adequately protected if it is used for a continuous duration of 36 hours or more.

6.d) When the Changeable Message Signs are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90□□away from the roadway.

6.e) The Changeable Message Sign generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).

6.f) The Changeable Message Sign should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).

6.g) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

6.h) Section 10 contains the messages that are allowed on the Changeable Message Sign. For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

6.i) If the required number of Changeable Message Signs is not available, the pattern shall not be installed.

SECTION 7. USE OF (REMOTE CONTROL) CHANGEABLE MESSAGE SIGNS WITH RADAR

7.a) (Remote Control) Changeable Message Signs with Radar shall be used when

specified, or as directed by the Engineer.

7.b) The typical placement of a (Remote Control) Changeable Message Sign with Radar is in the work zone portion of the traffic control pattern.

7.c) The typical usage of the (Remote Control) Changeable Message Sign with Radar is to display a message when a preset speed is exceeded. The sign will blank when no vehicles are present.

7.d) The preset speed for activating the message should be set 5-10 MPH above the posted, or desired, speed.

7.e) Section 12 contains the messages that are allowed on the (Remote Controlled) Changeable Message Sign with Radar. For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

SECTION 8. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

8.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.

8.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 72-hour duration.

8.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

8.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

SECTION 9. GENERAL

9.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available, the traffic control pattern shall not be installed**.**

9.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.

9.c) Failure of the Contractor to have the required minimum number of signs and equipment, which results in the not being installed, shall not be a reason for a time extension.

9.d) In cases of legitimate differences of opinion between the Contractor and the Inspection

staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 10. WORK ZONE SAFETY MEETING AGENDA

1) Review Project scope of work and time.
2) Review Section 1.08, Prosecution and Progress of the Special Provisions.
3) Review Section 9.70, Trafficperson of the Specifications.
4) Review Section 9.71, Maintenance and Protection of Traffic of the Special Provisions, including "Work Zone Safety Procedures".
5) Review Contractor's schedule and method of operations.
6) Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
7) Open discussion of work zone questions and issues.
8) Discussion of review and approval process for changes in contract requirements as they relate to work zone areas.

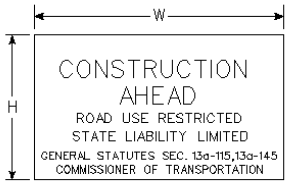
SECTION 11. WORK ZONE SAFETY PROCEDURES - ALLOWABLE MESSAGES FOR CHANGEABLE MESSAGE SIGNS

Message No.	Frame 1	Frame 2	Message No.	Frame 1	Frame 2
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

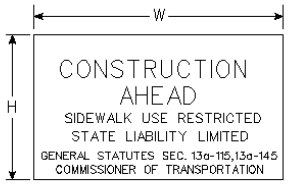
SECTION 12. WORK ZONE SAFETY PROCEDURES - ALLOWABLE MESSAGES FOR CHANGEABLE MESSAGE SIGN WITH RADAR

Message No.	Frame 1	Frame 2	Message No.	Frame 1	Frame 2
1	TOO FAST	SLOW DOWN	4		
2	TOO FAST SLOW DOWN		5		
3	YOU'RE SPEEDING	FINES DOUBLE	6		

SERIES 16 SIGNS



		W	H
16-E	80-1605	84"	60"
16-H	80-1608	60"	42"
16-M	80-1613	30"	24"



		W	H
16-S	80-1619	48"	30"

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED- ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

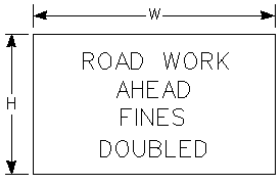
SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHEN THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD, FINES DOUBLED" REGULATORY SIGNS SHALL NOT BE INSTALLED ON TOWN ROADS.

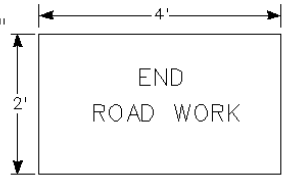
THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.



	W	H
31-1906	48"	42"

"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.



80-9612

REV'D 1-02

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN

REQUIRED SIGNS

APPROVED J.Carey PRINCIPAL ENGINEER DATE 1-02

NOTES FOR TRAFFIC CONTROL PLANS

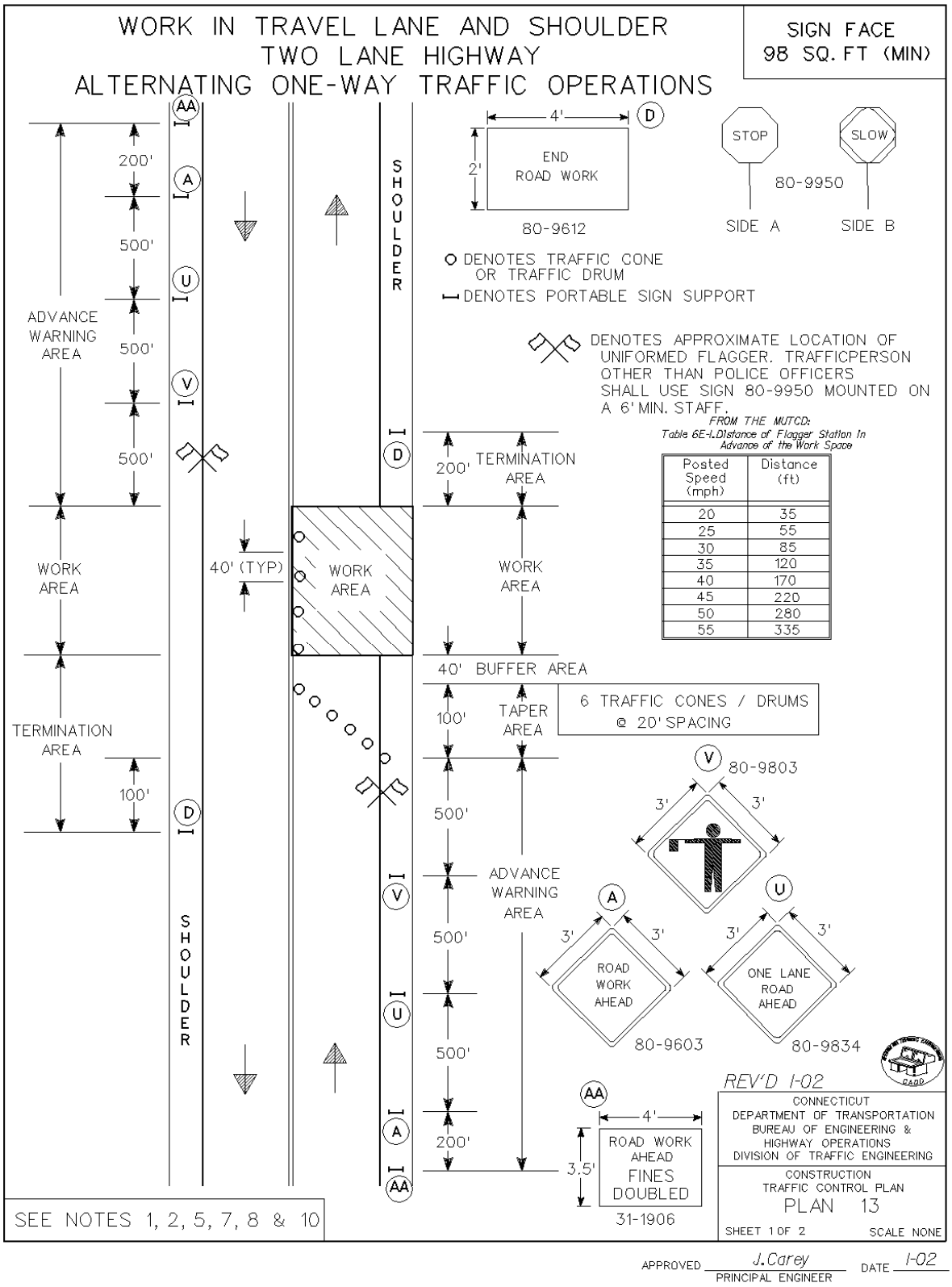
1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A) AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE #1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. A CHANGEABLE MESSAGE SIGN MAY BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
5. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 72 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
6. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA WILL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS REOPENED TO ALL LANES OF TRAFFIC.
7. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED AND TEMPORARY PAVEMENT MARKINGS THAT DEPICT THE PROPER TRAVELPATHS SHALL BE INSTALLED.
8. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 200' ON LOW SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
9. FOR LANE CLOSURES ONE (1) MILE OR LONGER, A "REDUCE SPEED TO 45 MPH" SIGN SHALL BE PLACED AT THE ONE MILE POINT AND AT EACH MILE THEREAFTER.
10. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
11. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.

REV'D 1-02

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
NOTES

NOTES.DGN


WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS
SIGN FACE
98 SQ. FT (MIN)
4'
2'
END
ROAD WORK
80-9612
STOP
SLOW
80-9950
SIDE A
SIDE B
DENOTES TRAFFIC CONE OR TRAFFIC DRUM
DENOTES PORTABLE SIGN SUPPORT
DENOTES APPROXIMATE LOCATION OF UNIFORMED FLAGGER. TRAFFICPERSON OTHER THAN POLICE OFFICERS SHALL USE SIGN 80-9950 MOUNTED ON A 6' MIN. STAFF.
FROM THE MUTCD:
Table 6E-1.Distance of Flagger Station In Advance of the Work Space
Posted Speed (mph) | Distance (ft)
20 | 35
25 | 55
30 | 85
35 | 120
40 | 170
45 | 220
50 | 280
55 | 335
ADVANCE WARNING AREA
200'
500'
500'
500'
WORK AREA
TERMINATION AREA
100'
40' (TYP)
WORK AREA
SHOULDER
SHOULDER
200'
TERMINATION AREA
WORK AREA
40' BUFFER AREA
100'
TAPER AREA
6 TRAFFIC CONES / DRUMS @ 20' SPACING
500'
ADVANCE WARNING AREA
500'
500'
200'
80-9803
3'
3'
ROAD WORK AHEAD
80-9603
ONE LANE ROAD AHEAD
80-9834
REV'D 1-02
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
31-1906
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 13
SHEET 1 OF 2
SCALE NONE
SEE NOTES 1, 2, 5, 7, 8 & 10
APPROVED J.Carey
PRINCIPAL ENGINEER
DATE 1-02

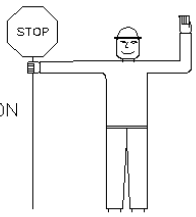
WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.04 FLAGGER PROCEDURES IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TYPICAL DETAIL SHEET ENTITLED "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

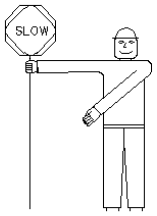
A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



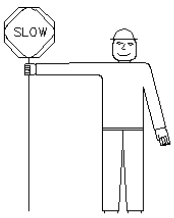
B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



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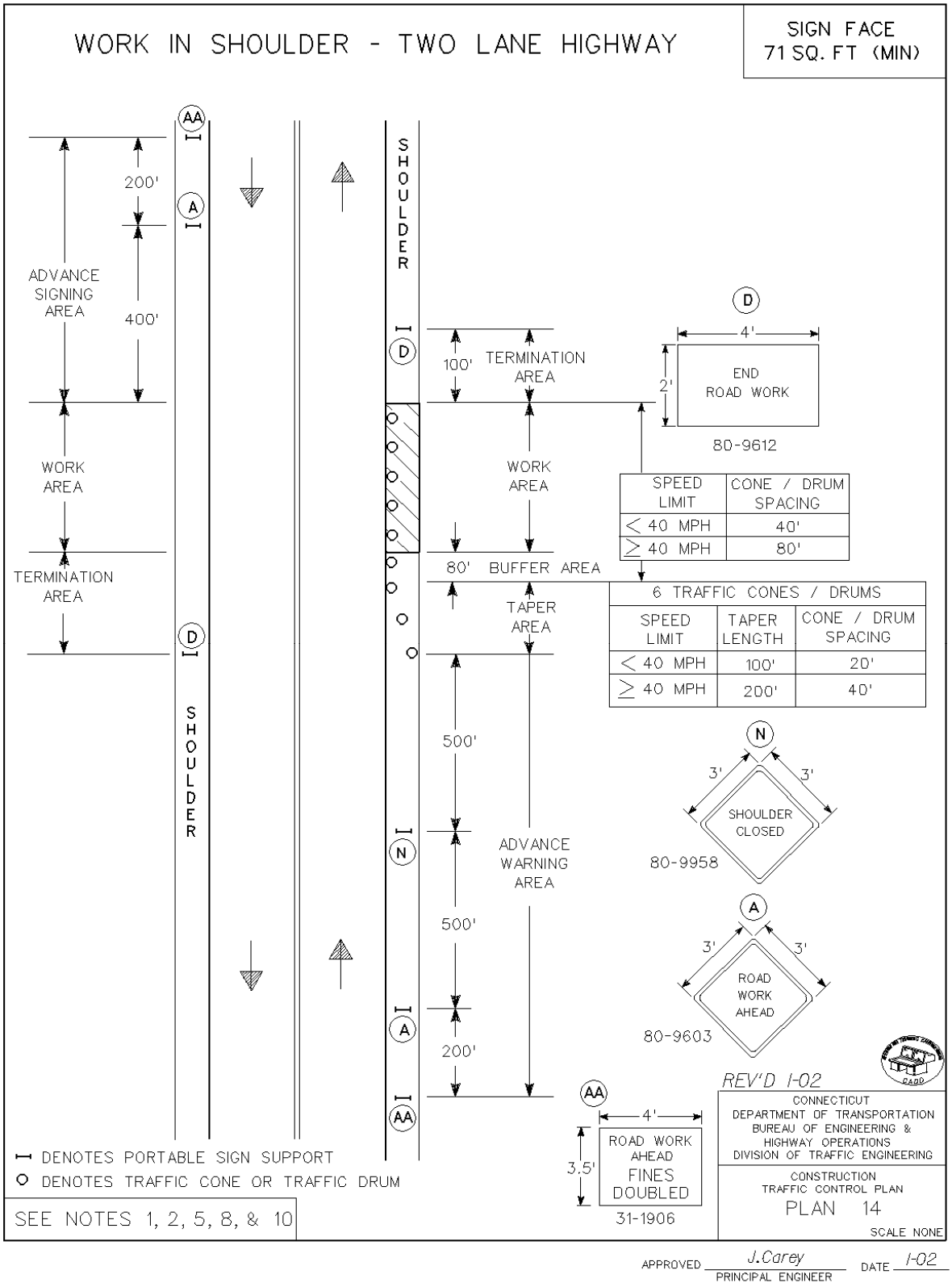
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 13

SHEET 2 OF 2 SCALE NONE

SEE NOTES 1, 2, 5, 7, 8 & 10

APPROVED J.Carey PRINCIPAL ENGINEER DATE 1-02


WORK IN SHOULDER - TWO LANE HIGHWAY
SIGN FACE
71 SQ. FT (MIN)
AA
A
D
N
200'
400'
ADVANCE SIGNING AREA
WORK AREA
TERMINATION AREA
SHOULDER
SHOULDER
100'
TERMINATION AREA
WORK AREA
80' BUFFER AREA
TAPER AREA
500'
500'
200'
ADVANCE WARNING AREA
4'
2'
END ROAD WORK
80-9612
SPEED LIMIT
CONE / DRUM SPACING
< 40 MPH
40'
≥ 40 MPH
80'
6 TRAFFIC CONES / DRUMS
SPEED LIMIT
TAPER LENGTH
CONE / DRUM SPACING
< 40 MPH
100'
20'
≥ 40 MPH
200'
40'
3'
3'
SHOULDER CLOSED
80-9958
ROAD WORK AHEAD
80-9603
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
31-1906
I DENOTES PORTABLE SIGN SUPPORT
O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
SEE NOTES 1, 2, 5, 8, & 10
REV'D 1-02
CONNECTICUT
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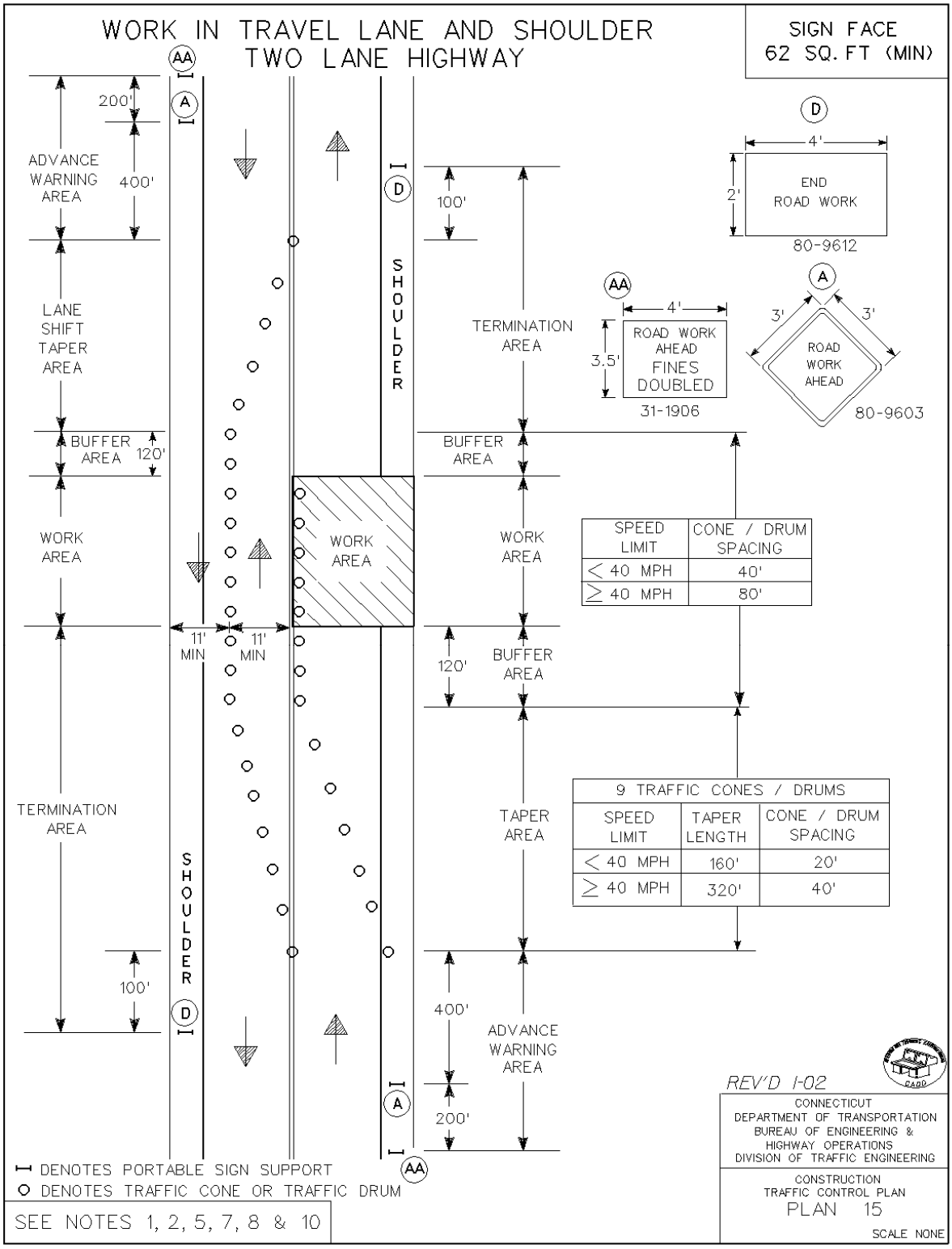
DIVISION OF TRAFFIC ENGINEERING
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 14
SCALE NONE
APPROVED J.Carey
PRINCIPAL ENGINEER
DATE 1-02


WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
SIGN FACE
62 SQ. FT (MIN)
200'
400'
ADVANCE WARNING AREA
LANE SHIFT TAPER AREA
BUFFER AREA
120'
WORK AREA
TERMINATION AREA
100'
SHOULDER
11' MIN
11' MIN
WORK AREA
100'
TERMINATION AREA
BUFFER AREA
WORK AREA
120'
BUFFER AREA
TAPER AREA
400'
ADVANCE WARNING AREA
200'
SHOULDER
4'
2'
END ROAD WORK
80-9612
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
31-1906
3'
3'
ROAD WORK AHEAD
80-9603
SPEED LIMIT
CONE / DRUM SPACING
< 40 MPH
40'
≥ 40 MPH
80'
9 TRAFFIC CONES / DRUMS
SPEED LIMIT
TAPER LENGTH
CONE / DRUM SPACING
< 40 MPH
160'
20'
≥ 40 MPH
320'
40'
I DENOTES PORTABLE SIGN SUPPORT
O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
SEE NOTES 1, 2, 5, 7, 8 & 10
REV'D 1-02
CONNECTICUT
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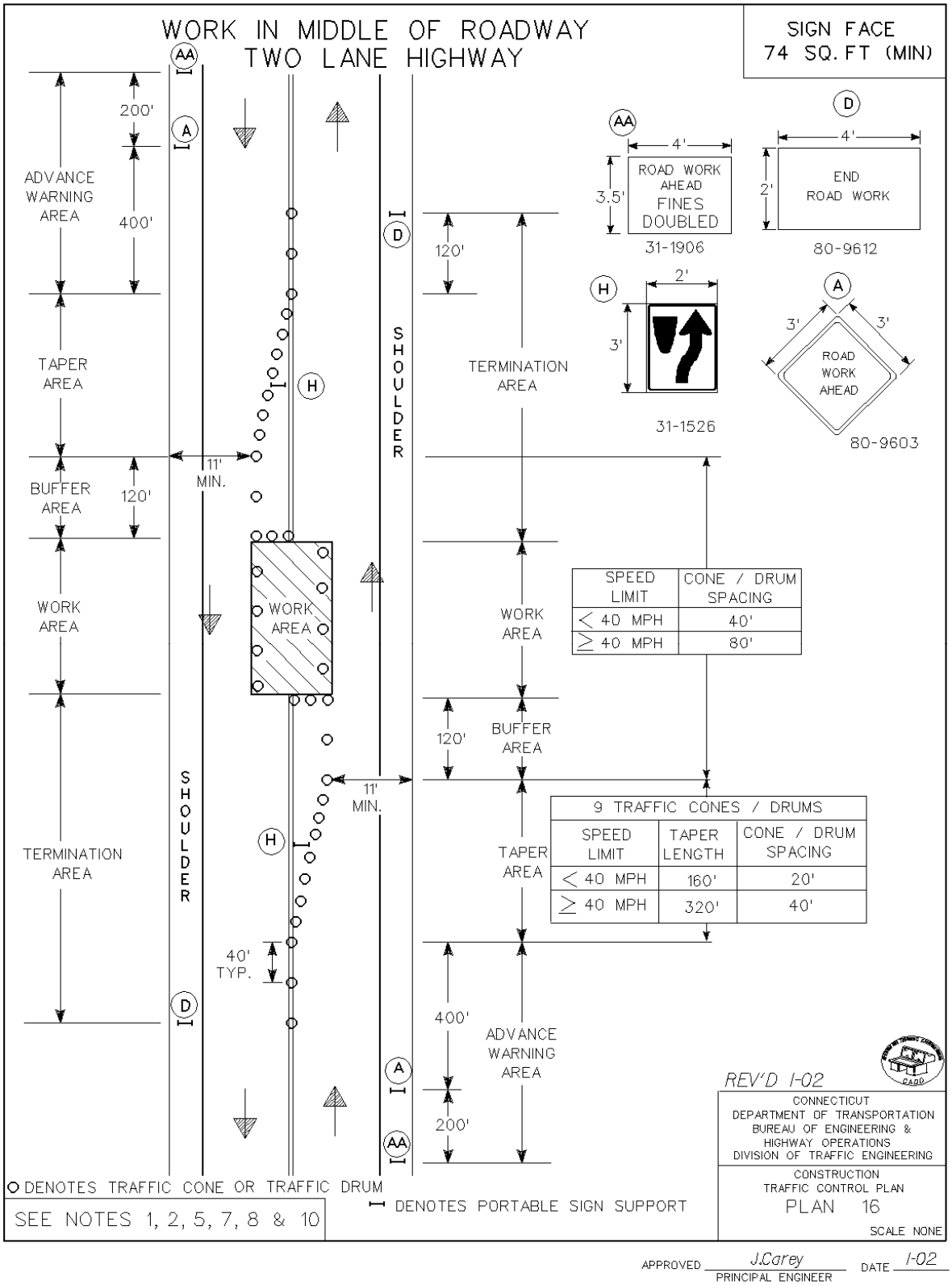
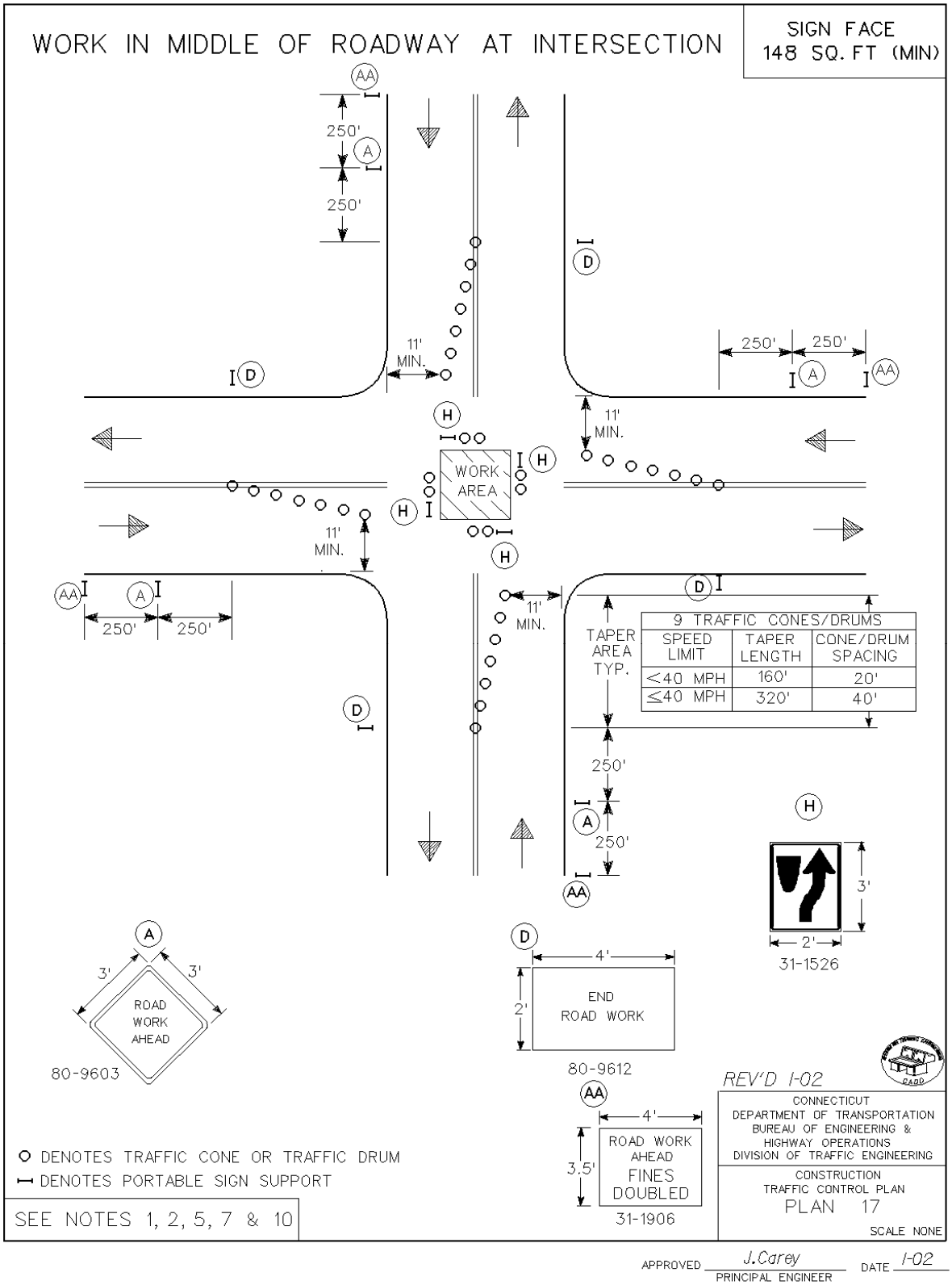
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 15
SCALE NONE
APPROVED J.Carey
PRINCIPAL ENGINEER
DATE 1-02


WORK IN MIDDLE OF ROADWAY
TWO LANE HIGHWAY
SIGN FACE
74 SQ. FT (MIN)
ADVANCE WARNING AREA
200'
400'
TAPER AREA
BUFFER AREA
120'
WORK AREA
TERMINATION AREA
11' MIN.
SHOULDER
WORK AREA
40' TYP.
120'
TERMINATION AREA
WORK AREA
BUFFER AREA
120'
11' MIN.
TAPER AREA
400'
ADVANCE WARNING AREA
200'
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
31-1906
4'
2'
END ROAD WORK
80-9612
2'
3'
31-1526
3'
3'
ROAD WORK AHEAD
80-9603
SPEED LIMIT
CONE / DRUM SPACING
< 40 MPH
40'
≥ 40 MPH
80'
9 TRAFFIC CONES / DRUMS
SPEED LIMIT
TAPER LENGTH
CONE / DRUM SPACING
< 40 MPH
160'
20'
≥ 40 MPH
320'
40'
O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
I DENOTES PORTABLE SIGN SUPPORT
SEE NOTES 1, 2, 5, 7, 8 & 10
REV'D 1-02
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 16
SCALE NONE
APPROVED J.Carey PRINCIPAL ENGINEER
DATE 1-02


WORK IN MIDDLE OF ROADWAY AT INTERSECTION
SIGN FACE
148 SQ. FT (MIN)
250'
250'
11'
MIN.
WORK
AREA
9 TRAFFIC CONES/DRUMS
SPEED LIMIT
TAPER LENGTH
CONE/DRUM SPACING
<40 MPH
160'
20'
≤40 MPH
320'
40'
TAPER
AREA
TYP.
3'
2'
31-1526
ROAD
WORK
AHEAD
80-9603
4'
2'
END
ROAD WORK
80-9612
ROAD WORK
AHEAD
FINES
DOUBLED
3.5'
31-1906
REV'D 1-02
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 17
SCALE NONE
O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
I DENOTES PORTABLE SIGN SUPPORT
SEE NOTES 1, 2, 5, 7 & 10
APPROVED J.Carey
PRINCIPAL ENGINEER
DATE 1-02

Article 9.71.05 – Basis of Payment is supplemented by the following:

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include furnishing, installing, and removing the material for the temporary traversable slope in those areas where a longitudinal dropdown exists.

If there is no method for payment for the temporary transition in those areas where a transverse dropdown exists, then the contract lump sum price for the "Maintenance and Protection of Traffic" shall also include furnishing, installing, and removing the material for the temporary transition.

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include temporarily relocating existing signs and sign supports as many times as deemed necessary and furnishing, installing, and removing temporary sign supports and foundations if necessary during construction of the project.

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include any adjustments or modifications required to the permanent drainage structures, including but not limited to the resetting of catch basin and manhole tops as necessary, to facilitate temporary drainage measures prior to final paving.

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include the cost for installation and maintenance of all temporary access to all commercial and residential properties, including but not limited to temporary graded surfaces consisting of subbase,

ITEM #0979003A - CONSTRUCTION BARRICADE TYPE III

DESCRIPTION:
The Contractor shall furnish construction barricades to conform to the requirements of NCHRP Report 350 (TL-3) and to the requirements stated in Article 9.71
"Maintenance and Protection of Traffic," as shown on the plans and/or as directed by the Engineer.

MATERIALS:

Prior to using the construction barricades, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices conform to NCHRP Report 350 (TL-3).

Alternate stripes of white and orange Type III or Type VI reflective sheeting shall be applied to the horizontal members as shown on the plans. Application of the reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer. Only one type of sheeting shall be used on a barricade and all barricades furnished shall have the same type of reflective sheeting. Reflective sheeting shall conform to the requirements of Article M.18.09.01.

Construction barricades shall be designed and fabricated so as to prevent them from being blown over or displaced by the wind from passing vehicles. Construction barricades shall be approved by the Engineer before they are used.

CONSTRUCTION METHODS:

Ineffective barricades, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

Barricades that are no longer required shall be removed from the project and shall remain the property of the Contractor.

METHOD OF MEASUREMENT:

Construction Barricade Type III will be measured for payment by the number of construction barricades required and used.

BASIS OF PAYMENT:
"Construction Barricade Type III" required and used will
be paid for at the Contract unit price per each. Each barricade will be paid for once, regardless of the number of times it is used.

PAY ITEM	PAY UNIT
CONSTRUCTION BARRICADE TYPE III	EA.

ITEM #0980001A – CONSTRUCTION STAKING

Work under these items shall conform to Section 9.80 of the Standard Specifications, supplemented as follows:

CONSTRUCTION METHODS:

Add the following:

All construction staking shall be performed under the direct supervision of a land surveyor licensed to do business in the State of Connecticut and acceptable to the Engineer.

ITEM #1002111A – DECORATIVE LIGHT POLE FOUNDATION (STREETSCAPE)
ITEM #1002112A – DECORATIVE LIGHT POLE FOUNDATION (PARKING LOT)

Description:
The work under this Item shall consist of furnishing and installing precast concrete decorative light pole foundation of the type and size, according to the detail, and as called for at the location and to the lines and grades as shown on the plans or as directed by the Engineer and in conformity with these specifications.

Materials:
The materials for this work shall conform to the following:
Precast Concrete Foundations, Article M08.02.4 of the Standard Specifications
Ground Rods, Article M15.15-7 of the Standard Specifications

The anchor bolts for this foundation shall be as shown on the plans.

Construction Methods:
The Contractor prior to installation shall confirm that the precast light foundations conform to the details as shown on the plans. If the dimensions for the precast foundations differ in any way from those indicated on the plans, the Contractor shall immediately notify the Engineer.
Necessary rigid metal conduit, anchor bolts, ground rod sleeve and ground rods shall be placed in proper position and held in place by means of a template.

The finished elevation of the top of the foundation shall be as shown on the plans.

Method of Measurements:
This work will be measured for payment for the number of decorative light pole foundation installed, completed and accepted in place,

Basis of Payment:
This work will be paid for at the contract unit price each for "Decorative Light Pole Foundation" complete in place, which price shall include excavation, backfill materials, equipment, labor and

PAY ITEM	PAY UNIT
ITEM #1002111A – DECORATIVE LIGHT POLE FOUNDATION (STREETSCAPE)	EA
ITEM #1002112A – DECORATIVE LIGHT POLE FOUNDATION (PARKING LOT)	EA

ITEM NO. 1003598A- LIGHT POLE & FIXTURE (STREETSCAPE)
ITEM NO. 1003599A- LIGHT POLE & FIXTURE (PARKING LOT)

Refer to Section 10.03 and corresponding materials sections of the 816

DESCRIPTION:
This item shall consist of installing light poles and fixtures and related equipment, on new foundations as indicated on the plans or as directed by the Engineer

MATERIALS:

All material for this work shall be as manufactured by:

STREETSCAPE:
Spring City Electrical Mtg. Co.
Hall and Main Street
P.O. Box 19
Spring City, PA 19475
(610) 948-4000
(610) 948-5577 (fax)
Or
An approved equal

PARKING LOT:
Philips Lighting – North America Corporation
200 Franklin Square Dr
Somerset, NJ 08873
Or
An approved equal

Models and appurtenances for the above are as shown on the drawings.

CONSTRUCTION METHODS:
Add the following:

It shall be the Contractors responsibility to measure the pole base plate bolt hole size and pattern to ensure the foundation anchor bolts are the correct diameter and are placed correctly. The Contractor shall install the pole in accordance with the manufacturer's recommendations.

The Contractor shall repair all scratches or damaged areas of the surface with a touch up material approved by the manufacturer.

METHOD OF MEASUREMENT:
This work shall be measured for payment by the number of light poles and fixtures, fitters and bases and related equipment for each, installed, and accepted in place.

BASIS OF PAYMENT:

This work will be paid for at the contract unit price each for " LIGHT POLE & FIXTURES" complete in place, which shall include all miscellaneous hardware, tools, entrance fittings and work

incidental thereto.

PAY ITEM	**PAY UNIT**
LIGHT POLE & FIXTURE (STREETSCAPE)	EA
LIGHT POLE & FIXTURE (PARKING LOT)	EA

ITEM #1003907A - REMOVE LIGHT STANDARD

DESCRIPTION: Under this item the contractor shall remove existing light standards (along Eugene O'Neill Drive and Green Street) complete with transformer base, bracket, luminaire, and ballast and foundation as indicated on the plans or as directed by the Engineer. Removed light standards, transformer bases, lamps, and remote ballasts shall remain the property of the Contractor.

MATERIALS: The Contractor shall be responsible for damage to all equipment and material incurred during removal and hauling to the specified area. All repairs or replacements due to damage or loss by the Contractor shall be made at the Contractor's expense.

CONSTRUCTION METHODS: The Contractor shall remove a light standard, base, bracket, luminaire, and ballast, where required. All light standards, transformer bases, lamps, and remote ballasts shall be disposed of by the Contractor.

H.I.D. lamps which are to be disposed of by the Contractor, must be handled as hazardous waste, and be subject to the provisions of the Resources Conservation and Recovery Act (RCRA) Subtitle C and chapter 446 of the Connecticut General Statutes. The removed lamps shall not be landfilled or incinerated, but must be handled and disposed of, or recycled, at an approved facility.

METHOD OF MEASUREMENT: This work will be measured for payment by the number of light standards with associated equipment removed and disposed of or delivered to the specified location, complete and accepted.

BASIS OF PAYMENT: This work will be paid for at the contract unit price each for "Remove Light Standard" complete, which price shall include the removal of light standards with associated transformer bases, brackets, luminaires, lamps, cable and hardware, delivering, disposing, hauling, storing, and including all materials, tools, equipment, labor and work incidental thereto.

PAY ITEM	PAY UNIT
REMOVE LIGHT STANDARD	EA

ITEM #1017100A – LIGHT CONTROL CABINET

Description: Work under this item shall consist of furnishing and installing a controller cabinet and all associated hardware to properly control the Light Fixtures. The control equipment shall be installed as specified in the contract drawings or as directed by the Engineer, and in conformance with these specifications.

Materials: The materials for this work shall conform to the requirements of Article M.15.15 and NEMA standards.

Cabinet: The cabinet shall be a NEMA 3R Aluminum Enclosure, 50”L x 30”W x 17”D single door APX Enclosures or approved equal.

Finish: The outside of the cabinet shall have a smooth, uniform, natural aluminum finish.

Pad Mounted Enclosure: Enclosure shall be constructed with a solid plate which shall be in place on the bottom of the enclosure to provide a weathertight seal.

Construction Method: The base mounted cabinet shall have the base casting attached to the foundation and leveled before the cabinet proper is bolted to the base. A mastic type compound conforming to ASTM C-647 shall be used between the cabinet proper and the base casting to make the units rain tight. The cabinet shall be included with a vandal proof lock. The meter shall be 5 terminal and visible to the outside.

Under this item, the Utility Company shall verify the load requirements of the system components for each service location and compensate for any potential changes in electric service that may result in inadequate service connections. The Utility Company shall verify the type and size of electric service cable to be used, as shown on the site plans.

The Contractor shall contact the Utility Company representatives listed on the site plans at least 30 days in advance to coordinate the service connection work to be performed by the Contractor and the Utility Company. The date the service is connected and energized shall be recorded for billing purposes and provided to the Engineer or his designated representative. All work performed by the Contractor under this item shall be in accordance with utility requirements and the National Electrical Code. The Contractor shall obtain the necessary utility specifications prior to any service work.

The Contractor shall make all arrangements with the utility company and complete the required service request forms for all service locations.

This item shall include all required service conductors on the load side of the meter socket. All circuit breakers in the cabinet shall be off when service is connected by the utility company. At all locations, the service installation shall be inspected and approved by the Engineer or his

designated representative prior to the service being energized.

Method of Measurement: This work will be measured for payment as a unit, complete in place and fully operational, and acceptable to the Engineer.

Basis of Payment:
This work will be paid for at the contract unit price each for "Light Control Cabinet", complete in place, which price shall include all materials, equipment, tools and labor incidental thereto. The cost of the cabinet foundation will be paid under this item "Light Control Entrance and Cabinet".

PAY ITEM	**PAY UNIT**
LIGHT CONTROL CABINET	EA.

SECTION 12.08 - SIGN FACE-SHEET ALUMINUM

Work under this item shall conform to the requirements of Section 12.08 amended as follows:

General: Delete all references to parapet mounted sign supports. **Article M.18.15 – Sign Mounting Bolts:** *Replace with the following*:

Bolts used for sign mounting shall be stainless steel and conform to ASTM F593, Group 1 or 2 (Alloy Types 304 or 316). Locking nuts shall be stainless steel and shall conform to ASTM F594 (Alloy Types 304 or 316). Washers shall also be stainless steel and shall conform to ASTM A240 (Alloy Types 304 or 316).

ITEM #1220013A - CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING

DESCRIPTION:

The Contractor shall furnish construction signs with bright fluorescent sheeting and their required portable supports or metal sign posts that conform to the requirements of NCHRP Report 350 (TL-3). The construction signs and their required portable supports or metal sign posts shall conform to the signing requirements stated in Article 9.71 "Maintenance and Protection of Traffic", as shown on the plans and/or as directed by the Engineer.

MATERIALS:

Prior to using the construction signs and their portable supports, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Portable sign supports shall be designed and fabricated so as to prevent signs from being blown over or displaced by the wind from passing vehicles. Portable sign supports shall be approved by the Engineer before they are used. Mounting height of signs on portable sign supports shall be a minimum of 1 foot and a maximum of 2 feet, measured from the pavement to the bottom of the sign.

All sign faces shall be rigid and reflectorized. Sheet aluminum sign blanks shall conform to the requirements of Article M.18.13. Metal sign posts shall conform to the requirements of Article M.18.14. Application of reflective sheeting, legends, symbols, and borders shall conform to the requirements specified by the reflective sheeting manufacturer. Attachments shall be provided so that the signs can be firmly attached to the portable sign supports or metal posts without causing damage to the signs. A Materials Certificate and Certified Test Report conforming to Article
1.06.07 shall be required for the reflective sheeting.

The following types of construction signs shall not be used: mesh, non-rigid, roll-up.

The following portable sign support systems or equivalent systems that meet the above requirements may be used: Korman Model #SS548 flexible sign stand with composite aluminum sign substrate (APOLIC)

 Traffix “Little Buster” dual spring folding sign stand with corrugated polyethylene (0.4 in.
thick) sign substrate (InteCel)

Reflective sheeting shall conform to the following:

The fluorescent orange prismatic retroreflective sheeting shall consist of prismatic lenses formed in a transparent fluorescent orange synthetic resin, sealed, and backed with an aggressive pressure sensitive adhesive protected by a removable liner. The sheeting shall have a smooth

surface.

Physical Properties:

A. Photometric -Coefficient of Retroreflection RA When the sheeting applied on test panels is measured in accordance with ASTM E 810, it shall have minimum coefficient of retroreflection values as shown in Table I. The rotation angle shall be as designated by the manufacturer for test purposes, the observation angles shall be 0.2 degrees and 0.5 degrees, the entrance angles (component B1) shall be -4 degrees and +30 degrees.

TABLE I

Minimum Coefficient of Retroreflection RA
Candelas per foot-candle per square foot

Observation Angle (deg.)	Entrance Angle (deg.)	RA Orange
0.2	-4	200
0.2	+ 30	90
0.5	-4	80
0.5	+ 30	50

The rotation shall be as designated by the manufacturer.

B. Daytime Color –
Color shall conform to the requirements of Table II. Daytime color and maximum spectral radiance factor (peak reflectance) of sheeting mounted on test panels shall be determined instrumentally in accordance with ASTM E 991. The values shall be determined on a Hunter Lab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 (or approved equal 0/45 instrument with circumferential viewing illumination). Computations shall be done in accordance with ASTM E 308 for the 2 degree observer.

TABLE II
Color Specification Limits** (Daytime)

Color	1		2		3		4		Reflectance Limit Y (%)	
	X	Y	X	Y	X	Y	X	Y	MIN	MAX
Orange (new)	.583	.416	.523	.397	.560	.360	.631	.369	28	-
Orange (weathered d)	.583	.416	.523	.397	.560	.360	.631	.369	20	45

Maximum Spectral Radiance Factor, new: 110%, min. weathered: 60%, min.

** The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colorimetric system measured with standard illuminant D65.

C. Nighttime Color

Nighttime color of the sheeting applied to test panels shall be determined instrumentally in accordance with ASTM E 811 and calculated in the u', v' coordinate system in accordance with ASTM E 308. Sheeting shall be measured at 0.33 degrees observation and -4 degree entrance at rotation as determined by the manufacturer for test purposes. Color shall conform to the requirements of Table III.

TABLE III

Color Specification Limits ** (Nighttime)

D. Resistance to Accelerated Weathering

Color	1		2		3		4	
	u'	v'	u'	v'	u'	v'	u'	v'
Orange (new and weathered)	.400	.540	.475	.529	.448	.522	.372	.534

The retroreflective surface of the sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after one year's unprotected outdoor exposure in south Florida, south-facing and inclined 45 degrees from the vertical, or after 1500 hours exposure in a xenon arc weatherometer in accordance with ASTM G26, Type B, Method A. Following exposure, panels shall be washed in a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft clean cloth and brought to equilibrium at standard conditions. After cleaning, the coefficient of retroreflection shall be not less than 100 when measured as in D.2, below, and the color is expected to conform to the requirements of Tables II and III for weathered sheeting. The sample shall:

1. Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 0.031 inch shrinkage or expansion.

2. Be measured only at angles of 0.2 degrees observation, -4 degrees entrance, and rotation as determined by the manufacturer for test purposes. Where more than one panel of color is measured, the coefficient of retroreflection shall be the average of all determinations.

E. Impact Resistance

The retroreflective sheeting applied according to the manufacturer's recommendations to a test panel of alloy 6061-T6, 0.040 inch by 3 inches by 5 inches and conditioned for 24 hours, shall show no cracking outside the impact area when the face of the panel is subjected to an impact of 100 inch-pounds, using a weight with a 0.625 inch diameter rounded tip dropped from a height necessary to generate an impact of 100 inch-pounds, at test temperatures of both 32° F and 72° F.

F. Resistance to Heat

The retroreflective sheeting, applied to a test panel as in E., above, and conditioned for 24

hours, shall be measured in accordance with Paragraph A. at 0.2 degree observation and -4 degree entrance angles at rotation as determined by the manufacturer for test purposes and exposed to 170°± 5° F for 24 hours in an air circulating oven. After heat exposure the sheeting shall retain a minimum of 70% of the original coefficient of retroreflection.

G. Field Performance:

Retroreflective sheeting processed and applied to sign blank materials in accordance with the sheeting manufacturer's recommendations, shall perform effectively for a minimum of 3 years. The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than 100 when measured at 0.2 degrees observation and -4 degree entrance. All measurements shall be made after sign cleaning according to the sheeting manufacturer's recommendations.

CONSTRUCTION METHODS: Ineffective signs, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

Signs and their portable sign supports or metal posts that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Rev. Date 1/17/01

METHOD OF MEASUREMENT: Construction Signs -Bright Fluorescent Sheeting will be measured for payment by the number of square feet of sign face. Sign supports will not be measured for payment.

BASIS OF PAYMENT: "Construction Signs - Bright Fluorescent Sheeting" required and used on the project will be paid for at the Contact unit price per square foot. This price shall include the furnishing and maintenance of the signs, portable sign supports, metal sign posts and all hardware. Each sign and support or posts will be paid for once, regardless of the number of times it is used.

PAY ITEM	**PAY UNIT**
CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING	SF

ITEM #1302061A – RESET GATE BOX (WATER)
ITEM #1302062A – RESET GATE BOX (GAS)

DESCRIPTION:

Under this item, the Contractor shall reset to final grade, the gate boxes and covers appurtenant to the various utilities present within the project limits.

MATERIALS:

The Contractor is to reuse existing gate boxes, covers and extension appurtenances. Should any materials be verified to need replacement in the field, the Contractor shall coordinate with the proper utility company to replace the materials to complete the work. The Contractor will coordinate the work of resetting the gate boxes with the various utilities.

CONSTRUCTION METHODS:

The Contractor shall carefully reset the gate boxes to final grade during the final paving course or immediately after the final paving course has been completed.

METHOD OF MEASUREMENT:

Resetting of gate boxes will be measured as units. When resetting gate boxes, there will be no measurement for excavation, cutting, removal and replacement of pavement.

BASIS OF PAYMENT:

Resetting of gate boxes will be paid for at the contract unit price each for "Reset Gate Boxes", regardless of type, complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement structure, and all materials, equipment, tools and labor incidental thereto. There will be no separate payment for cut-ins for new pipe entrances and rebuilding invert tables.

PAY ITEM	**PAY UNIT**
RESET GATE BOXES (WATER)	EA
RESET GATE BOXES (GAS)	EA

ITEM #1403501A - RESET MANHOLE (FRAMES AND COVERS)

DESCRIPTION:

This item shall consist of the adjustment to final grade the manhole frames and covers on Manholes, all as shown, specified or directed. It shall also consist of the furnishing and the installation of additional manhole riser sections, brick masonry, where necessary, and metal manhole extension rings to manhole frame; where indicated on the plans or directed by the engineer.

MATERIALS:

Materials shall conform to the following:

BRICK UNITS - Shall conform to ASTM C-32, Grade MS

MORTAR – Shall conform to Section M.11

MANHOLE RISER SECTIONS - Shall conform to ASTM C-478

MANHOLE RUNGS (STEPS) - Shall be 14 inches x 10 7/8 inches forged aluminum safety rung fabricated from 6061-T6 aluminum alloy as manufactured by ALCOA, or equal; or copolymer polypropylene steps in conformance with ASTM D4101, Grade 60 steel reinforcing rod, ASTM A615, with epoxy coating, ASTM A-934/M-95. The steps shall be either Model PS-1B or PS2-PFSL as manufactured by M.A. Industries, Inc. or equal.

MANHOLE EXTENSION RINGS - Shall conform to Article M.08.02-5 Metal for Drainage Structures. The type of manhole extension rings will be designed so that the existing manhole cover, when set in place, will have substantially the same bearing, fitness and load carrying capacity as existed in the existing manhole frame. The extension rings shall be designed to fit into the original manhole frame resting specifically on the flange area that originally supported the manhole cover.

CONSTRUCTION METHODS:

The Contractor shall carefully excavate the manhole frame and cover and add or delete brick masonry as necessary to reset the frame and cover to the final grade.

The present cover slab or cone section may be reused if it is not damaged. If the cover slab or cone section is damaged, it shall be replaced by the Contractor at his expense.

The Contractor may be required to “un-stack” the existing cone section so that riser sections can be added or deleted, where the change in grade is greater than 12 inches.

The distance between the proposed elevation of the manhole cover and the first manhole step shall be a minimum of 12 inches and a maximum of 16 inches.

Any material damaged by the Contractor shall be repaired or replaced by the Contractor at no cost to the City.
Where the change in grade is 3 inches or less, metal manhole extension rings shall be used to raise and support the existing manhole covers to the grade of the proposed roadway surface without disturbing the existing manhole frame.

METHOD OF MEASUREMENT:

The work for "Reset Manhole (Frames and Covers)" will be measured for payment by the actual number of each manhole reset to grade and accepted by the Engineer.

BASIS OF PAYMENT:

This work will be paid for at the Contract unit price for each contract price for "Reset Manhole (Frames and Covers)" complete in place, which price shall include all labor and equipment necessary to incorporate the manhole into the work. It shall also include the clearing, trenching, excavation and disposal of excavated materials, refilling trenches, furnishing additional material for refilling, grading, sheeting, bracing, pumping, and temporary and permanent resurfacing of DISTURBED AREAS.

PAY ITEM	**PAY UNIT**
RESET MANHOLE (FRAMES AND COVERS)	EA.

ITEM # 1303196A – RELOCATE HYDRANT (COMPLETE)

DESCRIPTION

The work required consists of furnishing all labor, equipment, appliances and materials and performing all operations in connection with the relocation of fire hydrant assemblies at the locations and to the details indicated and/or as directed by the Engineer including all pipe, fittings, valves and accessories, connections to other piping and structures, and testing of assemblies.

MATERIALS

A. Ductile iron pipe and fittings shall be ductile iron pipe manufactured in accordance with AWWA C151, latest revision, thickness Class 52 per AWWA C150, latest revision. Fittings shall be ductile iron rated at 250 psi conforming to AWWA C110, latest revision. Ductile iron pipe and fittings shall be provided with a double thickness of cement-mortar lining conforming to AWWA C104, latest revision. The cement-mortar lining shall be seal coated. Exterior surfaces of pipe and fittings shall be given a standard bituminous coating of coal-tar or asphalt of 0.04" minimum thickness. Joints for ductile iron pipe shall be rubber gasket push-on type, while fittings shall have mechanical joints with retainer glands. Pipe and fitting joints shall conform to AWWA C110 and C111, latest revision. All pipe, pipe, fittings, accessories and appurtenances shall be new and unused.

B. All bolts, nuts, rods, and miscellaneous connecting pieces not provided with an approved factory coating shall be given two (2) coats of bitumastic 50 after installation.

C. Crushed stone shall consist of clean, hard, durable, crushed rock and shall be satisfactorily free from fine sand, silt or rock flour. Crushed stone shall be uniformly graded 3/4" washed stone and conforming to ASTM Designation: D693, latest revision.

D. Hydrant Tees shall be ductile iron and must provide positive restraint to mechanical joint valves/fittings attached to the branch. Shall include all accessories, nuts & bolts. Shall be corten or ductile iron, high strength, low alloy steel per ANSI/AWWA A21.11/C-111. Must be North American made.

CONSTRUCTION METHODS

A. All new pipe shall have cast on it or stamped on it by means of a hand die stamp, the manufacturer's name or mark, and the year in which the pipe was cast. Also, the weight, thickness, class and sampling period shall be painted on each pipe. All pipe, fittings, hydrants and accessories shall be carefully inspected by the Contractor for damage before relocation and all defective, unsound or damaged materials shall be rejected. The Engineer will make such additional inspection he deems necessary and the Contractor shall furnish all necessary assistance for such inspection.

B. No pipe joints shall be covered in any way until the joints have been inspected.

C. Proper implements, tools and facilities, satisfactory to the Engineer shall be provided by the Contractor for the proper and satisfactory execution of the work.

D. The Contractor shall coordinate new installation and relocation work with and in accordance, to the City of New London Water Department.

E. The interior of pipe, valves, hydrants and fittings shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying

operations.

F. The trench bottom and bedding shall be shaped and compacted to give substantially uniform unyielding circumferential support to the lower quarter of pipe and valves along their entire length. Bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from the trench bottom.

G. Hydrant assemblies, including all pipe, fittings, and accessories shall be installed in conformance with the AWWA Specification C600, latest revision, and the additional requirements specified herein.

H. Ductile iron pipe shall be cut only by means of abrasive saws, hack saws, wheel type cutters, or milling type cutters. The use of "squeeze" type pipe cutters, cutting torches, diamond points, and dog chisels will not be permitted. This work shall be done by the Contractor in a manner satisfactory to the Engineer and only experienced men shall be engaged thereon. Flame cutting of pipe by means of an oxyacetylene torch shall not be allowed.

I. Jointing of mechanical joints, fittings, and valves shall be provided in accordance with the printed recommendations of the pipe manufacturer and as specified. The mechanical joint fittings, specials, and valves shall be suitable for jointing with the pipe with which they are used and the Contractor shall provide, at no additional expense to the Owner, all necessary adapters for the proper jointing of pipe, pipe fittings, specials, and valves. The last 8" outside of the spigot and inside of the bell of mechanical-joint shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter from the joint.

J. When assembling the joint it is essential that the gland be brought into place and bolts tightened in a manner to insure the maintaining of the same space between the gland and the face of the flange at all points around the socket. The range of bolt torque in making the joints shall be as recommended by the manufacturer of the mechanical joints. Overstressing of bolts will not be permitted; if effective sealing is not obtained at the recommended maximum bolt torque, the joint shall be disassembled, thoroughly cleaned and reassembled.

K. Hydrants and appurtenances, including thrust blocks, shall be installed as detailed on the contract drawings. Hydrants shall be set straight and true on a firm base. Bury depth shall be as required to maintain 5 feet of cover on the hydrant branch pipe. The above ground portion of each new hydrant shall be covered with a burlap bag until it is accepted and ready for use.

L. The Contractor shall remove each existing hydrant assembly using methods that will not damage the assembly. The Contractor shall furnish and install tie rods and clamps and concrete thrust blocks as necessary to ensure existing facilities are properly secured prior to removing hydrant assembly. The Contractor shall exercise care in the removal of these facilities. Any existing facilities damaged by the Contractor due to operations shall be replaced with new facilities, meeting these material specifications, by the Contractor with no separate payment for these items.

M. Existing facilities (gate valves and piping) which are deemed unserviceable by the Engineer, shall be removed and properly disposed of and replacement facilities shall be furnished and installed by the Contractor with payment provided per the appropriate bid items for such work. Existing fire hydrants with associated valves when necessary, shall be relocated as shown on the contract drawings or as directed by the Engineer.

N. A solid sleeve shall be used for connection to the existing branch pipe and new 6" ductile iron pipe shall be installed as necessary so the hydrant may be relocated behind the new curb line. The existing 6" gate valve and ductile iron piping shall remain unless otherwise directed by the Engineer. The Contractor shall furnish and install tie rods and clamps and concrete thrust blocks as necessary to ensure facilities are properly secured prior to removing hydrant assembly. The Contractor shall exercise care in the removal and resetting of these facilities. Any existing facilities damaged by the Contractor due to operations shall be replaced with new facilities, meeting these material specifications, by the Contractor with no separate payments for these items.
O. Reset shall consist of use of hydrant extension kit or 45 degree bends to achieve change of grade only.

Hydrostatic Testing

A. Test for leakage shall be conducted on all portions of completed water pipelines and appurtenances and all methods and procedures for performing the testing of water mains shall be subject to the acceptance of the Engineer. unless otherwise permitted, the testing shall be conducted with partial backfilling over the barrel of any new pipe, between new pipes, pipe fittings, valves and appurtenances of the section. Interiors of all pipe shall be cleaned of all dirt and foreign materials. The water pipelines may be tested in convenient sections acceptable to the Engineer.
B. Testing of water mains shall conform to the requirements of Section 4 of the AWWA Specification C 600, latest revision, except as herein specified. The test pressure shall be a minimum of 200 psi or 50 psi above working pressure, whichever is greater, for at least a two-hour duration. Maximum allowable leakage shall be as specified by the Engineer for the appropriate pipe diameter. Test results shall be accurate to within 0.1 of a gallon.
C. Testing of water mains shall be performed by the Contractor at their expense as witnessed by the Engineer. Notarized records of the test results shall be submitted by the Contractor to the Engineer. In case the specified rate of leakage for the portion of the pipeline being tested is exceeded, the Contractor shall find and repair the leaks and the pipelines shall be retested repeatedly if necessary, by the Contractor, until the required conditions are met, at no additional expense to the Owner.

Disinfecting Hydrant Assemblies

A. All portions of completed water mains and appurtenances are to be disinfected. Disinfection shall be in conformance with AWWA Specification C601, latest revision. In particular, the Contractor shall follow all of the disinfection procedures of Section 9- "Disinfection Procedures When Cutting Into or Repairing Existing Mains" of AWWA Specifications C601, unless otherwise directed by the Engineer.
B. The Contractor shall be responsible for satisfactory disposal of all flushing water and chlorinated water at no additional expense to the Owner.
C. After the mains have been flushed clean, samples of the water contained in the mains shall be arranged by the Contractor to be taken by a City-approved testing laboratory for bacterial analysis. Only after the analysis of the samples are approved by the City shall the mains be made part of the water system. In the event that positive reports of contamination are received, the Contractor shall flush and rechlorinate the mains as many times as may be necessary to obtain approved results.
D. The Contractor shall be required to take samples and have testing performed by an

approved testing laboratory for a minimum of the following items:

1. Total Coliform
2. Standard Plate Count
3. Gross Hydrocarbons
4. Volatile Organics

E. The Contractor shall take the required water samples after completion of flushing and disinfecting of the water mains as directed by the Owner. The Contractor shall be responsible for coordination and delivery of the samples to the approved testing laboratory. The Contractor shall also bear the costs of all water quality testing and analysis expenses by the approved laboratory. The Owner may also require additional testing if deemed necessary, at no additional expense to the Owner.

F. The Contractor shall submit an affidavit of compliance to the Owner. The affidavit of compliance shall be the bacteriological test results certifying the water sampled from the water main to be free of coliform bacteria contamination.

G. Disinfection not required for Reset or Relocation items.

METHOD OF MEASUREMENT

A. Remove, relocate and reset hydrant assemblies will be measured for payment as a unit per each, complete in place and accepted by the Owner.

B. Fire hydrants shall be measured as units, complete in place, regardless of bury depth as measured from, but not including the tee in the water main to the end of the excavation.

C. Thrust blocks, retainer glands, testing, disinfection, and joint restraint shall not be measured for payment.

BASIS OF PAYMENT

Hydrant assemblies removed and relocated or reset shall be measured for payment at the contract unit price bid per each, for "Relocate Hydrant (Complete)" or "Reset Hydrant (Complete), which price and payment shall include ductile iron pipe, joint restraint, thrust blocks, pipe bedding and drain material, testing and disinfection, protection of utilities, and all labor, tools, equipment and incidentals necessary to complete the work as specified, indicated and as directed by the Owner.

PAY ITEM	**PAY UNIT**
ITEM # 1303196A – RELOCATE HYDRANT (COMPLETE)	EA