

Volume 1 of 1 Project Manual

**Bradley – ANG Intersection Signalization
East Granby, CT
Project No.: 19MIL26601**

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Project Manual Date: May 31, 2018

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For : The National Guard Bureau and
The Connecticut Air National Guard

Construct Base Entry Complex

Building # 35

Bradley International Airport
East Granby, Connecticut

FY 2018 - PN CEKT139029



Specifications
Type B-3
(Final) Submission

May 31, 2018

Package Two –
Intersection Signalization



Contract No. W9133L-16-D-0005, Delivery Order 1S02

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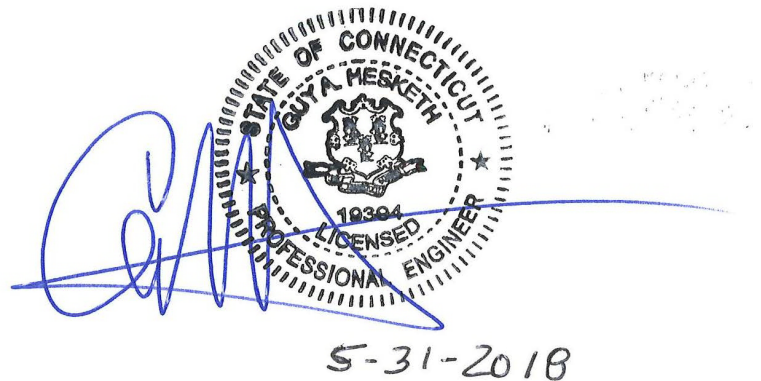


Construct Base Entry Complex - Package Two

Bradley Air National Guard Base
East Granby, Connecticut
FY 2018, PN CEKT139029
Contract No. W9733L-16-D-0005
Delivery Order 1S01

B3 Submission

May 31, 2018



5-31-2018

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SECTION 010000 GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

- A. Project provides for furnishing labor, material, equipment and appliances to construct the Intersection Signalization for the Connecticut Air National Guard, as described herein and shown on the construction drawings.
- B. The Contractor shall be responsible for all requirements described in the contract documents and all work including that of his Subcontractor(s), if any, shall be performed in accordance with the contract documents. Contractor's failure to become familiar with these requirements will not relieve the Contractor of responsibility to comply with the Contract requirements.
- C. The organization of the specifications into divisions, sections, and articles, and the arrangement of the drawings shall not control the Contractor in dividing the work among Subcontractor(s) or in establishing the extent of the work to be performed by any trade.

1.2 WORK SCHEDULING

- A. Normal base work hours for the Contractor will be between the hours of 7:15 AM thru 4:00 PM, excluding Saturdays, Sundays, and Federal Holidays. If the Contractor desires to work during periods other than above, he must notify the Contracting Officer's Representative (COR) three (3) working days in advance of his intention to work during other periods to allow assignment of additional inspection forces and for notification of fire, security and safety. When the COR determines that they are reasonably available, he may authorize the Contractor to perform work during periods other than normal duty hours/days. However, if inspectors are required to perform in excess of their normal duty hours/days solely for the benefit of the Contractor, the actual cost of the inspection, at overtime rates, will be charged to the Contractor and will be deducted from the final payment of the Contract amount. (Note: If applicable, at time of award this paragraph will be modified to the negotiated schedule for this project).
- B. The following Federal Legal Holidays are observed by this Base:
 - New Year's Day 1 January
 - Martin Luther's King's Birthday Third Monday of January
 - President's Day Third Monday of February
 - Memorial Day Last Monday of May
 - Independence Day 4 July
 - Labor Day First Monday in September
 - Columbus Day Second Monday in October
 - Veteran's Day 11 November
 - Thanksgiving Day Fourth Thursday in November
 - Christmas Day 25 December
- C. NOTE: Any of the above holidays falling on a Saturday will be observed the preceding Friday holidays falling on a Sunday will be observed on the following Monday.

- D. Prior to commencing work on the job initially, resumption of work after prolonged interruption (7 calendar days or more) commencement of any warranty work, and upon completion of warranty work, the Contractor must notify the Contractor Officer (or his/her COR). When relocating to new sites, returning to sites for follow-up work on a phased work plan, notification to the COR is sufficient. Notification should be by personal contact; however, advance notification may be by telephone, email or in writing, and should be accomplished sufficiently in advance to allow scheduling of inspection forces. The above precautions are to ensure construction inspection and recording of work proceedings.

1.3 ENTRY TO BASE/ACCESS TO SITE

- A. Connecticut Air National Guard is a closed Base, pursuant to Sec 21, Internal Security Act of 1950, 50 U.S.C. 797 and, as such, only those persons granted permission may enter. It is, therefore, required that control be exercised over Contractor personnel while working on the Base. To maintain this control, a listing of all Contractor personnel who will be working under the contract, must be submitted to the COR five working days prior to the start of work under the contract. The preferred method of providing this list is via email, to the contract administrator. The listing shall include, but not limited to: contract number, project number, employee name, and the estimated starting and ending date of each employee. Subsequent listings of all additions or deletions will be submitted as employees are hired or released. See Section 01501, Security Procedures for additional requirements.
- B. During construction, the Contractor shall permit base personnel access to the facilities within the work area. The Contractor shall provide protection to persons and property throughout the progress of the work.
- C. In the event of a declared National Emergency the COR may be required to stop work on this contract for security reasons. Contractor shall ensure the COR has a current Off Duty contact name and telephone number at all times to facilitate notification.
- D. Contractors and subcontractors shall comply with 103 AWI 31-102.

1.4 UNAUTHORIZED PERSONNEL

- A. The Contractor shall inform all personnel working under his jurisdiction (including subcontractor and visiting supplier personnel) that access to areas outside of the immediate work area excluding, direct haul and access routes, contracting and Civil Engineering offices and point of supply and storage is prohibited. Circulation of said personnel will be limited to official business only. Persons in violation of the above will be apprehended and appropriately disciplined. See Section 01501, Security Procedures for additional requirements.

1.5 INSPECTION OF SITE

- A. The Contractor shall be responsible for the complete coordination and proper relation of the work of all trades. Reference Contract Clauses FAR 52.236-3, Site Investigation and Conditions Affecting the Work and FAR 52.236-8, Other Contracts.

- B. It is recommended that prospective bidders visit the premises and thoroughly familiarize themselves with the details of the work and working conditions. It is the responsibility of all bidders to have compared the premises and the site with the Specifications and Drawings, and to have satisfied themselves as to all conditions of the premises, the existing obstructions, the actual elevations, and any other conditions affecting the execution and completion of the work prior to submission of his proposal. Reference Contract Clause FAR 52.236-3, "Site Investigation and Conditions Affecting the Work" .
- C. No allowances or extra construction on behalf of Contractor or any subcontractor will be permitted subsequently by reason of error or oversight on the part of the sub-contractor, or on account of interferences by the activities of the owner or others. Reference Contract Clause FAR 52.236-3, "Site Investigation and Conditions Affecting the Work" .
- D. For elements of the project where existing conditions are shown, all dimensions shown on the drawings are based on "as-built" record drawings and, to the extent possible, accurately represent existing conditions; however, there may be some variance between existing conditions and contract drawings. The Contractor is responsible for verifying all dimensions and for reporting to the COR any discrepancies that may affect performance of the work represented by contract drawings and specifications. Reference Contract Clause DFARS 252.236-7001 "Contract Drawings, Maps, and Specifications" .

1.6 CORRELATION OF DRAWINGS, SPECIFICATIONS AND CONTRACTS

- A. The specifications, Contract and the accompanying Drawings are intended to describe and provide for a complete, new and usable facility. They are intended to be complimentary and what is called for by one shall be as binding as if called for by all. The Contractor shall understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material for the entire completion of the work intended to be described and shall not avail himself of any manifestly unintentional error or omission, should any exist. Should any error or inconsistency appear in the Drawings or Specifications, the Contractor, before proceeding with the work, shall make mention of same to the Contracting Officer for proper adjustment, and in no case shall he proceed with the work in uncertainty. Reference Contract Clause DFARS 252.236-7001, "Contract Drawings, Maps and Specifications." For bidding purposes, the bidder shall be responsible for the higher cost requirement, wherever contradiction in requirements occur in contract documents.

1.7 REPORT OF ERROR AND DISCREPANCIES

- A. The Contractor shall be responsible for any and all discrepancies in work due to failure to obtain dimensions and investigate conditions at the building before fabrication and installation.
- B. The Contractor shall bear all costs in replacing all materials and labor due to not observing the above paragraph and such replaced materials shall meet the approval of the Contracting Officer.
- C. The Contractor shall promptly notify the Contracting Officer in writing of any discrepancies.

- D. Reference Contract Clauses FAR 52.236-21, ÓSpecifications and Drawings for Construction• . FAR 52.246-12 ÓInspection of Construction• , and DFARS 252.236-7001, ÓContract Drawings, Maps and Specifications. •
- E. Any proposed changes to the specifications by the Contractor must be submitted in writing to the Contracting Officer for approval prior to implementation.
- F. Where contradictory requirements occur, the contractor shall request clarification of requirements from the Contracting Officer before proceeding with related work. Unless otherwise directed by COR the contractor shall be responsible for the most restrictive and highest cost requirement.

1.8 DIVISION OF WORK

- A. The various divisions of the Specifications shall not be considered as negotiations of the material and labor involved. The arrangement and order of these divisions have been made for convenience only, and it is not the intent, nor shall it be so construed, a particular trade or subcontractor must perform that work included in any one division.
- B. Any item mentioned under any division heading must be supplied even though it is not specified under the heading for the respective work, but is shown on the Drawings. No claims for extras arising out of real or alleged error in such arrangement or order of the various divisions will be given consideration
- C. Reference Contract Clause FAR 52.236-21, ÓSpecifications and Drawings for Construction. •

1.9 METHOD OF CARRYING ON THE WORK

- A. All work under the Contract shall be arranged and carried on in such a manner as to complete work in the least possible time. The Contractor shall consult with the Contracting Officer as to methods or sequence of carrying on the work. A definite program of work shall be arranged before starting. Reference Contract Clause FAR 52.236-15, ÓSchedules for Construction Contracts• .
- B. Activities in the vicinity of this project may be kept in full or partial operation during construction. The Contractor shall coordinate with the Contracting Officer and schedule construction activities. Reference Contract Clause FAR 52.236-8, ÓOther Contracts• .

1.10 STANDARDS OF MANUFACTURE

- A. All recognized regulatory/code standards shall be the latest published edition prior to the date of release for bid/proposal of the contract documents.
- B. For purpose of establishing the standard of construction and the requirements to be met in the work of all divisions, the drawings and these specifications are based on the use of products hereinafter specified, adapted to the installation as required to meet the condition.

- C. Where brand names are shown, these names are intended to describe a quality of product, and in no way are intended to limit products of equal quality. Where a Basis-of-Design product is shown, this name is intended to establish the quality and type/series of product for this project, but is not intended to limit products of equal quality and type. Therefore, products of other manufacturers may be employed for this work provided they are equivalent in the manner described, and equally adaptable to the conditions as approved by the Contracting Officer. Reference Contract Clause FAR 52.236-5, "Materials and Workmanship" .
- D. Contractor will try to meet base standard when practical.

1.11 MEANING OF APPROVED, DIRECTED, ETC.

- A. "Approved" , "Directed" , "Required" , "Applicable" , or words of like or similar effect, when used in the specifications shall be interpreted to mean "Approved By" , "Directed By" , etc., the Contracting Officer unless otherwise specifically stipulated.

1.12 MISPLACED MATERIALS

- A. Any material that is deposited elsewhere than areas designated as approved by the COR shall be rehandled and deposited where directed. No payment will be made for rehandling such material. The COR will notify Contractor of any noncompliance with the foregoing provisions.

1.13 COMPLIANCE WITH CODES AND REGULATIONS

- A. All work shall be performed/accomplished in accordance with the applicable codes and/or ordinances in force at the time of construction. It is the Contractor's responsibility to ensure that where EPA, CT DEP or other such regulations control the removal, handling, installation or disposal of materials, they shall be strictly adhered to whether or not specifically referenced in the construction documents.
- B. Contractor shall have data sheets available at the site on any materials used to comply with OSHA and EPA. Reference Contract Clause FAR 52.223-3, "Hazardous Material Identification and Material Safety Data" .

1.14 MATERIAL TESTING BY NATIONAL LABORATORIES

- A. Electrical materials and equipment shall be new and bear the UL label or be listed in UL Electrical Construction Materials Directory or Electrical Appliance and Utilization Equipment Directory, wherever standards have been established by the agency.
- B. The Contractor shall submit proof that the material or equipment, which he proposes to furnish under this specification, conforms to the standards of Underwriters Laboratories. The label of Underwriters Laboratories (UL) shall be accepted as conforming to this requirement.

- C. In lieu of the label, the Contractor may submit a written certification from any recognized testing agency, adequately equipped and competent to perform such services, that the material or equipment has been tested and conforms to the standards, including the methods of testing used.

1.15 SUBMITTALS

- A. Shop Drawings and Product Data: The Contractor shall furnish submittals in the form of manufacturer's brochures, pamphlets, or written specifications on all items to be installed unless specifically directed otherwise by these specifications or by the Contracting Officer. Reference Contract Clause FAR 52.236-5, "Material and Workmanship", FAR 52.225-5, "Buy American Act-Construction Materials", FAR 52.223-3, "Hazardous Material Identification and Material Safety Data", and DFAR 252.227-7033, "Rights in Shop Drawings".
- B. Approval of Materials: Prior to the purchase of material, the Contractor shall submit to the Contracting Officer, for material approval/disapproval, brochures and technical literature covering, in detail, the materials he proposes to supply. This shall include the specific catalog and model specification number designations. Submittals shall demonstrate that the item conforms to all of the requirements. No unapproved or disapproved materials shall be used.
- C. Submittals shall be made for the items listed on AF Form 66, Schedule of Material Submittals, or equivalent. Reference Contract Clause FAR 52.236-5, "Material and Workmanship".

1.16 PROGRESS SCHEDULE

- A. The Contractor shall prepare a work progress schedule required for completion of each of the various divisions of work. The schedule shall be submitted to the Contracting Officer, in the number of copies as directed prior to start of construction. Reference Contract Clause FAR 52.236-15, "Schedules for Construction Contracts". Construction Contracts in excess of \$1 million will also be submitted on Microsoft Project 2003, electronic and paper. This schedule shall include a line item for rough inspections by government personnel as outlined in the various sections of the specifications or on the plans. A rough inspection is required on all installed systems prior to sealing off or closing in a wall, pipe chase, suspended ceiling system etc. These system include but not limited to: domestic and heating water lines, communication and electric runs, all insulation material to be covered by other material (GWB, wood panel etc), duct runs, ceiling suspension systems, raised flooring, fire detection/protection /suppression systems etc. A second or finish inspection will be conducted after these systems are "hidden" to insure the quality of the finished product. The finish inspection does not constitute the final project inspection accomplished at project completion. The Contractor shall request these inspections, through the COR at least 5 work days prior to the desired inspection date.

1.17 SAFETY ASSURANCE

- A. Compliance with Regulations. All work including the handling of hazardous materials or the disturbance or dismantling of structures containing hazardous materials shall comply with the applicable requirements of 29 CFR 1910/1926. Work involving the disturbance or dismantling of asbestos or asbestos-containing materials; the demolition of structures containing asbestos; and/or disposal and removal of asbestos, shall also comply with the requirement of 40 CFR, Part 61, Subparts A and B. ETL 1110-1-118 and DA Circular 40-83-4. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.
- B. Contractor Responsibility. The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work. The Government shall not be held liable for any action on the part of the Contractor, his employees or Subcontractor, which result in illness, injury or death.
- C. Crawl spaces and attics are to be treated as confined space entry. Contractor must follow 29CFR 1910.146 and follow Bradley ANBG Confined Space Program Procedures when making an entry. NOTE: A confined space does not include areas above suspended acoustical tile ceiling.
- D. Where an employee can fall more than 6 feet, a fall protection system must be used; 29 CFR
- E. 1926.500 stipulates where this occurs and the different types of fall arrest systems.
- F. When the Contractor is working in buildings that are occupied by Government personnel, the Contractor must provide copies of all Material Safety Data Sheets (MSDS) to the COR for processing with Base Hazardous Material Pharmacy (HAZMART) prior to being allowed on the installation for use.
- G. All references to protection of the site and adjacent buildings when trenching, shall include protection of all employees also.
- H. Inspections, Tests and Reports. The required inspections, tests and reports made by the Contractor, Subcontractor, specially trained technicians, equipment manufacturers and other as required, shall be at the Contractor's expense.
- I. Materials and Equipment. Special facilities, devices, equipment, clothing and similar items used by the Contractor in the execution of work shall comply with applicable regulations.
- J. Traffic Control Devices. The Contractor shall comply with the recommendations contained in Part 6 of the U. S. Department of Transportation, Federal Highway Administrations Manual on Uniform Traffic Control Devices (D6. -1978) to ensure proper warnings to motorists and adequate traffic control. The Contractor shall provide all warning lights, barricades and other traffic control devices and signs.

1.18 INSPECTIONS AND TESTS

- A. Inspections and tests are for the sole benefit of the Government and shall not relieve the Contractor of the responsibility of providing quality control measures to ensure that the work strictly complies with the contract requirements. No inspection or test by the Government shall be construed as constituting or implying acceptance. Reference Contract Clause FAR 52.246-12, "Inspection of Construction" .

1.19 QUALITY CONTROL/TESTS

- A. Where work is specified to be in conformity with Standard Specifications of the American Society for Testing Materials (ASTM), or with Federal specifications or with specifications of well-known recognized technical and trade organizations, but no tests are specifically stipulated in connection herewith, the Contractor shall furnish and pay for any tests or certifications required by the Contracting Officer to show that the proposed materials meet with the applicable requirements.
- B. The Contractor shall submit a written certification from any recognized testing agency, adequately equipped and competent to perform such services, that the material or equipment has been tested and conforms to the standards, including the methods of testing used.
- C. Wherever testing or analysis of material is required, such testing unless otherwise noted will be made at the Contractor's expense.
- D. Subsequent testing of those materials which fail to meet specifications will be accomplished by the Contractor at no cost to the Government.
- E. Contractor Quality Control (CQC) Program: The Contractor shall provide and maintain an effective quality control program in accordance with the contract. Within ten (10) days of the award of the contract, the Contractor shall provide three (3) copies of the project CQC plan to the Contracting Officer. This document, as a minimum, shall include name and address of the independent testing agency and the responsible principal with the firm; a summary of QC tests
- F. required by the specification and to be provided by the testing agency; and typical daily reports forms to be used for this project. The plan shall also indicate organizational procedures to immediately notify the Contracting Officer or his/her representative of test results in noncompliance with the specification and recommendations on correction. The testing agency must be an independent company and not owned or partially owned by the Contractor or any relation or employee of the Contractor.
- G. Samples used for testing shall be selected as specified for the various tests elsewhere in the specifications but in every case the method of selecting samples and the location for selection shall be as approved by the COR.
- H. Tests shall be made in accordance with the specified testing procedures and/or methods and otherwise as required to provide compliance with all contract requirements. Tests shall be made by independent, commercial testing laboratories approved in writing by the Contracting Officer.

- I. Results of all tests shall be recorded on certified test reports of the commercial testing laboratories. Reports shall include a statement that the materials tested do or do not meet the requirements of the Contract specifications. Six copies of all reports shall be forwarded directly to the Contracting Officer for approval within five (5) days of the actual performance of the test. The testing agency shall immediately notify (verbally) the Contracting Officer of any tests, which indicate failure to meet the contract requirements.
- J. Any item, for which test reports show failure to meet all Contract requirements shall be retested as often as required to show full compliance with Contract requirements, at the Contractor's expense.
- K. Contractor will provide an emergencies plan, with Contractors to accomplish the repairs in the event of utility and/or communications emergencies.

1.20 WARRANTY

- A. In addition to the specific guarantees required by the specifications for certain portions of the work to be performed under this Contract, the Contractor shall furnish a written warranty for all of the work to be performed under this Contract, against defects in materials or workmanship for a period of one (1) year from the date of final acceptance of the completed work by the Government.
- B. All work including workmanship, material, and equipment (other than Government furnished equipment) shall be warranted for the full period of standard manufacturer's warranty, but in no case shall be warranted for a period of less than one (1) year upon notice from the Contracting Officer of any failure during this warranty period, the part or parts shall be replaced promptly with new parts by and at the expense of the Contractor. Whenever the manufacturer of a piece of equipment supplied by the Contractor customarily provides a warranty covering the equipment, the Contractor shall promptly turn over such to the Contracting Officer.
- C. Upon completion, the Contractor shall provide the COR with five (5) bound sets containing maintenance, repair and operating instructions and parts lists for each piece of installed equipment.
- D. Reference Contract Clause FAR 52.246-12, "Inspection of Construction" and FAR 52.246-21, "Warranty of Construction" .

1.21 CUTTING AND REPAIRING

- A. Unless otherwise specified hereinafter, the Contractor shall do all necessary cutting, drilling, fitting and patching of work and corresponding work that may be required to make several parts come together and fit it to receive, or be received, by work of other trades shown upon, or reasonably implied, by the Drawings and Specifications for the completed project. Reference Contract Clause FAR 52.246-12, "Inspection of Construction" .

- B. The Contractor shall be held responsible for all cutting, replacement, and repairing of work that is due to faulty workmanship and which is not specifically covered by specifications for trades which are affected. He will also be held responsible for providing, without extra cost to the Government, any small incidental items which are not specifically mentioned in the specifications, but which are necessary to complete the work in accordance with the drawings, and under the general understanding that the work when completed, shall be a finished and workmanlike job. Reference Contract Clause FAR 52.236-5, "Material and Workmanship" and FAR 52.246-12, "Inspection of Construction" .
- C. See Section titled "Cutting and Patching" for additional requirements.

1.22 SITE CLEAN UP

- A. The Contractor shall maintain the construction site in as clean and orderly condition as possible. All refuse and/or salvage material shall be gathered and disposed of periodically to maintain the site in this condition. All roadways, taxiways and ramp areas within the work area, or used by the Contractor, shall be swept and vacuumed daily to assure safe operation of aircraft. The cleaning operation shall be accomplished with self-propelled sweepers equipped with pick-up devices. The method of cleaning and equipment employed shall be subject to the approval of the COR. Reference Contract Clause FAR 52.235-12, "Cleaning Up" .
- B. During and after periods of rain, this construction site may have a very high water table and/or areas of standing surface water. Dewatering techniques are a Contractor's option; however, the COR shall approve the method prior to start of work.
- C. Following completion of the work, the Contractor shall clean the entire area from any debris and/or excess of misplaced material due to his operation and obtain COR's approval of this finished work. (Reference Contract Clause FAR 52.246-12, entitled "Inspection of Construction" and FAR 52.236-12, "Cleaning Up" .)

1.23 LAYOUT AND GRADES

- A. All lines and grade work not presently established at the site shall be laid out by the Contractor in accordance with the drawings and specifications. The Contractor shall maintain all established boundaries and benchmarks and replace as directed any which are destroyed or disturbed. Reference Contract Clause FAR 52.236-17, "Layout of Work" .
- B. The Contractor shall engage a Professional Engineer or Registered Land Surveyor, licensed to practice in the State of Connecticut, to properly establish all locations, grades, elevations, dimensions, joints, etc., necessary to the proper location of all items of work included in this Contract. All such items shall be established in relation to the benchmark and control points noted on the drawings.
- C. Prior to acceptance of the facility and at such times as directed by the Contracting Officer, the Contractor shall thoroughly clean all exposed surfaces of the building where work under this contract was completed.

- D. All protective coatings, except lacquers, shall be removed from finish surfaces and the finish surfaces shall be washed and cleaned. Contractor shall be held responsible for all damaged materials, and at completion, shall replace, at his own expense, all such damaged materials.
- E. Reference Contract Clause FAR 52.236-21, "Cleaning Up", and FAR 52.246-12, "Inspection of Construction".

1.24 REFUSE AND SALVAGE MATERIALS

- A. All refuse, debris, and construction waste shall be legally disposed of off base at the Contractor's expense. (Reference FAR 52.236-12 "Cleaning Up"). Accumulations of refuse on the site will not be permitted.
- B. All salvage property removed and not reinstalled under this contract shall be returned to the Government at a place on Base designated by the COR, or properly disposed of when directed by the Government. Materials that can be of consideration to have a market value must be disposed of IAW 103 AWI 32-105.
- C. Non-Hazardous Solid Waste must be diverted to recycling, through appropriate means available to the Contractor, if such diversion is less than or equal to the equivalent cost of landfill or incineration.
- D. Prior to contract close out the Contractor must supply a report including the following:
 - 1. Amount (in tons) of non-hazardous solid waste, including construction and demolition debris, that is composted, mulched, recycled, reused, donated or otherwise diverted from a disposal facility.
 - 2. Amount (in tons) of solid waste (including construction and demolition debris) transferred to a disposal facility (landfill).

1.25 STORAGE

- A. No secure storage space will be provided by the Government. The Government will not be responsible for property belonging to, or under the present control of the Contractor. The Contractor is to protect his materials. An unsecured, open area will be designated by the COR for storage of construction equipment and materials during the period covered by this contract. Reference Contract Clause FAR 52.236-10, "Operations and Storage Areas".
- B. Contractor shall construct such temporary sheds as he may require for the use of his workmen and as required for tool cribs and storage of all work under this Contract. Temporary sheds shall be confined to the space assigned by the COR. Sheds shall be of approved construction and wood floors, lighting and heat shall be provided in all parts used by workmen. Exterior of sheds shall be painted, all parts maintained in good condition throughout the life of the Contract, and at completion, all parts shall be removed and the premises cleaned up. Reference Contract Clauses FAR 52.236-10, "Operations and Storage Areas" and FAR 52.236-12, "Cleaning Up".

1.26 TEMPORARY FIELD OFFICES

- A. As soon as practicable after award of Contract, and until final completion of the work, Contractor shall provide, maintain and later remove a suitable temporary office(s) for his own use. All field offices shall be painted on the exterior, maintained in good repair, provided with adequate heating, lighting and maintained in a clean and sanitary condition at all times. Reference Contract Clause FAR 52.236-10, "Operations and Storage Areas" .
- B. The Contractor shall provide temporary office space for exclusive use of the government inspectors, to include Contracted inspectors. This office shall include, as a minimum, a desk, a suitable chair, and access to a phone line at no additional cost to the Government.
- C. The Contractor is reminded that smoking in buildings on a Government facility is prohibited. Contractors must provide a smoking area for employees away from the main entrance of a building.

1.27 TEMPORARY TOILET FACILITIES

- A. Contractor to provide, at his expense, all temporary toilet facilities. All temporary toilet facilities shall meet the requirements of health authorities having jurisdiction and shall be kept clean and in a sanitary condition at all times.

1.28 TELEPHONE AND COMMUNICATIONS SECURITY MONITORING

- A. Contractor shall provide telephone services at his field office for his own use and for the use of Subcontractor and the COR. He shall make all arrangements with the telephone company and shall pay all charges for installation, services and removal.
- B. All communications with DOD organizations are subject to communications security (COMSEC) review. Contractor personnel will be aware telephone communications networks are continually subject to intercept by unfriendly intelligence organizations. The DOD has authorized the military departments to conduct COMSEC monitoring and recording of telephone calls originating from, or terminating at, DOD organizations. Therefore, civilian Contractor personnel are advised any time they place a call to, or receive a call from, an USAF organization, they are subject to COMSEC procedures. The Contractor will assume the responsibility for ensuring wide and frequent dissemination of the above information to all employees dealing with DOD information.

1.29 UTILITIES

- A. The Contractor is responsible for installing temporary service outlets, as necessary, and charges will be made in accordance with the clause entitled "Availability and Use of Utility Services, FAR Clause 52.236-14 (b). Any expense incurred to gain access to these utilities (temporary tap-ins, etc.) shall be the responsibility of the Contractor and all utilities shall be returned to their original configurations at the end of the contracts. No alterations to existing utilities shall be accomplished without the written permission of the Contracting Officer.

- B. The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia
- C. Contractor shall be responsible for gas charges once gas service is established until accepted by the Government.

1.30 UTILITY INTERRUPTIONS

- A. All utility shutdowns require the prior approval of the COR. Request for utility shutdown shall be made in writing at least four (4) weeks prior to the expected date of implementation. As soon as actual shutdown date is known, the Contractor shall notify the COR in writing requesting approval at least eight (8) work days prior to requested shutdown.
- B. The Contractor's progress schedule shall include preliminary listing of all proposed shutdown dates. Every effort shall be made to make all shutdowns as brief as possible, and as limited in extent as possible.

1.31 EXCAVATING PERMIT

- A. Contractor is required to secure a Bradley Air National Guard Base excavating permit from Base Civil Engineering, before proceeding with any exterior on-site excavating or digging. The Base Civil Engineer must have three (3) to four (4) working days notice from the Contractor prior to permit being secured.

1.32 COMPRESSED AIR

- A. Contractor shall provide all compressed air used for work under this contract including temporary lines and connections. Remove all temporary lines, etc., at the completion of the work.

1.33 WEATHER PROTECTION AND TEMPORARY HEATING

- A. The Contractor shall provide and maintain weather protection as may be required to properly protect all parts of the structure from damage during construction.
- B. The Contractor shall be responsible for repairs and maintenance to the heating system or units during the period during progress of building construction and shall deliver same to the Government, at termination of such use, in perfect condition, cleaning out all air ducts and replacing all filters. Any temporary heating shall be at the expense of the Contractor.

1.34 BLOCKING OFF BASE STREETS

- A. At least two (2) hours prior to the blocking of any street, the Contractor shall advise the COR, Base Fire Department and Security Forces of his intentions, identifying the location and the estimated time of closure. No more than two streets shall be closed at any time, and the two shall be no closer than five blocks from each other.

1.35 ARCHEOLOGICAL, PALEONTOLOGICAL AND ENDANGERED SPECIES FINDS

- A. Any archeological finds (evidence of human occupation) or paleontological finds (evidence of prehistoric plant or animal life) are to be reported to the COR immediately and continue work in other areas without interruption. Protect native endangered flora and fauna and notify COR of any construction activities that might threaten endangered species or their habitats.

1.36 EQUIPMENT REPORT

- A. The Contractor shall furnish, upon completion of the project, ÓReal Property Installed Cost• , form in triplicate, of all equipment installed in the facility, and the installed cost of each item. Furthermore, the listing shall include the location of each item and nameplate date.
- B. Typically, the listing shall include: air conditioners, air handling units, condensers, fans, pumps, air compressors, transformers, unit heaters, regulators, direct current power supplies, latrine fixtures, motors, engines, motor or engine-driven equipment, cranes, drinking fountains, sinks, water coolers, generators, space heaters, water heaters, refrigerators, freezers, coolers, meters, gas detectors, humidifiers dehumidifier, air purifier, ovens, power units, fuel tanks, water tanks, elevators, welders, recorders, reels, scales, hydrants, intrusion detection equipment, fire detection and alarm equipment, emergency light sets, emergency eye wash, deluge showers, washers, dryers, dishwashers, bridge cranes, and like items of equipment.
- C. Final payment will not be made to the Contractor until the Government has received and approved the listing. The Contractor shall use the ÓReal Property Installed Cost• form provided to him in the Preconstruction Contractor Guide or given to him at the Pre-performance Conference. List will be coordinated with COR to ensure completed prior to submission.

1.37 DAMAGES, REPAIRS

- A. All damages by the Contractor's operations shall be repaired, or replaced, at the Contractor's expense, as directed by the Contracting Officer. Any Government property damaged as a result of the work, materials, or operations of the Contractor shall be restored at no additional expense to the Government.
- B. All existing sidewalks, curbs, and pavement disturbed, broken or removed or otherwise damaged by the Contractor during performance of the work under this contract shall be replaced by the Contractor at his own expense. Replaced sidewalks, curbs, and pavements shall be smooth, shall blend into the existing work, and shall not present depressions or humps.

- C. Reference Contract Clause FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities and Improvements• .

1.38 1.38 AS-BUILT DRAWINGS

- A. The Contractor shall keep an accurate record of all deviations from the approved design drawings and specifications which may occur in the work as actually constructed, and shall submit to the Contracting Officer, at completion of the work, complete information including descriptions, drawings, dimensions, marked prints, etc., as required for correction of the tracings to the as-built conditions. The information should be color coded for easy decoding as follows:
 - 1. Red - when showing information added to the drawings.
 - 2. Green - when showing information deleted from the drawings.
 - 3. Blue and circled in blue to show notes.
- B. B. The red lined drawings shall be complete with any deviation in actual construction.
- C. C. In addition to Hard Copies of Red Lines, contractor shall provide As-Built Drawings in CAD form using Auto Cad 2007 or later. Submit to Contracting Officer 2 CDø.s.

1.39 MAINTENANCE OF TRAFFIC AND SAFETY

- A. Where possible, the Contractor and his work shall not interfere with the normal operations of traffic, particularly emergency vehicles and equipment. Contractor is responsible for safety on the Project Site
- B. The Contractor shall use only established haul routes. When materials are transported in prosecution of the work, vehicles shall not be loaded beyond the loading limit established by Federal, State or Local Law or regulation. When it is necessary to cross curbing or sidewalks, protection against damage shall be provided by the Contractor.
- C. The Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas of the Base with respect to his own operations and the operations of all his Subcontractor. The Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airfield or Base.
- D. With respect to his own operations, and those of all his Subcontractor, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the Base.
- E. The Contractor shall furnish, erect, and maintain weighted barricades, warning signs, and other traffic control devices as required to maintain traffic and insure the safety of aircraft and the Contractorø.s equipment. The Contractor shall make his own estimate of all labor, materials, equipment, and coincidental necessary for providing the maintenance of aircraft and vehicular traffic.

1.40 SPECIAL CONDITIONS

- A. Any Contractor's equipment that causes or generates electro-magnetic disturbances or interference shall be removed from service until properly repaired. The COR may also require repositioning or removal of the equipment from the Base.
- B. The Contractor shall be responsible for the coordination of his work with base communications personnel, who may be working in the area and making them aware of proposed work that may affect the work of their particular trade in process of performance.

1.41 COMMERCIALY OWNED/OPERATED RADIOACTIVE SOURCES USED ON Bradley
Air National Guard Base

- A. When using radioactive sources for soil compaction tests or stress/support studies for detection of structural/weld defects in structural framing, pressurized pipe, vessels, etc. on Bradley ANG Base, CT, the operator shall comply with the following requirements.
 - 1. Prior to bringing the radiation generator on to Bradley Air National Guard Base, the Contractor shall provide the Base Radiation Safety Officer (RSO) and the COR with the following information/documentation for review and approval
 - a. A copy of the Radioactive Source Permit with operational use conditions/restrictions with expiration date or a Certification of Exemption from licensure from the Nuclear Regulatory Commission (NRC) or Agreement State (AS).
 - b. A current list of trained and qualified employees that will be using the radioactive source.
 - c. The name of the Permit Radiation Safety Officer (PRSO), emergency contact telephone number, and current address for each source used on Connecticut.
 - d. Operating instruction(s)/technical order(s) for the equipment that contains the radioactive source.
 - e. Designated storage location of the radioactive source if it remains on Connecticut overnight.
 - f. Proposed marking of the storage location if it exceeds 2mR/hr as measured at the surface of the storage container.
 - g. A copy of the company Radiation Safety Program.
 - h. Emergency Response Plan in case of an emergency for a lost or damaged source and/or over exposure incident/injury.
 - i. Provide the portion of their contract that identifies the location(s) of where the source will be used, for how long, and for what type use.
 - 2. After approval is received for use of the specific radiation generator, the Contractor shall:

- a. Meet proper Department of Transportation (DOT) and NRC shipping criteria to include properly filled out shipping manifest(s), container marking/labels, and placards on the vehicle as needed when transporting the source onto and around base. His documents shall also allow him to remove the source from the base also when needed. The source and the activity shall dictate which DOT and NRC regulations and CFR's are applicable.
 - b. These include, but not limited to 10 CFR parts 19, 20, 21, 30, 33, 34, & 71 for the permit and operation itself; 29 CFR 1910, 1096 for occupational safety and health activities when using the instrument; 40 CFR part 190 for environmental protection activities; 49 CFR parts 172 & 173 for transporting the instrument, and if the source is lost or stolen 10 CFR parts 30, 40, 50, 70, 73 & 150.
3. Limit authorized use of radioluminescent signs and markers to areas with low occupancy and where electrical power is not available except at prohibitive cost.
 4. The Contractor shall not:
 - a. Buy radioactive materials or accept radioactive materials into the Air
 - b. Force inventory without approval from the Radioisotope Committee (RIC).
 - c. Buy or use radium without RIC approval.
 - d. Buy radio luminescent signs and markers solely for energy conservation in general administrative, industrial, and housing applications.
 5. The Base RSO or his representative reserves the right to inspect work sites and terminate/suspend any operation involving a radioactive source deemed to be unsafe IAW applicable laws, rules and federal regulations.

1.42 HAZARDOUS MATERIAL USAGE

- A. The Contractor shall establish a hazardous material (HM) storage and distribution system when HM is to be used. All HM required to support the contract shall be reported to the Hazardous Material Pharmacy (HMP) using the Contractor HM Identification Form. The Contractor HM Identification Form will be provided to the Contractor at or prior to the Pre-Construction meeting. Additional HM needed by the Contractor shall be identified to the COR's Representative for approval by the Hazardous Material Pharmacy (HMP) (See Attachment ÓContractor Hazardous Material Identification Form, Part I in Section 01502).
- B. The Contractor planning to use HM for the work must register with the base Hazardous Material Pharmacy (HMP) prior to start of work in order to support the installation's compliance with Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements.
- C. The Contractor shall maintain Contractor HM Identification Form for HM on the job site for inspection/verification.
- D. COR's Representative will verify that the HM identified to HMP is the only HM in use on the job site.
- E. Contractors shall provide the following to the HMP:

1. Provide a list of each material and quantity of material for all proposed HM. Hazardous Material (HM) shall be construed to mean any item that is:
 - a. A health hazard or physical hazard as defined in 29 CFR, 1910.1200(c).
 - b. Regulated in its disposal by EPA under 40 CFR.
 - c. Hazardous as defined by DOT regulations under 49 CFR.
 - d. Hazardous as defined by the Dangerous Goods Regulations of the International Air Transport Association.
 2. Provide a material safety data sheet (MSDS) for each item on the list.
- F. Typical examples of hazardous materials used on the job site include, but are not limited to:
1. Petroleum based liquids/gases (gasoline, kerosene, diesel, propane, butane, acetylene, etc.)
 2. Explosives
 3. Adhesives and glues
 4. Shot charges for anchor systems
 5. Volatile solvents (such as PVC cleaner and glues, paint thinners)
 6. Non-water based paints
 7. Liquid sealants
 8. Epoxies and coating systems
 9. Acidic or alkali cleaners
- G. The Contractor shall establish his/her own HM storage and issue location that complies with federal, state and local environmental regulations. Materials issued shall be tracked for quantities used. Unused materials shall be inventoried and removed from the ANG installation prior to close out of the contract or expiration date of the HM. Reports of material delivered, used and removed from the installation shall be submitted to the COR monthly and prior to contract closeout.
- H. The Contractor shall comply with all federal, state and local environmental standards.
- I. The Contractor shall accompany the COR and the installation Environmental Manger (EM) on project closeout inspection to ensure all used and unused HM has been removed from the installation. This requirement shall not be a punch list item and must be accomplished prior to the government accepting beneficial occupancy of the facility or construction item (See Attachment ÓContractor Hazardous Material Identification Form Close-Out Procedures, Part II).
- J. Any material suspected of being hazardous that is encountered during performance of a project shall immediately be brought to the attention of the COR, at which time a determination will be made as to whether hazardous material testing shall be performed. If the COR directs the Contractor to perform tests, and/or the material is found to be of a hazardous nature requiring additional protective measures, a task order modification may be required, subject to equitable adjustment under the terms of the contract. [] Applicable if xçd.

1.43 ENERGY AND WATER EFFICIENCY AND RENEWABLE ENERGY

- A. The Government's policy is to acquire supplies and services that promote energy and water efficiency, advance the use of renewable energy products, and help foster markets for emerging technologies.
- B. The Contractor shall include the provisions of energy-using products for construction, renovation, or maintenance of a public building by acquiring energy-using products designated by the Department of Energy's Federal Energy Management Program (FEMP).

1.44 SECURITY REQUIREMENTS

- A. The Contractor shall comply with all security regulations imposed by the wing/post commander where work is to be performed. Any necessary security clearances shall be obtained prior to commencement of work.
- B. The Contractor shall ensure that all parts of the facility where work is being performed are adequately protected against vandalism and theft.

1.45 POLLUTION ABATEMENT

- A. All work shall be performed in a manner minimizing pollution of air, water and land as required.
- B. Transporting materials to or from the site shall be accomplished in a manner preventing materials or particles from becoming airborne. Earth materials shall be wetted or otherwise protected. Gravel, sand and concrete shall be contained within vehicles to prevent spillage. Tarpaulins must be fastened over load before entering surrounding streets. Removal of any materials dropped or blown off vehicles shall be the responsibility of the Contractor.
- C. Burning of any material is strictly prohibited.
- D. Stream beds, lakes, drainage ways, sanitary and storm sewers, etc., shall not be polluted by fuels, oils, bitumen, acids or other harmful materials. Grading shall be accomplished to prevent surface drainage from the construction site containing harmful amounts of sediment from draining onto adjacent areas.
- E. Flushing on concrete trucks is restricted to the location specifically designed for this purpose by the COR.
- F. Excess mortar, plaster or drywall materials shall not be disposed of on Government property. Water utilized for plastering or drywall equipment shall be disposed of in accordance with the instructions of the COR, and under no circumstances shall water be disposed of in areas which are planted or scheduled to be planted.

1.46 WORK BY GOVERNMENT

- A. The Government reserves the right to undertake performance by Government forces, for the same type or similar work as contracted herein, as the Government deems necessary or desirable, and to do so will not breach or otherwise violate this contract.

1.47 REGULATIONS

- A. The contractor shall comply with all applicable Federal, State, Local, DOD, National Guard Bureau, Army and Air Force regulations pertaining to safety, traffic control and fire prevention.
- B. The Contractor, his employees, and his Subcontractor are subject to, and shall abide by and comply with, all relevant statutes, ordinances, laws and regulations of the United States (including Executive Orders of the President) and any State (or other public authority now or hereafter in force). The Contractor agrees to observe and comply with all applicable state and federal requirements regarding social security, workman's compensation, unemployment insurance and any other matters concerning employment applicable to the performance of this contract or rules, regulations, directions and order not inconsistent herewith as may from time to time be issued by the Government. The unilateral act of any governmental body against any employee of the Contractor for the violation of a state or federal law or regulation shall not excuse the Contractor from full compliance with the terms and conditions of this contract.
- C. The contractor may use the Civil Engineering library which contains most applicable Army and Air Force publications as well as some commercial project data information or the following Contracting Resources on the Internet, <http://users.interline.net:80/jc/contract.htm> or DOD Acquisition Reform Home Page which links for several other sites with available publications, forms and project data information, <http://www.acq.osd.mil/ar/>. These may also be acquired from the Government Printing Office website, http://www.access.gpo.gov/su_docs.
- D. The Contractor, his employees, and Subcontractor shall become familiar with and obey the regulations of the installation including fire, traffic, safety and security regulations while on the military installation. Those driving motor vehicles shall observe and obey all speed limits posted throughout the installation. Personnel should not enter restricted areas unless required to do so and only upon prior approval. All contractor employees and Subcontractor shall carry proper personal identification with them at all times.
- E. Contractor's equipment shall be conspicuously marked for identification and parked or placed within approved areas only, out of the way of driveways, emergency access roads, and traffic. The contractor shall ensure that all parts of the facility where work is being performed are adequately protected. The contractor shall comply with all security regulations imposed by the base/post commander against vandalism and theft.

1.48 ENVIRONMENTAL IMPACT

- A. All waste materials generated by any work under the contract performed on a government installation shall be handled, transported, stored, and disposed of by the contractor and by his Subcontractor at any time in accordance with all applicable Federal, state, or local laws, ordinances, regulations, court orders, or other types of rulings having the effect of the law, including, but not limited to Executive Order 12088, 13 October 1978; the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 ET SEQ); the Clean Air Act as amended (42 U.S.C. Sec 1857 ET SEQ); the Endangered Species Act, as amended (16 U.S.C. Sec 1531, ET SEQ); the Toxic Substances Control Act, as amended (15 U.S.C. Sec 2601, ET SEQ); the National Historic Preservation Act, as amended (16 U.S.C. Sec 470, ET SEQ); the Solid Waste Disposal Act, Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6901 ET SEQ); and the Archaeological and Historic Preservation Act, as amended (16 U.S.C. Sec 469, ET SEQ). Should the United States Government be held liable for any neglect or improper actions by the contractor or any subcontractor regarding removal or disposal of any hazardous waste, the contractor shall reimburse the government for all such liability.

1.49 SOLID WASTE DISPOSAL AND DIVERSION TRACKING

- A. In accordance with the Deputy Undersecretary of Defense DOD Pollution Prevention Measure of Merit (MoM) Memorandum, HQ USAF/ILLEV, 6 August 1998, the attached Solid Waste Disposal and Diversion Tracking form must be submitted at the end of each quarter during the contract.

1.50 PROJECT IDENTIFICATION AND SIGNS

- A. General: Paragraph 1.50 applies to the basic requirements for temporary project identification and information signs required during construction. Related work specified elsewhere:
1. Submittal Procedures: SECTION 013300
 2. Interior Painting: SECTION 099123
 3. Exterior Painting: SECTION 099113
- B. Quality Assurance: Design sign and structure to withstand wind and environmental conditions of locality. Provide with finish adequate to withstand weathering, fading, chipping, and peeling for duration of construction.
- C. Submittals:
1. Submit as specified in SECTION 013300
 2. Includes, but is not limited to, the following:
 - a. Shop Drawings and product data as applicable.
 - b. Show content, layout, lettering, colors, structure, and foundation.
- D. Identification Signs: Project Identification:

1. Construct structure and framing of wood or metal, structurally adequate to resist design requirements of locality.
2. Construct sign surface of minimum 3/4-inch thickness exterior grade plywood with medium density overly. Panels shall be of size to minimize joints. Overall size shall be 48 inches by 96 inches.
3. Rough hardware shall be galvanized or aluminum.
4. Coating: Paint as specified in SECTION 09911 of colors selected by the COR.
5. Information Content: Government agency logos (to be provided at pre-construction meeting).
 - a. Project number and title.
 - b. Contractor's name.
 - c. Architect-Engineer's name.
 - d. COR's name and telephone number.
 - e. Project Engineer's name and telephone number(s).
 - f. COR's name and telephone number.

E. Informational Signs

1. Construction:
 - a. This includes signs for traffic, construction workers, and general public in regards to directions, warnings, hazards, location of areas, facilities, equipment, and others of a similar nature.
 - b. Provide signs of design, size, color, and lettering as required by regulatory agencies. Signs shall be painted metal, wood, plastic, or fiberglass and of materials suitable for the conditions in which they are placed, such as weathering and fading.
 - c. Construct structure and framing of wood or metal, structurally adequate to resist design requirements of area of Project.

F. Bulletin Board

1. Bulletin board shall be not less than 36 inches by 48 inches in size, for displaying the Equal Employment Opportunity Poster, a copy of the wage decision contained in the Contract, Wage Rate Information Poster, and other information approved by the COR and as required under FAR 52.222-27 "Affirmative Action Compliance Requirements for Construction". The bulletin board shall be located at the site of Work in a conspicuous place easily accessible to all employees. Legible copies of the above items shall be displayed until work under the Contract is complete.

G. Safety Sign

1. The safety sign shall be located in a conspicuous place within view of all employees and visitors. Paint shall be gloss exterior enamel. Lettering shall be as shown on the drawing. The Contractor shall keep the safety sign current by repositing the numbers daily.

H. Installation

1. Project and Contractor Identification Sign:

- a. Install in appropriate location so as not to obstruct traffic, pedestrians, or construction operations.
 - b. Erect on framing or foundation, and rigidly brace.
 - c. Maintain sign in good repair, in a clean and neat condition.
 - d. Remove upon completion of Project.
2. Other Signs and Bulletin Boards:
- a. Install at appropriate locations and in sufficient quantities to assure visibility.
 - b. Relocate is required by progress of Work.
 - c. Remove all signs, framing, supports, and foundations upon completion of Project.

PROJECT IDENTIFICATION SIGN DRAWING

ÓTO BE DETERMINED BY COR•

END OF SECTION 010000

SECTION 01100 SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Work covered by the Contract Documents.
 2. Work phases.
 3. Use of premises.
 4. Owner's occupancy requirements.
 5. Specification formats and conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Construct Base Entry Complex Ó CEKT139029.
1. Project Location: Bradley ANGB, East Granby, Connecticut
- B. Owner:
USPFO for Connecticut
Lt. Col. Thomas Tortorella, Contracting Officer
360 Broad Street
Hartford CT 06105-3779
- C. Architect:
Frankfurt Short Bruza, Assoc., P.C.
5801 Broadway Extension, #500
Oklahoma City, OK 73112
- D. The Work consists of the following:
1. The Work includes extensive site work, paving and utilities demolition, new utilities, grading, paving. General building work consists of selective demotion, construction of foundations, slab on grade floor, steel construction, load bearing masonry, masonry veneer exterior, metal roof/walls and steel stud gypsum board interior partitions, finishes, HVAC, plumbing, fire protection, electrical and communications work.
- E. Project will be constructed under a single prime contract.

1.3 USE OF PREMISES

- A. General: Contractor shall have use of premises for construction operations as indicated on Drawings by the Contract limits.

- B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine constructions operations to areas within the Contract limits.
 - a. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 5 feet beyond primary roadway curbs, walkways and main utility branch trenches; and 25 feet beyond pervious paving areas.
 - 2. Government Occupancy: Allow for Government occupancy of Project Site.
 - 3. Driveways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Government, Government's employees and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- D. Coordinate work in and around adjacent buildings with Government.

1.4 GOVERNMENT'S OCCUPANCY REQUIREMENTS

- A. Occupancy of Completed Areas of Construction: Government reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Contracting Officer will prepare a Certificate of Substantial Completion (or equivalent document) for each specific portion of the Work to be occupied before occupancy.
 - 2. Obtain a Certificate of Occupancy from Contracting Officer before using organization occupancy.
 - 3. Before partial Government occupancy (or equivalent document), mechanical and electrical systems shall be fully operational, and required tests, inspections, and fundamental commissioning activities shall be successfully completed. On occupancy, Government will operate and maintain mechanical and electrical systems serving occupied portions of building.
 - 4. On occupancy, Government will assume responsibility for maintenance and custodial service of occupied portions of building.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat 1995" numbering system.

1. Division 1: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
 - a. Refer to Section 01000 **General Requirements** for government's applicable terms and definitions in addition to instructions presented in this specification section. If any conflicts between the sections are found, then Section 01000 **General Requirements** prevails.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000

SECTION 012300 ADDITIVE BID ITEMS (ABIs)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for optional line items.

1.2 DEFINITIONS

- A. **Optional Line Item:** An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Optional Line Items described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each optional line item is the net addition to or deduction from the Contract Sum to incorporate optional line items into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. **Coordination:** Revise or adjust affected adjacent work as necessary to completely integrate work of the optional line item into Project.
 - 1. Include as part of each optional line item, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of optional line item.
- B. Execute accepted optional line items under the same conditions as other work of the Contract.
- C. **Schedule:** A Schedule of optional line items is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each optional line item.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF OPTIONAL LINE ITEMS

- A. OLI No. 1: Traffic Circle in Lieu of 3-Way Intersection

- B. OLI No. 2: Furnish and install additional planting materials as indicated in the drawings and specifications.
- C. OLI No. 3: Furnish and install decorative paving in lieu of broom finish.
- D. OLI No. 4: Furnish and install an emergency generator.
 - 1. New unit shall meet all requirements to support the ECF emergency power needs.

END OF SECTION 012300

SECTION 012900 PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Cost-loaded CPM Schedule may serve to satisfy requirements for the Schedule of Values.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets Submittals Schedule and Contractor's Construction Schedule.
 2. Submit the Schedule of Values to the Contracting Officer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Government's project number.
 - c. Contractor's name and address.
 - d. Date of submittal.
 2. Submit draft of AIA Document G703 Continuation Sheets or other forms required by COR.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - END OF SECTION 012900

SECTION 013100 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Project meetings.
- B. See Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
- C. See Division 1 Section "Submittal Procedures" for coordination with "Shop Drawings", "Product Data", etc.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited or critical performance of assemblies including, but not limited to, roofing systems, wall system, mechanical and electrical systems, coordinate installation of different components to ensure maximum performance and accessibility for required weather tightness, operation, maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Government and separate contractors if coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals, including action submittals such as shop drawings and informational submittals such as coordination/assembly drawings.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Project closeout activities.

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Prepare Coordination Drawings of the weather, thermal and moisture protection assemblies indicating the functional installation of different components (including, but not limited to: insulation; vapor retarders; air barriers; flashing; cavity drainage systems; doors and other wall penetration components; roofing systems and roof penetrations) manufactured, fabricated and installed by separate entities.
 2. Prepare Coordination Drawings of building systems indicating the functional and operational installation, (including mechanical; electrical; plumbing; fire protection and telecom/data systems) manufactured, fabricated and installed by separate entities.
 3. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Contracting Officer for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 4. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 5. Number of Copies: Submit two opaque copies of each submittal. Contracting Officer will return one copy.
 6. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
 7. Refer to Schedule of Coordination Drawings at end of this section.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Contracting Officer, Base Civil Engineer, Base Safety, Security and the using organization and of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Contracting Officer, Base Civil Engineer, and the using organization within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Government, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Contracting Officer, Base Civil Engineer and the using organization, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for requests for interpretations (RFIs).
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.
 - l. Use of the premises and existing building.
 - m. Work restrictions.
 - n. Government's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.

- w. Working hours.
 3. Minutes: Contractor shall record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Contracting Officer of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Options.
 - c. Related requests for interpretations (RFIs).
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at regular intervals, to be agreed upon with Contracting Officer. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Government and each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for interpretations (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
3. Minutes: Contractor shall record the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 Coordination Drawings:

- A. Provide the following Coordination Drawings. Coordination Drawings are informational submittals and shall be accompanied by shop drawings and product data which are action submittals for each component of the assembly or system depicted on the Coordination Drawings.

3.2 Schedule of Coordination Drawings:

- A. Foundation Assembly Drawings: Indicating insulation, vapor barriers/retarders, utility penetrations and similar items.
- B. Wall Assembly Drawings: Indicating framing, vapor retarders, air barriers, door and other penetrations; flashing moisture drainage provisions; exterior finish materials; and interior finish materials.
- C. Roof Assembly Drawings: Indicating framing; protection board; vapor retarder; air barrier; roof penetrations; roof to wall transitions; ridge and valley assemblies existing to new transitions.
- D. Structural, Mechanical and Electrical Coordination Drawings: Indicating interface of these systems and equipment needed to provide for efficient installation; maintenance; and replacement of mechanical and electrical equipment and devices.

END OF SECTION 013100

SECTION 013200 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Daily construction reports.
 - 4. Field condition reports.
- B. See Division 1 Section "Payment Procedures" for submitting the Schedule of Values.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either the government or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
- E. Fagnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for final release or approval.
- B. Contractor's Construction Schedule: Submit three opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- C. CPM Reports: Concurrent with CPM schedule, submit by email to Contracting Officer, COR, and others directed by Contracting Officer, each of the following computer generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
- D. Daily Construction Reports: Email copies to Contracting Officer, COR and others directed by Contracting Officer, at weekly intervals.
- E. Field Condition Reports: Email copies to Contracting Officer, COR and others directed by Contracting Officer, at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, re-review, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Contracting Officer.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review, re-submittal and re-review times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than ten days for startup and testing. Coordinate with requirements of Division 01, Section "General Commissioning Requirements", Division 15, Section "Commissioning of Mechanical Systems" and Division 16, Section "Commissioning of Electrical Systems".
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Contracting Officer's administrative procedures necessary for certification of Substantial Completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Work Restrictions: Show the effect of the following items on the schedule:

- a. Uninterruptible services, if any.
 - b. Seasonal variations.
 - c. Environmental control.
2. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of government approved proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice of Award. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Equipment at Project site.
 3. Material deliveries.
 4. High and low temperatures and general weather conditions.
 5. Accidents.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. Orders and requests of authorities having jurisdiction.
 9. Services connected and disconnected.
 10. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to the Contracting Officer's Representative (COR), separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. See Division 1 Section 01320 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule.
- C. See Division 1 Section 01400 "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
- D. See Division 1 Section 01770 "Closeout Procedures" for submitting warranties.
- E. See Division 1 Section 01781 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
- F. See Division 1 Section 01782 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Contracting Officer's responsive action.
- B. Informational Submittals: Written information that does not require Contracting Officer's responsive action. Submittals may be rejected for not complying with requirements.
- C. Initial Submittal: Initial transmittal of a project submittal package from the Contractor to the Contracting Officer/A-E of Record.
- D. First Resubmittal: First retransmittal of a project submittal package from the Contractor to the Contracting Officer/A-E of Record.
- E. Second and Subsequent Resubmittal: Second and subsequent transmittals of a project submittal package from the Contractor to the Contracting Officer/A-E of Record.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Contracting Officer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
1. The attached contract (AF Form 3000) listing shall be used for submission of Contractor's Material and Equipment for approval. The listing is not all inclusive and the contractor may submit additional shop drawings and product data as may be required. Submit the AF Form 3000 with the procurement schedule and construction progress schedule
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals and re-review, as follows. Time for review shall commence on Contracting Officer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals and re-review.
1. Initial Review: Allow 14 calendar days for initial review of each submittal by the Architect- Engineer. Allow additional time if coordination with subsequent submittals is required. Architect will advise the COR when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: The engineer/architect shall make all recommendations to the Contracting Officer his/her technical representative regarding acceptance or rejection of resubmittals. The Contracting Officer is the only person having authority to reject or approve resubmittals. Allow 14 calendar days for review of each resubmittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Contracting Officer.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.

- h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall be sequential followed by a decimal and then Specification Number (e.g. 001.01330). Resubmittals shall include an alphabetic suffix after another decimal point (e.g. 001.01330.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals. Include all changes or adjustments to other building components or systems necessary to accommodate the deviation at no additional cost to the Owner.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect/COR observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- 1. Additional copies submitted for installation, operation and maintenance manuals will be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Submittals will be returned without review, if received from sources other than Contractor.
- 1. Transmittal Form: Government AF Form 3000, Material Approval Submittal will be used for initial and resubmittals. See sample at end of this section
- H. First Resubmittals: Make first resubmittals in same form and number of copies as the initial submittal.
- 1. Note date and content of initial submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are approved by the Contracting Officer.
- I. Second and Subsequent Resubmittals: If a second or subsequent resubmittal is required, make resubmittal in the same form and number of copies as initial submittal with a letter to the Contracting Officer indicating explanation of why the resubmittal has not been corrected in previous submittal. Letter shall also acknowledge responsibility for all additional costs incurred to the Government and the Architect for expenses related to the review of the second or subsequent resubmittal. Letter will indicate agreement to pay resubmittal review fee as described in paragraph 3.3.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final complete submittals that have been recommended for approval by the Architect/Engineer and approved by the Contracting Officer (AF Form 3000).

1.4 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
1. Contractor shall secure from the Frankfurt Short Bruza, Assoc., P.C. (FSB) a written agreement that limits the contractor's use of the drawings, such as shop drawing preparation, or his uses in maintaining As Built Drawings (required under other sections of the contract documents) and the like. FSB will provide to the contractor a statement limiting such use to be incorporated into the title block.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with specified referenced standards.
 - i. Testing by recognized testing agency.
 4. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Two (2) copies will be returned. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of Architect's CAD Drawings is otherwise permitted by COR.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.

- b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.
 - k. Relationship to adjoining construction clearly indicated.
 - l. Seal and signature of professional engineer if specified.
 - m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 34 by 44 inches.
 3. Number of Copies: Submit two opaque (bond) copies of each submittal. One copy will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit four sets of Samples. Architect/COR will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.
 1. Number of Copies: Submit four copies of product schedule or list, unless otherwise indicated. Contracting Officer will return two copies.
- F. Submittals Schedule: Comply with requirements specified in Division 1 Section 01320 "Construction Progress Documentation."
- G. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Contracting Officer will return two copies.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit four copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section 01320 "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- F. **Manufacturer Certificates:** Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. **Product Certificates:** Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. **Material Certificates:** Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. **Material Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. **Product Test Reports:** Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. **Research/Evaluation Reports:** Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- L. **Preconstruction Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. **Compatibility Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. **Field Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. **Maintenance Data:** Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- P. **Design Data:** Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- R. Manufacturer's Field Reports: Prepare written information documenting factory- authorized service representative's tests and inspections. Include the following, as applicable:
1. Statement on condition of substrates and their acceptability for installation of product.
 2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- T. Material Safety Data Sheets (MSDSs): Submit information directly to COR; do not submit to Architect, except as required in "Action Submittals" Article.

2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Contracting Officer.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit six copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal (including initial first, second and subsequent resubmittals) and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Contractor shall mark with approval stamp before submitting.

- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved by the Contractor for compliance with the Contract Documents.
- C. Contractor shall comply with the requirements of Division 1 Section 01310 ÓProject Management and Coordination• and provide Coordination Drawings as specified and required.

3.2 GOVERNMENTS ACTION

- A. General: Government will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Contracting Officer will review each submittal, (including initial first, second and subsequent resubmittals) make marks to indicate corrections or modifications required, and return it. Contracting will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Contracting Officer will review each submittal, (including initial first, second and subsequent resubmittals) and will not return it, or will return it if it does not comply with requirements. Contracting Officer will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements. The Contractor shall pay for all testing and inspection services.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and -control services required by COR, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 2 through 16 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

- A. Notwithstanding the definitions in this section, contractor is responsible to adhere to requirements defined in Division 01 Section 01000 "General Requirements", Article 1.19 as related to Quality Control/Tests.
- B. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- C. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Contracting Officer.
- D. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- E. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

- F. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- G. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- H. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- I. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- J. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- K. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades-people of the corresponding generic name.
- L. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels; for bidding purposes, bid to comply with the most stringent or highest cost requirement. Notify COR of conflicting requirement for decision before proceeding with construction. Refer uncertainties and requirements that are different, but apparently equal, to COR for a decision before proceeding with construction.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to COR for a decision before proceeding.

1.4 ESSENTIAL COMPONENTS

- A. All essential components, appurtenances, devices, and accessories, of indicated building systems and equipment shall be included as part of the work of this project, though not specifically stated in the specifications or indicated on the drawings, to ensure a complete, functional and fully operational system.
- B. Contractor shall provide framing, fasteners, and connection devices recommended by the manufacturer for the substrates and conditions on which specified items are to be anchored.
- C. Contractor shall examine and verify suitability and capacity of supporting construction to support specified item, in compliance with applicable code requirements. Contractor shall notify Contracting Officer's representative if unsuitable supporting construction is observed.

1.5 OPERATION AND MAINTENANCE ACCESS AND CLEARANCE

- A. Contractor and manufacturer of item(s) purchased by the contractor for installation in the project shall examine and verify that adequate access and clearance from adjacent construction has been provided for operations and maintenance access for all operational items including but not limited to doors, handles, switches, gauges, meters, access panels, filters, and similar items. Contractor and manufacturer shall verify that adequate access space, doors, or panels are provided in adjacent construction where required. Contractor and manufacturer of item(s) purchased by the contractor for installation in the project shall verify that access ladders or platforms are provided as required to operate and maintain specified item. Contractor shall notify Contracting Officer's representative if acceptable access and clearance based on the items purchased for installation do not coordinate with the requirements indicated in the contract documents.

1.6 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

C. Permits, Licenses, and Certificates: For Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in Connecticut and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent. Fire protection engineer must meet requirement called out in appropriate sections.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

- H. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Contracting Officer.
 - 2. Notify Contracting Officer seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Contracting Officer's approval of mockups before starting work, fabrication, or construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.
- J. **Laboratory Mockups:** Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 16.

1.8 QUALITY CONTROL

- A. **Contractor's Responsibilities:** Where quality-control and testing services are indicated, contractor shall engage a qualified testing agency to perform and pay for these services.
 - 1. Contractor shall submit to Contracting Officer for approval a list of names, including addresses and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be paid by the Contractor.
 - 3. Contractor shall engage a qualified independent testing agency to perform quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 4. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 5. Submit a certified written report, in duplicate, of each quality-control service.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section 01330 "Submittal Procedures."

- C. Testing Agency Responsibilities: Cooperate with COR and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify COR and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- D. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- F. Coordination Meetings: Contractor shall meet with government personnel as directed by COR to conduct review of quality control procedures and methods employed by the contractor's personnel or his testing agencies.

1.9 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.

2. Notifying COR and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Contracting Officer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and re-inspecting corrected work.

1.10 PHOTOGRAPHIC DOCUMENTATION

- A. Contractor will maintain a digital camera on site for construction progress photography documentation.
- B. Camera to be a minimum resolution of 6 mega pixels.
- C. Maintain a color copier at the job site suitable for producing high resolution printing of 8" x 10" copies of photos.
- D. Photograph construction activities at a minimum of weekly progress. Contractor shall photograph underground and concealed installation items before covering.
- E. Submit digital images in sufficient number of images to illustrate construction progress on a weekly basis to COR.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

**IBC 2015
STRUCTURAL TESTS AND SPECIAL INSPECTIONS**

SOILS & FOUNDATIONS

Required Verification and Special Inspections

Inspection/Test Description	Inspection Frequency		Reference Standard	IBC Reference	Firm/ Action
	Cont.	Peri.			
1. Soils Report – Prepared by a registered design professional.	-	-	-	Sec. 1803.2	Wolti Geotechnical
2. Soils					To Be Determined
a. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.		X	Approved Soils Report Construction Docs	Sec. 1705.6	
b. Verify excavations are extended to proper depth and have reached proper material.		X	Approved Soils Report Construction Docs	Sec. 1705.6	
c. Perform classification and testing of compacted fill materials.		X	Approved Soils Report Construction Docs	Sec. 1705.6	
d. Prior to placement of compacted fill, inspect subgrade and verify that the site has been prepared properly.	-	X	Approved Soils Report Construction Docs	Sec. 1705.6	
e. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill. (Frequency: 1 test for each 10,000 sqft of each lift.)	X		Approved Soils Report Construction Docs	Sec. 1705.6	

**IBC 2015
STRUCTURAL TESTS AND SPECIAL INSPECTIONS**

CONCRETE

Required Verification and Special Inspections

Inspection/Test Description	Inspection Frequency		Reference Standard	IBC Reference	Firm/ Action
	Cont.	Peri.			
1. Inspection of reinforcing steel and verify placement.	-	X	ACI 318 (14), Ch. 20, 25.2, 25.3, 26.5-1-26.5.3	Table 1705.3	To Be Determined
2. Inspection of reinforcing bar welding:					To Be Determined
a. Verify weldability of reinforcing bars other than ASTM A 706	-	X	AWS D1.4 ACI 318 (14), Sec 26.6.4	Table 1705.3	
b. Inspect single-pass fillet welds, maximum 5/16"	-	X	AWS D1.4 ACI 318 (14), Sec 26.6.4	Table 1705.3	
c. Inspect all other welds.	X	-	AWS D1.4 ACI 318 (14), Sec 26.6.4	Table 1705.3	
3. Inspect of anchors cast in concrete prior to and during placement of concrete.	-	X	ACI 318 (14), Section 17.8.2	Table 1705.3	To Be Determined
4. Inspection of anchors post-installed in hardened concrete members.					To Be Determined
a. Adhesive anchors installed in horizontally or upwardly inclined orientation to resist sustained tension loads.	X	-	ACI 318 (14), Section 17.8.2.4	Table 1705.3	
b. Mechanical anchors and adhesive anchors not defined in 4.a.	-	X	ACI 318 (14), Section 17.8.2	Table 1705.3	
5. Verifying use of required design mix.	-	X	ACI 318 (14), Chapter 19, Sections 26.4.3 and 26.4.4	Secs. 1904.1, 1904.2, 1908.2 and 1908.3	To Be Determined
6. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests and determine the temperature of the concrete. Compression: 4 cys from 1 st mixer load for each 50 cyd of each type concrete placed in one day. Flexure: 3 beams from 1 st mixer load for each 50 cyd of each type concrete placed in one day.	X	-	ASTM C 172 ASTM C 31 ACI 318 (14), Sections 26.4.5 and 26.12	Sec.1908.10	To Be Determined
7. Inspection of concrete placement for proper applications techniques.	X	-	ACI 318 (14), Section 26.4.5	Secs 1908.6, 1908.7, 1908.8	To Be Determined
8. Inspection for maintenance of specified curing temperature and techniques.	-	X	ACI 318 (14), Sections 26.4.7-26.4.9	Sec. 1908.9	To Be Determined

9. Verification of in-situ concrete strength prior to removal of shores and forms from beams and structural slabs.	-	X	ACI 318 (14), Section 26.10.2	-	To Be Determined
10. Inspect formwork for shape, location and dimensions of the concrete member being formed.	-	X	ACI 318 (14), Section 26.10.1 (b)	-	To Be Determined
11. Where reinforcing other than ASTM A706 is to be welded:					To Be Determined
a. Mill test reports of material properties verifying compliance with AWS D1.4 for weldability required.			ACI 318(14) Section 26.6.4	Sec. 1704.5	Submittal

IBC 2015
STRUCTURAL TESTS AND SPECIAL INSPECTIONS

MASONRY – LEVEL B

Engineered Masonry – Risk Categories I - III

Required Verification and Special Inspections

Inspection/Test Description	Inspection Frequency		IBC Reference	ACI 530 (13) ASCE 5 (13) TMS 402 (13)	ACI 530.1 (13) ASCE 6 (13) TMS 602 (13)	Firm/ Action
	Cont.	Peri.				
1. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.	-	X	-	-	Art. 1.5	To Be Determined
2. Verification of f'm prior to construction. f'm to be determined by the "Unit Strength Method".	-	X	-	-	Art. 1.4 B	To Be Determined
3. Verification of slump flow and VSI as delivered to the site for self-consolidating grout.	X	-	-	-	Art. 1.5 B.1.b.3	
4. As masonry construction begins, verify that the following are in compliance:						To Be Determined
a. Proportions of site-prepared mortar.	-	X	-	-	Art. 2.1, 2.6 A	
b. Construction of mortar joints.	-	X	-	-	Art. 3.3 B	
c. Location of reinforcement.	-	X	-	-	Art. 3.4 Art 3.6 A	
5. Verify During Construction:						To Be Determined
a. Size and location of structural elements.	-	X	-	-	Art 3.3 F	
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	-	X	-	Sec. 1.2.1(e) Sec. 6.1.4.3 Sec 6.2.1	-	
c. Specified size, grade and type of reinforcement.	-	X	-	-	Art. 2.4 Art. 3.4	
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40 F) or hot weather (temperature above 90 F).	-	X	-	-	Art. 1.8 C Art. 1.8 D	
e. Placement of grout is in compliance	X	-	-	-	Art. 3.5, 3.6 C	
6. Prior to grouting, verify that the following are in compliance:						To Be Determined
a. Grout space.	-	X	-	-	Art. 3.2 D, 3.2 F	

b. Grade, type, and size of reinforcement and anchor bolts.	-	X	-	Sec. 6.1	Art. 2.4, 3.4	
c. Placement of reinforcement.	-	X	-	Sec. 6.1, 6.2.1, 6.2.6, 6.2.7	Art. 3.2 E, 3.4, 3.6 A	
d. Proportions of site-prepared grout.	-	X	-	-	Art. 2.6 B, 2.4 G.1.b	
e. Construction of mortar joints.	-	X	-	-	Art. 3.3 B	
7. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed. (Grout Cubes – 3 per 2500 sq. ft.)	-	X	-	-	Art. 1.4 B.2.a.3 1.4 B.2.b.3 1.4 B.2.c.3 1.4 B.3 1.4 B.4	To Be Determined

**IBC 2015
STRUCTURAL TESTS AND SPECIAL INSPECTIONS**

**STRUCTURAL STEEL
Required Verification and Special Inspections**

Inspection/Test Description	Inspection Frequency		Reference Standard	IBC Reference	Firm/ Action
	Cont.	Peri.			
1. Material verification of structural steel					To Be Determined
A. Review material test reports and certifications as listed in AISC 360(10), Section N3.2 for compliance with the construction documents	-	X	AISC 360(10) Sect. N5.2	-	
2. Welding Inspections					To Be Determined
A. Prior to Welding:					
1. Welding procedure specifications available	X	-	AISC 360(10) Sect. N5.4		
2. Manufacturer certifications for welding consumables available	X	-	AISC 360(10) Sect. N5.4		
3. Material Identification	-	X	AISC 360(10) Sect. N5.4		
4. Welder identifications system	-	X	AISC 360(10) Sect. N5.4		
5. Groove weld fit-up: Joint preparation, Dimensions, Cleanliness, Tacking, Backing type and fit		X	AISC 360(10) Sect. N5.4		
6. Configuration and finish of access holes		X	AISC 360(10) Sect. N5.4		
7. Fit-up of fillet welds Dimensions, Cleanliness, Tacking		X	AISC 360(10) Sect. N5.4		
8. Check welding equipment		X	AISC 360(10) Sect. N5.4		
B. During Welding:					
1. Use of qualified welders		X	AISC 360(10) Sect. N5.4		
2. Control and handling of welding consumables: Packaging, Exposure Control		X	AISC 360(10) Sect. N5.4		
3. No welding over cracked tack welds		X	AISC 360(10) Sect. N5.4		
4. Environmental conditions: Wind Speed, Precipitation, Temperature		X	AISC 360(10) Sect. N5.4		
5. Welding Procedures Specifications followed: Settings on Welding Equipment, Travel Speed, Selected Welding Materials, Shielding Gas Type/Flow Rate, Preheat Applied, Interpass Temp. Maintained, Proper Position		X	AISC 360(10) Sect. N5.4		
6. Welding techniques: Interpass and Final Cleaning, Profile Limitations, Quality Requirements		X	AISC 360(10) Sect. N5.4		
C. After Welding:					
1. Welds Cleaned	-	X	AISC 360(10) Sect. N5.4		
2. Size, Length, Location of Welds	X	-	AISC 360(10) Sect. N5.4		
3. Visual acceptance: Crack Prohibition, Weld/Base-Metal Fusion, Crater Cross Section, Weld Profiles, Weld	X	-	AISC 360(10) Sect. N5.4		

	Size, Undercut, Porosity					
4.	Arc Strikes	X	-	AISC 360(10) Sect. N5.4		
5.	K-Area	X	-	AISC 360(10) Sect. N5.4		
6.	Backing and Tabs Removed	X	-	AISC 360(10) Sect. N5.4		
7.	Repair Activities	X	-	AISC 360(10) Sect. N5.4		
8.	Document Weld Acceptance	X	-	AISC 360(10) Sect. N5.4		
3. Bolting Inspections						To Be Determined
A. Prior to Bolting:						
1.	Manufacturer's certifications available for fastener materials	X	-	AISC 360(10) Sect. N5.6		
2.	Fasteners marked in accordance with ASTM requirements	-	X	AISC 360(10) Sect. N5.6		
3.	Proper fasteners selected for the joint detail (grade, type, bolt length if threads are excluded from the shear plane)	-	X	AISC 360(10) Sect. N5.6		
4.	Proper bolting procedure selected for the joint detail	-	X	AISC 360(10) Sect. N5.6		
5.	Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	-	X	AISC 360(10) Sect. N5.6		
6.	Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used (Exception: Not required for snug-tight bolts)	X	-	AISC 360(10) Sect. N5.6		
7.	Proper storage for bolts, nuts, washers, and other fastener components	-	X	AISC 360(10) Sect. N5.6		
B. During Bolting						
	Snug-Tight Joints and Slip-Critical Joints using: Turn-of-nut with match marks, Direct-tension-indicator method, or twist-off-type tension control bolts.	-	X	AISC 360(10) Sect. N5.6		
Inspection Tasks During Bolting						
1.	Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required		X	AISC 360(10) Sect. N5.6		
2.	Joint brought to the snug-tight condition prior to the pretensioning operation		X	AISC 360(10) Sect. N5.6		
3.	Fastener component not turned by the wrench prevented from rotating		X	AISC 360(10) Sect. N5.6		
4.	Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges		X	AISC 360(10) Sect. N5.6		
C. After Bolting						
	Document Bolting Acceptance	X	-	AISC 360(10) Sect. N5.6		
4. Other Inspection Tasks						To Be Determined
A. Anchor Rods / Other Embedments						
1.	Compliance with the construction documents	X	-	AISC 360(10) Sect. N5.7		
2.	Prior to placing concrete, verify: Diameter, grade, type, and length	X	-	AISC 360(10) Sect. N5.7		

of the anchor rod or embedded item and the depth of embedment into the concrete					
B. Erected Steel					
1. Compliance with the construction documents:					
a. Brace, stiffener, member locations	-	X	AISC 360(10) Sect. N5.7		
b. Proper application of joint details at each connection	-	X	AISC 360(10) Sect. N5.7		

SECTION 014200 REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": Definition as shown in Division 01 Section 01000 "General Requirements" , Article 1.11.
- C. "Directed": Definition as shown in Division 01 Section 01000 "General Requirements" , Article 1.11.
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use. I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, or as defined in Section 01000.1.10, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG Americans with Disabilities Act (ADA)
AFI Air Force Instruction
AFOSH Air Force Occupational Safety and Health
ANGETL Air National Guard Engineering Technical Letter
ANGI Air National Guard Instruction
AWI Airlift Wing Instruction
BCE Base Civil Engineer (Authority Having Jurisdiction)
CFR Code of Federal Regulations
CRD Handbook for Concrete and Cement
CTANG Connecticut Air National Guard
DOD Department of Defense Military Specifications and Standards
DSCC Defense Supply Center Columbus (See FS)
FED-STD Federal Standard (See FS)
FS Federal Specification
FTMS Federal Test Method Standard (See FS)
MIL See MILSPEC
MS MIL See MILSPEC
MILSPEC Military Specification and Standards
UFAS Uniform Federal Accessibility Standards
USPFO United State Property and Fiscal Office - Connecticut

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

AA Aluminum Association, Inc. (The)
AAADM American Association of Automatic Door Manufacturers
AABC Associated Air Balance Council
AAMA American Architectural Manufacturers Association
AASHTO American Association of State Highway and Transportation
Officials
AATCC American Association of Textile Chemists and Colorists (The)
ABMA American Bearing Manufacturers Association
ACI American Concrete Institute/ACI International
ACPA American Concrete Pipe Association
AEIC Association of Edison Illuminating Companies, Inc. (The)
AFPA American Forest & Paper Association (See AF&PA)
AF&PA American Forest & Paper Association

AGA American Gas Association
AGC Associated General Contractors of America (The)
AHA American Hardboard Association
AHAM Association of Home Appliance Manufacturers AI Asphalt
Institute
AIA American Institute of Architects (The)
AISC American Institute of Steel Construction
AISI American Iron and Steel Institute
AITC American Institute of Timber Construction
ALCA Associated Landscape Contractors of America
ALSC American Lumber Standard Committee, Incorporated
AMCA Air Movement and Control Association International, Inc.
ANSI American National Standards Institute
AOSA Association of Official Seed Analysts
APA APA - The Engineered Wood Association
APA Architectural Precast Association
API American Petroleum Institute
ARI Air-Conditioning & Refrigeration Institute
ARMA Asphalt Roofing Manufacturers Association
ASCA Architectural Spray Coaters Association
ASCE American Society of Civil Engineers
ASHRAE American Society of Heating, Refrigerating and Air-Conditioning
Engineers
ASME ASME International
(The American Society of Mechanical Engineers International)
ASSE American Society of Sanitary Engineering
ASTM ASTM International
(American Society for Testing and Materials International)
AWCI AWCI International
(Association of the Wall and Ceiling Industries International)
AWCMA American Window Covering Manufacturers Association (See
WCSC)
AWI Architectural Woodwork Institute
AWPA American Wood-Preservers' Association
AWS American Welding Society
AWWA American Water Works Association
BHMA Builders Hardware Manufacturers Association
BIA Brick Industry Association (The)
BIFMA BIFMA International
(Business and Institutional Furniture Manufacturer's Association
International)
CCC Carpet Cushion Council
CCFSS Center for Cold-Formed Steel Structures
CDA Copper Development Association Inc.
CEA Canadian Electricity Association
CFFA Chemical Fabrics & Film Association, Inc.
CGA Compressed Gas Association
CGSB Canadian General Standards Board
CIMA Cellulose Insulation Manufacturers Association
CISCA Ceilings & Interior Systems Construction Association

CISPI Cast Iron Soil Pipe Institute
CLFMI Chain Link Fence Manufacturers Institute
CPPA Corrugated Polyethylene Pipe Association
CRI Carpet & Rug Institute (The)
CRSI Concrete Reinforcing Steel Institute
CSA CSA International
(Formerly: IAS - International Approval Services)
CSI Construction Specifications Institute (The)
CSSB Cedar Shake & Shingle Bureau
CTI Cooling Technology Institute (Formerly: Cooling Tower Institute)
DHI Door and Hardware Institute
EIA Electronic Industries Alliance
EIMA EIFS Industry Members Association
EJCDC Engineers Joint Contract Documents Committee
EJMA Expansion Joint Manufacturers Association, Inc.
ESD ESD Association
FCI Fluid Controls Institute
FGMA Flat Glass Marketing Association (See GANA)
FM Factory Mutual System (See FMG)
FMG FM Global
(Formerly: FM - Factory Mutual System)
FRSA Florida Roofing, Sheet Metal & Air Conditioning Contractors
Association, Inc.
FSA Fluid Sealing Association
FSC Forest Stewardship Council
GA Gypsum Association
GANA Glass Association of North America
(Formerly: FGMA - Flat Glass Marketing Association)
GBCI Green Building Certification Institute
GRI Geosynthetic Research Institute
GTA Glass Tempering Division of Glass Association of North America
(See GANA)
HI Hydraulic Institute
HI Hydronics Institute
HMMA Hollow Metal Manufacturers Association (See NAAMM)
HPVA Hardwood Plywood & Veneer Association
HPW H. P. White Laboratory, Inc.
IAS International Approval Services (See CSA)
ICEA Insulated Cable Engineers Association, Inc.
ICRI International Concrete Repair Institute, Inc.
IEC International Electrotechnical Commission
IEEE Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA Illuminating Engineering Society of North America
IGCC Insulating Glass Certification Council
IGMA Insulating Glass Manufacturers Alliance (The)
ILI Indiana Limestone Institute of America, Inc.
ISSFA International Solid Surface Fabricators Association
ITS Intertek Testing Services
IWS Insect Screening Weavers Association (Now defunct)
KCMA Kitchen Cabinet Manufacturers Association

LMA Laminating Materials Association
LPI Lightning Protection Institute
LSGA Laminated Safety Glass Association (See GANA)
MBMA Metal Building Manufacturers Association
MFMA Maple Flooring Manufacturers Association
MFMA Metal Framing Manufacturers Association
MH Material Handling Industry of America (See MHIA)
MHIA Material Handling Industry of America
MIA Marble Institute of America
MPI Master Painters Institute
MSS Manufacturers Standardization Society of The Valve and Fittings
Industry Inc.
NAAMM National Association of Architectural Metal Manufacturers
NAAMM North American Association of Mirror Manufacturers (See
GANA)
NACE NACE International
(National Association of Corrosion Engineers International)
NADCA National Air Duct Cleaners Association
NAIMA North American Insulation Manufacturers Association (The)
NAMI National Accreditation and Management Institute, Inc.
NBGQA National Building Granite Quarries Association, Inc.
NCMA National Concrete Masonry Association
NCPI National Clay Pipe Institute
NCTA National Cable & Telecommunications Association
NEBB National Environmental Balancing Bureau
NECA National Electrical Contractors Association
NeLMA Northeastern Lumber Manufacturers' Association
NEMA National Electrical Manufacturers Association
NETA InterNational Electrical Testing Association
NFPA NFPA International
(National Fire Protection Association International)
NFRFC National Fenestration Rating Council
NGA National Glass Association
NHLA National Hardwood Lumber Association
NLGA National Lumber Grades Authority
NOFMA National Oak Flooring Manufacturers Association
NRCA National Roofing Contractors Association
NRMCA National Ready Mixed Concrete Association
NSF NSF International
(National Sanitation Foundation International)
NSSGA National Stone, Sand & Gravel Association
NTMA National Terrazzo and Mosaic Association, Inc.
NTRMA National Tile Roofing Manufacturers Association (See RTI)
NWWDA National Wood Window and Door Association (See WDMA)
OPL Omega Point Laboratories, Inc.
PCI Precast/Prestressed Concrete Institute
PDCA Painting and Decorating Contractors of America
PDI Plumbing & Drainage Institute
PGI PVC Geomembrane Institute
RCSC Research Council on Structural Connections

- RFCI Resilient Floor Covering Institute
RIS Redwood Inspection Service
- RTI Roof Tile Institute
(Formerly: NTRMA - National Tile Roofing Manufacturers Association)
- SAE SAE International
SDI Steel Deck Institute
SDI Steel Door Institute
SEFA Scientific Equipment and Furniture Association
SGCC Safety Glazing Certification Council
SIA Security Industry Association
SIGMA Sealed Insulating Glass Manufacturers Association (See IGMA)
SJI Steel Joist Institute
SMA Screen Manufacturers Association
SMACNA Sheet Metal and Air Conditioning Contractors' National Association
- SMPTE Society of Motion Picture and Television Engineers
SPFA Spray Polyurethane Foam Alliance
(Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.;
Spray Polyurethane Foam Division)
- SPIB Southern Pine Inspection Bureau (The)
SPI/SPFD Society of the Plastics Industry, Inc. (The) Spray Polyurethane Foam Division (See SPFA)
- SPRI SPRI (Single Ply Roofing Institute)
SSINA Specialty Steel Industry of North America
SSPC SSPC: The Society for Protective Coatings
STI Steel Tank Institute
SWI Steel Window Institute
SWRI Sealant, Waterproofing, & Restoration Institute
TCA Tile Council of America, Inc.
TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance
- TMS The Masonry Society
TPI Truss Plate Institute, Inc.
TPI Turfgrass Producers International
UL Underwriters Laboratories Inc.
USGBC United States Green Building Council
UNI Uni-Bell PVC Pipe Association
USITT United States Institute for Theatre Technology, Inc.
WASTEC Waste Equipment Technology Association
WCLIB West Coast Lumber Inspection Bureau
WCMA Window Covering Manufacturers Association (See WCSC)
WCSC Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association)
- WDMA Window & Door Manufacturers Association (Formerly:
NWWDA - National Wood Window and Door Association)
WIC Woodwork Institute of California
WMMPA Wood Moulding & Millwork Producers Association
WSRCA Western States Roofing Contractors Association

WWPA Western Wood Products Association

- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

BOCA BOCA International, Inc.

CABO Council of American Building Officials (See ICC)

IAPMO International Association of Plumbing and Mechanical Officials

(The)

ICBO International Conference of Building Officials

ICBO ES ICBO Evaluation Service, Inc.

ICC International Code Council, Inc.

(Formerly: CABO - Council of American Building Officials)

SBCCI Southern Building Code Congress International, Inc.

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

CE Army Corps of Engineers

CPSC Consumer Product Safety Commission

DOC Department of Commerce

EPA Environmental Protection Agency

FAA Federal Aviation Administration

FDA Food and Drug Administration

GSA General Services Administration

HUD Department of Housing and Urban Development

LBL Lawrence Berkeley Laboratory (See LBNL)

LBNL Lawrence Berkeley National Laboratory

NCHRP National Cooperative Highway Research Program (See TRB)

NIST National Institute of Standards and Technology

OSHA Occupational Safety & Health Administration

PBS Public Building Service (See GSA)

RUS Rural Utilities Service (See USDA)

SD State Department

TRB Transportation Research Board

USDA Department of Agriculture

USPS Postal Service

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 014200

SECTION 015000 TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. See Division 1 Section "Execution Requirements" for progress cleaning requirements.
- C. See Divisions 2 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Contracting Officer, permanent roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Contracting Officer and occupants, Project testing, agencies, and authorities having jurisdiction.
- B. Water Service and Sanitary Sewer Service: Water and sanitary sewer from Bradley ANGB's existing water and sanitary sewer systems are NOT available for use without metering and without payment of use charges. Contractor is to provide metering and payment acceptable to the Contracting Officer. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service: Electric power from Bradley ANGB's existing system is NOT available for use without metering and without payment of use charges. Contractor is to provide metering and payment acceptable to the Contracting Officer. Provide connections and extensions of services as required for construction operations.

1.4 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Government's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Heating Equipment: Unless Government authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work. All materials to be removed and stored for reinstallation shall be stored on the Military Installation.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Government, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- C. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- D. Electric Power Service: Use of Government's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Government.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Contracting Officer.
- B. Paved Areas: Construct and maintain temporary paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
 - C. Temporary Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary paved areas in same location as permanent roads and paved areas. Extend temporary paved areas, within construction limits indicated, as necessary for construction operations.
 - D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION
- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
 - D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
 - E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Government. Perform control operations lawfully, using environmentally safe materials.
 - F. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

END OF SECTION 015000

SECTION 015010 SPECIAL PROJECT SECURITY PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes several procedures to be followed by all Contractor and Subcontractor's personnel.

1.2 PROCEDURES

- A. Follow procedures indicated in Part 4 of the attached memorandum for Contractors and provide signed records acknowledging attendance at security briefing for all employees. Original signed copies are to be provided to the COR.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - ATTACHMENTS

- A. Contractors Security Briefing

END OF SECTION 015010

CONTRACTORS SECURITY BRIEFING

The following security briefing will be provided to contractors who have official or otherwise approved travel within the confines of the 103d Airlift Wing, Air National Guard Base.

- A. Contractors will sign in on the Contractor's Log and be issued a contract appropriate colored, serially controlled badge. This badge will be worn on outer garment at all times while on the installation. Anytime leaving the installation, the contractor must sign out on the Contractor's Log and leave the badge behind.
- B. Security Forces will require a list of only those personnel who will be working on the installation for the project, not a list of all company employees. Any additions or deletion must be made at least 24 hours in advance. Personnel will not be allowed on the installation unless prior notification has been made. At the discretion of the Chief, Security Forces, a local background check may be conducted.
- C. Entry Authority List will be submitted through the COR and include the individual(s) name, SSAN or Driver License #, company, work site, start date and end date.
- D. If you are expecting any deliveries to the installation, prior notification and coordination must be accomplished through Security Forces.
- E. You must have a valid driver's license to operate any privately owned vehicle while on this installation. Security Forces may ask to see your valid license prior to allowing entry to the installation. The maximum speed limit is 25 mph; however, slower speeds around buildings and congested areas are usually called for. Seat belts will be worn while operating any vehicle on the installation. Obey all traffic signs.
- F. All contractors will be expected to remain within the construction limits established. If for any reason that work must be accomplished outside the construction limits, contact Civil Engineering for an escort.
- G. Do not enter any aircraft parking area or in front of the Main Hangar. Do not enter any area marked as "Controlled Area" or "Restricted Area" without an assigned escort.
- H. Upon entering the installation you hereby grant the consent search your vehicle, personal belongings or you're self at the discretion of the installation commander or his designated representative. Under the current threat we are searching all contractors' vehicles, packages, and containers. At the discretion of the Security Forces individual searches may also be conducted. Security Forces randomly search vehicles exiting the installation. You will comply with any request to search your vehicle.
- I. At no time will any contraband be transported onto the installation, to include firearms, explosives, illegal drugs or alcohol.
- J. Do not leave any pilfer able equipment or supplies unsecured. Security Forces will not be responsible for any items lost or stolen.
- K. By nature of this installation certain information is protected by Federal and State laws and statues. If at any time you come in contact with protected information contact Security Forces immediately. This information may contain the markings of "For Official Use Only", "Privacy Act Information" "Confidential", "Secret" or "Top Secret"

- L. In the event of an emergency contact Security Forces at X 911 with base phone, or 860-292-2312 with cell phone. For medical emergencies dial 911.
- M. While on this installation we expect you to be alert to any type of suspicious activity. Report this to Security Forces at X 911.
- N. Failure to follow these guidelines could result in your disbarment from the installation at the discretion the Installation Commander.
- O. The 103d SFS will conduct Antiterrorism briefings to personnel upon request.

If you have any questions at any time contact Security Forces at X 911.

NAME _____	COMPANY _____
COMPANY ADDRESS _____	
CITY _____	STATE _____ ZIP _____
OFFICE PHONE _____	CELL PHONE _____
SIGNATURE _____	DATE _____
NAME OF PERSON GIVING BRIEFING _____	
SIGNATURE _____	



SECTION 015020 ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes procedures and requirements for use and storage of Hazardous Materials. Requirements are to be followed by all Contractor personnel.

1.2 HAZARDOUS MATERIAL USAGE

- A. The contractor shall establish a Hazardous Material (HM) storage and distribution system when HM is to be used. All HM required to support the contract shall be reported to the Hazardous Material Pharmacy (HMP) using the Contractor HM Identification Form. The Contractor HM Identification Form will be provided to the Contractor at or prior to the Pre-Construction meeting. Additional HM needed by the contractor shall be identified to the Contracting Officer's Representative (COR) for approval by the HMP. Reference Attachment 18A.
- B. The contractor planning to use HM for the work shall register with the base HMP prior to start of work in order to support the installation's compliance with Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements.
- C. The contractor shall maintain Contractor HM Identification Form for HM on the job site for inspection / verification.
- D. The COR will verify that the HM identified to HMP is the only HM in use on the job site.
- E. The contractor shall be responsible for the following items:
 - 1. Material (HM). HM shall be construed to mean any item that is:
 - a. A health hazard or physical hazard as defined in 29 CFR, 1910.1200(c).
 - b. Regulated in its disposal by EPA under 40 CFR.
 - c. Hazardous as defined by DOT regulations under 49 CFR.
 - d. Hazardous as defined by the Dangerous Goods Regulations of the International Air Transport Association.
 - 2. Provide material safety data sheets (MSDS) for each item on the HM list.
- F. The contractor shall establish a construction specific HM storage and issue location that fully complies with Federal, State and Local environmental regulations. Materials issued shall be tracked for quantities used. Unused materials shall be inventoried and removed from the Bradley ANGB installation prior to close out of the contract or expiration date of the HM. Reports of materials delivered, used and removed from the installation shall be submitted to the COR monthly and prior to contract close-out.
- G. The Contractor shall comply with all Federal, State and Local environmental standards.

- H. The contractor shall accompany the Bio-environmental Engineering Representative (BEE) and the (COR) on project close-out inspection to ensure all used/unused HM is removed from the installation. This requirement shall not be a punch list item and must be accomplished prior to the Government accepting beneficial occupancy of the facility or construction item. Reference Attachment 18B.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - ATTACHMENTS

- A. Attachment 18A: Contractor Hazardous Material Identification Form.
- B. Attachment 18B: Contractor Hazardous Material Identification Form Close-Out Procedures.

END OF SECTION 015020

**ATTACHMENT
18A**

Contractor Hazardous Material Identification Form

Part I

Date: _____

This part is to be completed by Contractor prior to the construction start date, and shall be maintained on the job site.

Contractor Company: _____ (NAME)

Proposed Work Term: _____ (DATE) to _____ (DATE)

Contractor Point of Contact: _____ (Full name or names, phone/pager numbers,
emergency _____

_____ 24 hour contact numbers, etc ...)

HM to be used:	M.S.D. S.	Quantity	Disposal Procedures	Used/Unused material removed from

Note: This form is good for a one-month period and is to be submitted to the Hazardous Material Pharmacy. All Hazardous Material used thereafter will be identified to the Contracting Officer's Representative for approval by the Hazardous Material Pharmacy. See Part II for Contractor close-out procedures. The Hazardous Material Pharmacy phone number is to be obtained by contacting the BCE.

Approval Signatures:

COR (Contracting Officer Representative) _____

BEER (Bio-Environmental Engineering Representative) _____

EM (Environmental Manager) _____

SO (Safety Officer)

ATTACHMENT 18B

**Contractor Hazardous Material Identification
Form Close-Out Procedures**

Part II

Date: _____

Attach this form to Part I

The Contractor shall accompany the Contracting Officer Representative (COR) and Environmental Manager on the close-out inspection to ensure all used / unused HM was removed from the installation.

Close-out Approval Signatures:

COR (Contracting Officer Representative) _____

BEER (Bio-Environmental Engineering Representative) _____

EM (Environmental Manager) _____

Contractor _____

SECTION 015240 CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. Division 1 Section "Temporary Facilities and Controls" for environmental- protection measures during construction and location of waste containers at Project site.
 - 2. Division 1 Section "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
 - 3. Division 2 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.
 - 4. Division 4 Section "Unit Masonry Assemblies" for disposal requirements for masonry waste.
 - 5. Divisions 2 through 16 for disposal requirements for excess construction materials including, but not limited to items such as concrete, metal scraps, wood scraps, wire scraps, etc.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE GOALS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.
- B. Salvage/Recycle Goals: The government's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible. Government has established minimum goals for the following materials:

1. Demolition Waste:

- a. Asphaltic concrete paving.
- b. Concrete.
- c. Concrete reinforcing steel.
- d. Brick.
- e. Concrete masonry units.
- f. Plywood and oriented strand board.
- g. Wood trim.
- h. Structural and miscellaneous steel.
- i. Rough hardware.
- j. Roofing.
- k. Insulation.
- l. Doors and frames.
- m. Door hardware.
- n. Windows.
- o. Glazing.
- p. Metal studs.
- q. Gypsum board.
- r. Acoustical tile and panels.
- s. Carpet.
- t. Carpet pad.
- u. Demountable partitions.
- v. Equipment.
- w. Cabinets.
- x. Plumbing fixtures.
- y. Piping.
- z. Supports and hangers.
- aa. Valves.
- bb. Sprinklers.
- cc. Mechanical equipment.
- dd. Refrigerants.
- ee. Electrical conduit.
- ff. Copper wiring.

- gg. Lighting fixtures.
- hh. Lamps.
- ii. Ballasts.
- jj. Electrical devices.
- kk. Switchgear and panelboards.
- ll. Transformers.

2. Construction Waste:

- a. Site-clearing waste.
- b. Masonry and CMU.
- c. Lumber.
- d. Wood sheet materials.
- e. Wood trim.
- f. Metals.
- g. Roofing.
- h. Insulation.
- i. Carpet and pad.
- j. Gypsum board.
- k. Piping.
- l. Electrical conduit.
- m. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.5 SUBMITTALS

- A. Construction Waste Management Plan (CWMP): Submit four copies of the CWMP within 30 days of date established for the Notice to Proceed.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit four copies of report. Include separate reports for demolition and construction waste. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

- C. Waste Reduction Calculations: Before request for Substantial Completion, submit four copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- H. HPSB GP5 Submittal: Credit MR 2.1 and 2.2, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
- I. Qualification Data: For Waste Management Coordinator.

1.6 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: The Waste Management Coordinator may also serve as the Contractor's HPSB Coordinator.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN (CWMP)

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of selective demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement Construction Waste Management Plan as approved by the Contracting Officer. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 1 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

- B. Waste Management Coordinator: Engage a person to serve as waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project, but may also serve in other capacities such as HPSB Coordinator or QA/QC Coordinator.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within five days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING SELECTIVE DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Must receive approval from Contracting Officer. Appropriate credit must be made to contract value.
- C. Salvaged Items for Governments Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Government.
 - 4. Transport items to Owner's storage area designated by Contracting Officer.
 - 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

3.3 RECYCLING SELECTIVE DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - 2. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 5. Store components off the ground and protect from the weather.
 - 6. Remove recyclable waste off Government's property and transport to recycling receiver or processor.

3.4 RECYCLING SELECTIVE DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Grind asphalt to maximum 4-inch size.
 - 1. Crush asphaltic concrete paving and screen to comply with requirements in Division 2 Section "Earthwork" for use as general fill.
- B. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility, unless otherwise directed by COR for reuse elsewhere.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch size.
 - 2. Crush concrete and screen to comply with requirements in Division 2 Section "Earthwork" for use as satisfactory soil for fill or subbase.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.
1. Comply with requirements in Division 2 Section "Exterior Plants" for use of chipped organic waste as organic mulch.
- C. Wood Materials:
1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Division 2 Section "Exterior Plants." for use of clean sawdust as organic mulch.
- D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a. Comply with requirements in Division 2 Section "Exterior Plants." for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Government's property and legally dispose of them.

END OF SECTION 01524

SECTION 016000 PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; Contractor proposed request for selection of comparable products and product substitutions.
- B. See Division 1 Section 01000 "General Requirements" for definition of Standards of Manufacture.
- C. See Division 1 Section 01770 "Closeout Procedures" for submitting warranties for Contract closeout.
- D. See Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.2 DEFINITIONS

- A. A. Products - General: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
- B. Basis-of-Design Product: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- C. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a comparable product, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of the specified product.
- D. Substitution: Contractor proposed requests for changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1.3 SUBMITTALS

- A. Basis-of-Design Product Submittal: Comply with requirements in Division 1 Section 01330 "Submittal Procedures" and Section 01000 "General Requirements", show compliance with requirements.
- B. Comparable Product Submittal: Submit three copies of each comparable product for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Contracting Officers Action: If necessary, Contracting Officer will request additional information or documentation for evaluation within one week of receipt of a comparable product submittal. Contracting Officer will notify Contractor of approval or rejection of proposed comparable product within 14 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: AF Form 3000, Material Approval Submittal
 - b. Use product specified if Contracting Officer cannot make a decision on use of a comparable product within time allocated.
- C. Substitution Requests: Submit three copies of each proposed product substitution for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use Government AF Form 3000, "Material Approval Submittal" to identify substituted materials. Identify on the form AF 3000 that the product is a proposed substitution and meets or exceeds the salient characteristics of the product specified. See Division 01 Section 01000 "General Requirements", Article 1.15, for submittal procedures.
 - 2. Documentation: Show compliance with requirements for substitutions and provide the following, in support of the proposed substitution:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work that will be necessary to accommodate proposed substitution, including but not limited to, structural, mechanical and electrical systems and equipment.
 - c. Detailed comparison of significant characteristics of proposed substitution with those of the Work specified. Significant characteristics may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products, fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

- h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Contracting Officer's Action: If necessary, Contracting Officer will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Contracting Officer will notify Contractor of acceptance or rejection of proposed substitution within 14 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: AF Form 3000, Material Approval Submittal.
 - b. Use product specified if Contracting Officer cannot make a decision on use of a proposed substitution within time allocated at no additional cost to the Government.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 COMPARABLE PRODUCTS AND SUBSTITUTIONS COSTS

- A. Where a basis of design product is indicated, the contractor shall be responsible for all direct and indirect costs associated with use of comparable products or approved substitutions. Such costs include, but are not limited to, costs of all changes to other products or systems which may be necessary to accommodate the contractor's selected comparable products or approved substitutions. Such costs include, but are not limited to, all design, architectural, engineering or re-engineering which may be necessary to accommodate comparable products or approved substitutions.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. 4Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products in compliance with UFC-4-010-01.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
5. Store cementitious products and materials on elevated platforms.
6. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
8. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties shall be in accordance with Division 01 Section 01000 ÓGeneral Requirements• , Article 1.20, Warranties.
- B. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to the Government - Contracting Officer.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for the Government Ó Contracting Officer.
- C. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.

3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- D. Submittal Time: Comply with requirements in Division 1 Section 01770 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Government reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Contracting Officer will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Contracting Officer's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products, and in accordance with Division 01 Section 01000 "General Requirements", Article 1.10, Standards of Manufacture.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Contracting Officer's sample. Contracting Officer's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions: Contracting Officer will consider Contractor's request for selection and use of comparable products when the following conditions are satisfied. If the following conditions are not satisfied, COR will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed comparable product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant characteristics of proposed comparable product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed comparable product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

- B. Contractor shall be responsible for all changes to other building systems and components necessary to accommodate proposed comparable products. Contractor shall be responsible for design and all engineering costs associated with comparable products or changes to other components related to the Contractor's selection and use of approved comparable products.

2.3 PRODUCT SUBSTITUTIONS

- A. **Timing:** Contracting Officer will consider Contractor proposed requests for product substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of COR.
- B. **Conditions:** Contracting Officer will consider Contractor's request for proposed product substitution when the following conditions are satisfied. If the following conditions are not satisfied, COR will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers the Government a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Government must assume. The Government's additional responsibilities may include compensation to Architect/Engineer for redesign and evaluation services, increased cost of other construction by the Government, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01600

SECTION 017000 EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.

- B. See Division 1 Section 01770 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Government-accepted deviations from indicated lines and levels, and final cleaning.

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

- C. Certified Surveys: Submit two copies signed by land surveyor.

1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in Connecticut and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
1. Comply with Division 01 Section 01000 "General Requirements", Article 1.15, Inspection of Site.
 2. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Comply with Division 01 Section 01000 "General Requirements", Article 1.15, Inspection of Site.
 2. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 3. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Comply with Division 01 Section 01000 "General Requirements", Article 1.15, Inspection of Site
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to COR that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Contracting Officer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify COR promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify COR when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Contracting Officer™s Representative.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by COR.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with Division 01 Section 01000 "General Requirements", Article 1.22, Site Clean Up.
 - 2. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 3. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 4. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted. Comply with requirements of Division 01, Section æConstruction Waste Management .
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Provide a factory-authorized service representative for any requirements to inspect field-assembled components and equipment installation.
- E. Commissioning: Comply with requirements of Division 01 Section æGeneral Commissioning Requirements• .

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Comply with requirements in Division 1 Section 01731 "Cutting and Patching."
 2. Comply with requirements in Division 1 Section 01000. • General Requirements • , 1.21, Cutting and Patching.
 3. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

SECTION 312300 – EXCAVATION/EARTHWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Excavating for building and canopy foundations, drives, parking, walkways, and landscaping.
- B. Excavating for miscellaneous site structures.
- C. Excavating for removal of utility lines, existing culverts, sewer piping or other miscellaneous buried structures.
- D. Excavation for underground stormwater systems and water quality (detention) basins and vegetated drainage swale.
- E. Dewatering and trench support necessary to perform excavations.

1.2 RELATED SECTIONS

- A. Section 312333 - Trenching: Excavating for Utility Trenches.
- B. Section 312500 - Temporary Soil Erosion and Sedimentation Controls.

1.3 REFERENCES

- A. Geotechnical Report - Report by Dr. Clarence Welti, P.E., P.C. dated May 12, 2017, as amended.
- B. CTDOT Form 817 – Standard Specifications

1.4 FIELD MEASUREMENTS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

1.5 PROJECT COORDINATION

- B. Sequence and schedule activities with Construction Manager in accordance with the Contract Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate and identify utilities that are to be removed.

- C. Locate, identify and protect utilities that remain from damage.
- D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- E. Protect bench marks, survey control points, existing structures, sidewalks, paved areas, curbs, and walkways from excavating equipment and vehicular traffic.

3.2 EXCAVATING

- A. Underpin adjacent structures which may be damaged by excavating work. Support and protect utility lines.
- B. Excavate topsoil, wetland soil and subsoil to accommodate building, driveways, loading areas, parking, walkways, miscellaneous site structures, and landscaping in accordance with the details shown on the plans and the recommendations of the Geotechnical Report.
- C. Excavate subsoil to permit removal or abandonment of utilities designated.
- D. Follow recommendations of the Geotechnical Report for cut backs and long term slope banks.
- E. Dewater excavation as necessary.
- F. Horizontally bench existing slopes greater than 1:4 that will receive fill to key fill material to slope to provide firm bearing.
- G. Do not interfere with 45 degree bearing splay of foundations.
- H. Provide trench boxes, sheeting and/or shoring as required to meet safety requirements of all National, State, and Local codes and consistent with accepted construction practices.
- I. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- J. Remove lumped subsoil, boulders, and rock up to one (1) cu. yd. measured by volume.
- K. Notify Construction Manager and Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- L. Correct areas due to over excavation.
- M. Stockpile excavated material in area designated on site or remove excess or unsuitable material from site.

3.3 TOLERANCES

- A. Top surface of subgrade: \pm 1/10 foot from required elevation.

3.4 FIELD QUALITY CONTROL

- B. It is the Contractor's responsibility to complete testing adequate to insure compliance of the Work and materials to the specifications to the satisfaction of the Site and Geotechnical Engineer.

3.5 DEWATERING

- C. Install all necessary dewatering, sheeting and shoring and fall protection to complete and

stabilize the excavation.

- D. Handle dewatering wastewater in accordance with the Stormwater Pollution Control Plan.

3.6 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath structure foundations from freezing.

3.7 SCHEDULES

- A. All scheduled excavation depths listed below shall be confirmed by the Contractor with the Engineer, Architect, Construction manager and Geotechnical Engineer prior to starting the work.
- B. Building Slab and Foundation, Driveways, Walkways, Parking and Loading Areas: Excavate to depths indicated in the civil and architectural building plan details and the recommendations of the Geotechnical Report.
- C. Lawn Areas: Excavate to 6 inches below finished grade.
- D. Planting Areas: Excavate to 8 inches below finished grade.
- E. Misc. Site Structures: Excavate to depths indicated in the plan details and the recommendations of the Geotechnical Report.
- F. Utility lines to be removed: Excavate to minimum depth and width necessary to permit removal or abandonment of line or structure.

END OF SECTION 312300

SECTION 312323 – BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Backfilling for concrete foundation and misc. site structures.
- B. Backfilling for utilities, storm drainage, sanitary sewer, tanks, conduits, piping or misc. structures removed.
- C. Fill under bituminous paving, walks, unit pavers, and misc. concrete pads.
- D. Fill under landscape and lawn areas.
- E. Fill for over-excavation.
- F. Consolidation and compaction as scheduled.

1.2 RELATED SECTIONS

- A. Section 312300 - Excavating/Earthwork.
- B. Section 320513 - Soil Materials.
- C. Section 320516 - Aggregate Materials.
- D. Section 312333 – Trenching.
- E. Section 312500 - Temporary Soil Erosion and Sedimentation Control.

1.3 REFERENCES

- A. AASHTO T180D - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction.
- C. Geotechnical Report - Preliminary Report by Dr. Clarence Welti, P.E., P.C. Dated May 12, 2017, as amended.

1.4 PROJECT COORDINATION

- A. Sequence and schedule activities in accordance with applicable requirements of the Contract Documents.
- B. Coordinate Work with backfilling for building foundation and misc. structures with the Construction Manager and Geotechnical Engineer.
- C. Coordinate review and inspection of unsuitable soils encountered during the Work with the Geotechnical Engineer and Construction Manager.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Approved General Backfill: As specified in Section 320513.
- B. Structural Fill: As specified in Section 320513.
- C. Sand Fill: As specified in Section 320513.
- D. Subbase: As specified in Section 320513.
- E. Aggregate Materials: As specified in Section 320516.
- F. Geotextile Fabric: MIRAFI 500 or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify sub-drainage, damp proofing, or waterproofing installation has been inspected.
- B. Verify that removed or abandoned utilities have been capped where required.
- C. Verify that fill materials to be reused are acceptable.

3.2 PREPARATION

- A. Identify required lines, levels, contours and datum locations.
- B. Excavate existing subsoil in accordance with Section 312300.
- C. Provide dewatering as needed to insure required compaction.

3.3 BACKFILLING-GENERAL

- A. Backfill areas to contours and elevations with unfrozen and approved backfill materials. Correct areas over excavated in accordance with Section 312300, at Contractor's expense.
- B. Do not backfill over excessively wet, frozen or spongy subgrade surfaces. Review these conditions with Geotechnical Engineer in the field.
- C. Place compacted general backfill materials in layers and compacted in accordance with the recommendations of the Geotechnical Report.
- D. Controlled Structural Fill under and around the building structure shall be placed in layers and compacted in accordance with the recommendations of the Geotechnical Report, in particular Section 5.0 of the report.
- E. Backfill utility and storm sewer trenches in layers and compact in accordance with Section 312333.
- F. Place subbase in accordance with Section 321116.
- G. Employ a placement method that does not disturb or damage other work.
- H. Maintain optimum moisture content of backfill materials to attain required compaction density.
- I. Do not backfill against unsupported walls except to backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- J. Slope grade away from building minimum 2 inches in 10 ft., unless otherwise directed.
- K. Make gradual grade changes. Blend slope into level areas.
- L. Remove surplus backfill materials from site.
- M. Leave fill material stockpile areas free of excess fill materials.
- N. Coordinate this work with Sections 312300 and 312333.
- O. All backfill and fill must be compacted to at least 95% of modified optimum density per the Geotechnical Report.

3.4 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing as required by the applicable requirements of the Contract

Documents.

- B. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Geotechnical Engineer and Site Engineer.
- C. Compaction testing will be performed in accordance with AASHTO T180, Method D.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Proof roll compacted fill surfaces.
- F. Coordinate with Engineer on certification of building pad sites until specifications are met.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished Work under applicable provisions of Contract Documents.
- B. Reshape and re-compact fills subjected to vehicular traffic.

3.7 SCHEDULE

Not Used.

END OF SECTION 312323

SECTION 312333 – TRENCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

Excavating trenches for utility lines, storm drainage systems, sanitary sewer, underdrains and miscellaneous site utility structures as shown.

Excavation and off-site disposal of unsuitable material as defined in the Geotechnical Report and as directed by the Construction Manager.

Compacted bedding.

Backfilling and compaction from top of utility bedding to subgrade elevations as shown, including installation of warning tape.

Dewatering and trench support necessary to perform trenching and installation of utilities.

1.2 RELATED SECTIONS

Section 312300 – Excavation/Earthwork.

Section 320513 - Soil Materials.

Section 320516 - Aggregate Materials.

Section 312323 - Backfilling.

1.3 REFERENCES

AASHTO T180D - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.

ASTM D1556 - Test Method for Density of Soil in Place by Sand Cone Method.

CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction

Geotechnical Report - Preliminary Report by Dr. Clarence Welti, P.E., P.C. Dated May 12, 2017, as amended.

Applicable Federal, State, and Local codes as required to meet trench excavation safety requirements.

1.4 FIELD MEASUREMENTS

Verify that survey bench mark, control point, and intended elevations for the Work are as shown on
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drawings.

1.5 SUBMITTALS

Geotextile Product Data: Including full product name by trademark and style number; geotextile polymer type (s); geotextile physical properties.

1.6 QUALITY ASSURANCE

It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Geotechnical Engineer.

Sampling and testing of Geotextile Fabric shall be in accordance with ASTM D4354, ASTM D4759, and Section 2.2.

All materials that are defective, deteriorated or damaged shall be replaced.

1.7 PROJECT COORDINATION

Sequence and schedule activities in accordance with applicable requirements of the Contract documents.

Complete all test pits required to identify location and depth of existing underground utilities and structures.

Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

Contact and coordinate with utility companies prior to starting work.

Coordinate review/inspection of unsuitable soils encountered during the Work with the Geotechnical Engineer per

Geotechnical Report recommendations.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

Approved General Backfill: As specified in Section 320513.

Sand Fill: As specified in Section 320513.

Aggregate Materials: As specified in Section 320516.

Concrete Base: As specified in CT DOT Form 817 M.03-Class 'C'.

2.2 ACCESSORIES

Geotextile Fabric: Per CT DOT Form 817 M08.01-26 or as otherwise approved by the Geotechnical Engineer.

Warning Tape: Non-detectable utility line marking tape, 4 inches wide, various colors to suit utility being identified; "ShieldTec", manufactured by Thor Enterprises, Inc., or equal.

PART 3 - EXECUTION

3.1 PREPARATION

Identify required lines, levels, contours, and datum locations.

Protect plant life, lawns, and other features remaining as a portion of final landscaping.

Protect bench marks, existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

Maintain and protect above and below grade utilities which are to remain.

3.2 EXCAVATING

Complete all Work in accordance with the details shown on the Plans and all MDC and other applicable utility company requirements.

Excavate subsoils and/or rock required for utilities. If rock removal is required, the Contractor shall submit a rock removal and/or blasting plan for approval by the Geotechnical Engineer and Construction Manager prior to the start of rock removal.

Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

Do not interfere with 45 degree bearing splay of nearby foundations.

Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

Correct areas over excavated in accordance with Section 312300.

Stockpile excavated material in area designated on site and remove excess material not being used, from site.

Provide dewatering as required to provide a stable base for bedding and backfill and to permit required compaction.

As specific site conditions require, provide trench boxes, sheeting and/or shoring and fall protection in

accordance with all Federal, State, and Local codes as required to meet safety requirements and consistent with accepted construction practices. The Contractor is responsible for the design and installation of required support at his/her expense.

3.3 BEDDING

Provide bedding material in accordance with the details shown on the plans, or as otherwise directed by the MDC and other utilities companies.

Do not install bedding over soft, excessively wet or frozen subsoil.

In areas of wet silts or otherwise unstable soils or in rock conditions prepare trench in accordance with Geotechnical Report or as directed by the Geotechnical Engineer, including placement of concrete base, crushed stone and/or geotextile fabric.

Support pipe and conduit during placement and compaction of bedding.

3.4 BACKFILLING

Backfilling in accordance with Section 312323.

Do not backfill over wet or frozen bedding material.

Backfill trenches to contours and elevations with unfrozen, approved fill materials.

Employ a placement method that does not disturb or damage utilities in trench.

Place material in specified lifts and compact to specified densities.

Maintain optimum moisture content of fill materials to attain required compaction density.

Place warning tape in trench 24 inches directly above utility line or as otherwise shown on the plans or directed by the MDC or other utility company.

Leave fill material stockpile areas completely free of excess fill materials.

Remove surplus fill materials from site as directed by the Construction Manager.

3.5 DEWATERING

Install all necessary dewatering necessary to perform trench excavation, utility installation, backfilling and to achieve required compaction.

Handle dewatering wastewater in accordance with all applicable regulatory requirements.

3.6 TOLERANCES

Top Surface of Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Site and Geotechnical Engineer.

In-situ density testing (compaction testing) will be performed in accordance with ASTM D1556 or other method approved by the Geotechnical Engineer.

If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at Contractor's expense.

Proof roll compacted fill surfaces under slabs-on-grade, and paving.

3.8 PROTECTION OF FINISHED WORK

Protect finished Work under provisions of the Contract Documents.

Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

Not Used

END OF SECTION 312333

SECTION 312500 – TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Controls (aka Sedimentation Control System): Erosion and sediment control; stormwater pollution control prevention.
- B. Stormwater Monitoring and Inspection requirements.

1.2 RELATED SECTIONS

- A. Section 024100 – Site Clearing and Utility Line Removal.

1.3 REFERENCES

- B. Connecticut Guidelines for Soil Erosion and Sedimentation Control (SE&SC Guidelines), by the Connecticut Council on Soil and Water Conservation.
- C. CTDEEP requirements for General Stormwater Permit for Construction issued for this project as detailed in the Stormwater Pollution Prevention Plan (SWPPP).
- D. CTDOT 817 - Standard Specifications for Roads, Bridges and Incidental Construction.
- E. ASTM D4759 - Standard Practice for Determining the Specification Conformance of Geo-synthetics.
- F. Erosion and Sedimentation Control Plan as incorporated in the Details on the Drawings.

1.4 SUBMITTALS

- A. Geotextile Product Data (including Geotextile Fabric and Sedimentation Fence, blankets and sediment logs): Including fill product name by trademark and style number; geotextile polymer type(s); geotextile physical properties.
- B. Geotextile installation instructions.
- C. Samples: If requested, samples of the geotextile shall be submitted for approval. Each sample shall be the full roll width and 1.5 yards long.

1.5 QUALITY ASSURANCE

- A. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction

of the Engineer and Construction Manager.

- B. Sampling and testing of Geotextile Fabric shall be in accordance with ASTM D4354, ASTM D4759, and Section 2.1.
- C. All materials that are defective, deteriorated or damaged shall be replaced.

1.6 PERFORMANCE REQUIREMENTS

- A. All construction materials and methods, including any required temporary controls shall be provided, operated and maintained to minimize erosion of soil from the construction site and the downstream deposition of sediment.
- B. Particular attention will be given to protecting wetlands, waterways, public drainage facilities, public roadways and adjacent properties.
- C. The Erosion and Sedimentation Controls Measures shown on the approved plans are the MINIMUM installation requirements for the Work. The Contractor shall develop and implement specific erosion control plans for each sub-phase of the work and shall modify the plan as actual construction conditions warrant or as directed by the Engineer and town or state officials.

1.7 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with all provisions of the approved Erosion and Sedimentation Control Plan and the CTDEEP General Stormwater Permit for Construction Activities specifically issued for the project (SWPPP).
- B. The Contractor shall assist the Engineer and Construction Manager in the preparation of the registration to CTDEEP for the General Stormwater Permit for Construction Activities.
- C. The Contractor shall comply with all orders issued by local or state officials or the Construction Manager and Engineer.

1.8 SEQUENCING

- A. Soil Erosion and Sedimentation Control measures shall be in place for each area and each phase as appropriate prior to initiating construction.

1.9 PROJECT COORDINATION

- A. Schedule and sequence activities in accordance with the applicable sections of the Contract Documents.

1.10 STORAGE

- A. Sedimentation Fence and Geotextile Fabric shall be stored so as not to become damaged by sunlight.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hay Bales: Shall weight between 40 and 120 pounds and shall be tightly and securely bound with wire or cord.
- B. Wood Stakes for Hay Bales: Hardwood stakes shall be a minimum 1 inch by 1 inch (nominal dimensions), softwood stakes shall be a minimum of 2 inch by 2 inch; stakes shall be a minimum of 3 feet in length with one pointed end.
- C. Sedimentation Fence (aka Silt Fence): Shall be silt fence designed specifically for this purpose in accordance with CTDOT Form 817, Section 2.19.02.
- D. Geotextile Fabric: Shall comply with CTDOT Form 817, Section 7.55, M.08.
- E. Crushed Stone: Shall comply with CTDOT 817, Section M.01.01-Stone No. 3 (2-inch).
- F. Erosion Control Blanket and Sediment Log: Shall comply with CTDOT Form 817, Section 2.10.
- G. All other products used shall meet the design requirements set forth in the 2004 CT SE&SC Guidelines and shall be designed by the manufacturer for that use.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Plan activities to minimize amount of bare soil exposed at one time and to prevent erosion and sedimentation.
- B. Review proposed erosion and sedimentation control measures for each phase with the Site Engineer and Construction Manager prior to initiating work.

3.2 INSTALLATION

- A. Sedimentation Fence: Place parallel to land contour lines and install in accordance with manufacturers recommendations.
- B. Inlet Protection: Stretch filter fabric over inlet and secure with staked hay bales.
- C. Hay Bales: Place bales in trench 4 inches deep and compact backfill against edge; butt bales tight together and stake in place with two stakes per bale.
- D. Construction Entrance Pad: Clear and grade area for pad of dimensions shown; place geotextile fabric with minimum 24 inch overlap; cover with a minimum 8 inch thickness of No. 3 (2 inch)

crushed stone as shown on the details.

- E. Vegetated Swale: Install as shown on the details.
- F. Scour Hole: Install as shown on the details.
- G. Plunge Pool: Install as shown on the details.
- H. Install an on-site rainfall gauge acceptable to the Engineer.

3.3 INSPECTION AND MAINTENANCE

- A. Ongoing Routine and after Rainfall Events inspections and discharge monitoring shall be done by the Contractor in accordance with the CTDEEP General Permit (SWPPP) requirements. All inspections shall be completed by a Qualified Inspector as defined by CTDEEP General Permit requirements.
- B. Maintenance and modifications to the erosion and sedimentation control measures shall be done in accordance with the approved Erosion and Sedimentation Control Plan.
- C. The Contractor is responsible for all discharge monitoring required by the SWPPP.

3.4 DUST CONTROL AND ROAD CLEANING

- A. Dust control and road cleaning shall be done daily by the Contractor as needed to prevent adverse impacts to the public and environment.

Note: Dust Control will be of concern, particularly during the early stages of site preparation. The Contractor shall maintain an adequate number of water trucks and other methods as necessary on-site at all times to control dust throughout the day.

3.5 REMOVAL

- A. When the upstream area has been stabilized and the erosion or sedimentation control measures are no longer needed they shall be removed by the Contractor as directed by the Engineer.

3.6 FIELD QUALITY CONTROL

- A. The Contractor shall designate one individual to be responsible for monitoring and maintaining the erosion and sedimentation control system throughout the duration of the project.
- B. The individual responsible for monitoring shall maintain at the site a written record of all installations, inspections, and maintenance activities in accordance with the CTDEEP General Permit requirements. Such records shall be provided to the Construction Manager and Engineer, and authorized government officials as requested.

END OF SECTION 312500

SECTION 320513 – SOIL MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General fill.
- B. Structural Fill.
- C. Sand fill.
- D. Subbase.
- E. Soil testing.

1.2 RELATED SECTIONS

- A. Section 320516 - Aggregate Materials.
- B. Section 312300 – Excavation/Earthwork.
- C. Section 312333 - Trenching.
- D. Section 329119 - Topsoil.

1.3 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Course Aggregate.
- B. Geotechnical Report – Preliminary Report by Dr. Clarence Welti, P.E., P.C. dated May 12, 2017, as amended.
- C. CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction, as amended.

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, 10 LB. sample of each type of fill.
- B. Materials Source: Submit name of imported materials suppliers for review and approval.
- C. Results of material testing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Approved General Backfill (aka General Fill): As per CTDOT 817 Section M.02.07:
- B. Approved excavated free draining on-site subsoils to be reused or acceptable imported borrow material free of debris, organic materials, frozen and other unsuitable materials.
- C. Use of on-site and/or off-site materials is subject to the final approval of the Geotechnical Engineer.
- D. Structural Fill (aka Controlled Fill): As per the Geotechnical Report:

<u>Sieve Size</u>	<u>Percent Passing</u>
3.5 Inch	100
3/4 Inch	50 - 100
No. 4	25 - 100

The fraction passing the No. 4 sieve shall have less than 15% passing the No. 200 sieve.

A 3/8" crushed stone per CTDOT 816, Section m.01.01 can be used to meet this requirement.

Per the Geotechnical Report, some of the excavated on-site material below the topsoil generally conform to this gradation.

For base material immediately below the floor slabs, see specification in Section 6.0 of the Geotechnical Report.

- E. Sand Fill: Natural or bank sand, free of silt, clay, loam, friable or soluble materials, or organic matter; gradation per CTDOT 817 Section M.03.01-2.
- F. Subbase: As per CTDOT 817 Section 2.12, or the Geotechnical Report Section 6.0:

<u>Sieve Size</u>	<u>Percent Passing</u>
3.5 Inch	100
3/4 Inch	50 - 100
No. 4	25 - 100

The fraction passing the No. 4 sieve shall have less than 15% passing the No. 200 sieve.

2.2 TOPSOIL MATERIALS

- A. Excavated topsoil to be reused and borrow topsoil as specified in Section 329119.

2.3 SOURCE QUALITY CONTROL

- B. It is the Contractor's responsibility to complete testing adequate to insure compliance of the

materials and methods to the specifications to the satisfaction of the Site and Geotechnical Engineer.

- C. Testing and Analysis of Subsoil Material: Perform in accordance with ANSI/ASTM C1
- D. If tests indicate materials do not meet specified requirements, remove and replace material and retest at no additional cost to Owner.

PART 3 - EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site at locations indicated on the plans or as designated by Construction Manager.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.
- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- F. Install staked silt fencing or hay bales around perimeter of stockpiles as directed by the Engineer or Construction Manager.

3.2 SOIL PROCESSING

- A. Excavated subsoil may be processed on site to remove unsuitable material or to produce approved general backfill. The processing operation is subject to the approval of the Geotechnical Engineer, Construction Manager and any permit limitations imposed by the Owner.
- B. Excavated topsoil may be processed on site to remove unsuitable material and to produce topsoil conforming to Section 329119.13. The processing operation is subject to the approval of the Landscape Architect, Construction Manager and the Owner.

3.3 STOCKPILE CLEANUP

- A. Remove stockpiles, leave area in a clean and neat condition.
- B. Grade site surface to prevent free standing surface water.

END OF SECTION 320513

SECTION 320516 – AGGREGATE MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aggregate materials.
- B. Materials testing.

1.2 RELATED SECTIONS

- A. Section 320513 - Soil Materials.
- B. Section 312300 – Excavation/Earthwork.
- C. Section 321116 - Subbase.
- D. Section 312333 - Trenching.
- E. Section 320516 - Aggregate Base Course.

1.3 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Course Aggregate.
- B. Geotechnical Report - Preliminary by Dr. Clarence Welti, P.E., P.C. Dated May 12, 2017, as amended.
- C. CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction.

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, 10 LB. sample of each type of material.
- B. Materials Source: Submit name of imported materials suppliers for review and approval.
- C. Results of material testing

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

- A. Crushed Stone No. 3 (2-inch stone): Conforming to CTDOT 817, Section M.01.01.
- B. Crushed Stone No. 6 (3/4-inch stone): Conforming to CTDOT 817, Section M.01.01.
- C. Crushed Stone No. 67 (1/2-inch stone): Conforming to CTDOT 817, Section M.01.01.
- D. Crushed Stone No. 8 (3/8-inch stone): Conforming to CTDOT 817, Section M.01.01.
- E. Bedding Material: Conforming to CTDOT 817, Section M.08.01- 21.
- F. Processed Aggregate Base (a.k.a. Processed Stone Base): Conforming to CTDOT 817, Section M.05.01.
- G. Rip Rap: Conforming to CTDOT 817, Section M.12.02.
- H. Structural Fill: Conforming to Section 320513 and the Geotechnical Report recommendations.

2.2 SOURCE QUALITY CONTROL

- A. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Site and Geotechnical Engineer.
- B. If tests indicate materials do not meet specified requirements, change material or material source and retest.
- C. Provide materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site at locations indicated.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition.
- B. Grade site surface to prevent free standing surface water.
- C. For areas established outside project lease area, re-establish vegetative cover on exposed areas.

END OF SECTION 320516

SECTION 321116 – SUBBASE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Bituminous concrete and porous pavement, concrete slab, paver and walkway subbase.

1.2 RELATED SECTIONS

- B. Section 320513 – Soil Materials
- C. Section 320516 - Aggregate Materials.
- D. Section 312323 - Backfilling
- E. Section 312333 - Trenching.
- F. Section 321123 - Aggregate Base Course.

1.3 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. CTDOT Form 817, Section 2.12.
- C. Geotechnical Report - Preliminary Report by Dr. Clarence Welti, P.E., P.C. May 12, 2017, as amended.

1.4 PROJECT COORDINATION

- A. Sequence and schedule activities in accordance with the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Subbase: As specified in Section 320513 and CTDOT Section 2.12.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- B. Verify that all underdrains have been installed where required.
- C. Verify that subgrade has been installed per requirements of Geotechnical Report.
- D. The entire area of the subgrade, whether in fill or excavated areas, shall be compacted by equipment designed specifically for that purpose to at least the required minimum density recommended in the Geotechnical Report.
- E. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.

3.2 PLACEMENT

- A. Spread subbase material uniformly upon the required grade, in courses not exceeding 6 inches in thickness after final compaction.
- B. After each course has been placed it shall be compacted with equipment specifically designed for that purpose.
- C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.3 TOLERANCES

- A. Scheduled Compacted Thickness: Within 1/2 inch.
- B. Variation From Design Elevation: Within 1/2 inch.

3.4 FIELD QUALITY CONTROL

- A. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Site and Geotechnical Engineer.
- B. In-situ density testing (compaction testing) will be performed in accordance with ASTM D1556 or other method approved by the Geotechnical Engineer.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.5 SCHEDULES

Not Used

NGBJV/CT - Base Entry Complex – Pkg Two
PN CEKT139029

Bradley International Airport
East Granby, Connecticut

END OF SECTION 321116

Type B-3 Submission
May 31, 2018

SUBBASE
321116-3

SECTION 321123 – AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES

Aggregate base course (a.k.a. processed stone base) for on-site paved areas, driveways, sidewalks, curbs, and misc. concrete pads.

1.2 RELATED SECTIONS

- A. Section 320516 - Aggregate Materials.
- B. Section 312323 - Backfilling.
- C. Section 321116 - Subbase.
- D. Section 321200 - Bituminous Concrete Paving.

1.3 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. ASTM D1556 - Test Method for Density of Soil in Place by Sand Cone Method.
- C. CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction.
- D. Geotechnical Report by Dr. Clarence Welti, P.E. P.C. dated May 12, 2017, as amended.

1.4 PROJECT COORDINATION

- A. Sequence and schedule activities in accordance with applicable sections of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Processed Aggregate Base: As specified in Section 320516.
- B. Geotextile Fabric: As specified in CTDOT Form 817 M 08.01- 26.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify subbase has been inspected and approved, gradients and elevations are correct.

3.2 PREPARATION

- A. Correct irregularities in subbase gradient and elevation by scarifying, reshaping, and re-compacting.

3.3 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared subbase in maximum 6 inch layers utilizing spreaders or stone boxes designed for such purpose.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Compact aggregate to specified density utilizing rollers designed for such purpose.
- D. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- E. Water may be added to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- F. Install aggregate over geotextile fabric where shown on the plan details or as directed by the Geotechnical Engineer.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation From Design Elevation: Within 1/2 inch

3.5 FIELD QUALITY CONTROL

- A. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Site Engineer.
- B. Compaction testing will be performed in accordance with AASHTO T180.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at Contractor's expense.

3.6 SCHEDULES

Not Used.

END OF SECTION 321123

SECTION 321200 – BITUMINOUS CONCRETE PAVING & CURB

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Bituminous concrete driveway paving.
- B. Bituminous concrete parking paving.
- C. Bituminous concrete walkways.
- D. Bituminous concrete curbing.
- E. Tack Coat Application.
- F. Testing of materials.

1.2 RELATED SECTIONS

- A. Section 312323 – Backfilling
- B. Section 321116 – Subbase
- C. Section 321123 - Aggregate Base Course

1.3 SUBMITTALS

- A. Provide name of supplier and mix design for asphalt materials, curbing and guide railing used.
- B. Result of analysis of materials indicating the materials are in compliance with specifications.

1.4 REFERENCES

- A. CTDOT Form 817 - Standard Specifications for Roads, Bridges and Incidental Construction.

1.5 QUALITY ASSURANCE

- B. Perform Work in accordance with CTDOT Form 817, Sections 4.06, 8.15 and 8.16.
- C. Paving Mixing Plant: Conform to CTDOT Form 817.

1.6 PROJECT COORDINATION

- A. Sequence and schedule activities in accordance with applicable sections of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All paving materials shall be in accordance with CTDOT Form 817, Section 4.06.02.
- B. Bituminous concrete curbing shall be in accordance with CTDOT Form 817, Section 8.15.02.

2.2 BITUMINOUS CONCRETE PAVING MIX

- A. All mixes shall be in accordance with CTDOT Form 817.

2.3 SOURCE QUALITY CONTROL AND TESTS

- A. Test samples in accordance with CTDOT Form 817.

PART 3 – EXECUTION

3.1 EXAMINATION

- B. Prior to placement pavement, verify base conditions.
- C. Verify that compacted aggregate base is dry and ready to support paving and imposed loads.
- D. Verify gradients and elevations of aggregate base are correct.
- E. Verify that final grading is in place to accommodate timber guiderail installation.

3.2 PREPARATION FOR PAVEMENT WEARING SURFACE

- A. Sweep binder course and apply tack coat in accordance with CTDOT Form 817, Section 4.06.03-6.

3.3 PLACING BITUMINOUS CONCRETE PAVEMENT

- A. Install all Work in accordance with CTDOT Form 817 Section 4.06.03 and to the details shown on the Plans.

3.4 CURBING

- A. Install bituminous concrete curbing on binder course.

3.5 FIELD QUALITY CONTROL

- A. It is the Contractor's responsibility to complete testing adequate to insure compliance of the work and materials to the specifications to the satisfaction of the Engineer.
- B. Take samples and perform tests in accordance with CTDOT Form 817.
- C. If tests indicate Work does not meet specified requirements, remove work, replace and retest at no additional cost to the Owner.

3.6 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury until surface temperature is less than 140°F or as approved by the Engineer.

END OF SECTION 321200

SECTION 321723 – PAVEMENT MARKINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Roadway markings.
- B. Pedestrian Cross walks.

1.2 RELATED SECTIONS

- A. Section 324000 - Traffic Control Signs.

1.3 REFERENCES

- A. CTDOT 817 - Standard Specifications for Roads, Bridges and Incidental Construction.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data: Provide manufactures data sheet for paints and preformed markings.

1.5 PROJECT COORDINATION

- A. Sequence and schedule activities in accordance with applicable sections of the Contract Documents.
- B. Verify required Fire Lane markings with the Fire Marshal prior to installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Epoxy Resin Pavement Markings: Conforming to CTDOT Item #1209801A, #1209802A, and #1209810A, as amended.
- B. ALkyd and Acrylic Painted Pavement Markings - Conforming to CTDOT 817, Section 12.09, as amended.

- C. Colors as shown on the Plans and Details. Handicap parking is blue. Note: Contractor to verify required handicap space paint colors with Construction Manager prior to application of paint.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare surface in accordance with CTDOT specifications or manufactures recommendations.
- B. Layout striping, symbols and legends in accordance with the plans.

3.2 APPLICATION

- A. Paint shall be applied in accordance with CTDOT specifications or manufactures recommendations utilizing spray equipment manufactured for the purpose.
- B. Preformed markings shall be applied in accordance with the applicable DOT Additional Item number or as recommended by the manufacturer.

3.3 PROTECTION

- A. Painted surfaces shall be protected from traffic in accordance with CTDOT specifications or manufacturer's recommendations.

3.4 SCHEDULE

- A. Roadway and Driveway line striping: Yellow and white epoxy resin pavement markings as indicated on the plans.
- B. Stop bars, arrows, crosswalks, and misc. markings: White epoxy resin pavement markings as indicated on the plans.
- C. Parking Lot Striping: Two (2) coats white acrylic traffic marking paint (15 mils wet film thickness) for newly constructed bituminous or Portland cement concrete surfaces; Alkyd traffic marking paint for concrete surfaces that have aged 30 days, as indicated on plans.
- D. Handicapped Parking Space Striping and Marking: Add coarse pumice or other texturizing material in accordance with the manufacturer's recommendations to increase slip resistance.

END OF SECTION 321723

SECTION 324000 – TRAFFIC CONTROL SIGNS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Standard Traffic Control Signs.
- B. Pedestrian Crossing Signs.
- C. Barrier Warning Signs.

1.2 RELATED SECTIONS

- A. Section 321723 - Pavement Markings.

1.3 REFERENCES

- A. CTDOT 817 - Standard Specifications for Roads, Bridges and Incidental Construction.
- B. CTDOT-Div. of Traffic Engineering Catalog of Signs, dated 7/21/2016, as amended.
- C. Federal requirements for handicapped parking space signage.

1.4 SUBMITTALS

- A. Provide four (4) copies of supplier's printed product data clearly marked to indicate all proposed materials.
- B. Manufacturers Certificate: Certify that all signage, posts and hardware products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Traffic control signs shall conform to CTDOT-Div. of Traffic Engineering Catalog of Signs, as amended.
- B. Reflective sheeting: Shall comply with CTDOT Form 817, Section M.18.09.
- C. Sheet aluminum sign blanks: Shall comply with CTDOT Form 817, Section M.18.13.

- D. Metal sign posts for handicap signs: Shall comply with the sign post details shown on the plans. Concrete filled bollard base shall be painted yellow or covered with approved yellow plastic bollard cover.
- E. Metal sign posts for standard traffic and barrier warning signs: Shall be breakaway galvanized steel U-channel posts 2 lb. per foot minimum.
- F. Sign mounting bolts: Shall comply with CTDOT Form 817, Section M.18.15.
- G. Barrier Warning Signs: Shall comply with CTDOT Form 817, Item #1117101A, supplemented by the details shown on the plans.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

- A. All work shall be done in accordance with CTDOT 817 Section 12.08.03, and all applicable federal requirements.
- B. Data labels shall not be required.
- C. Install all signs to the height, size and at the locations shown on the plans, including an individual sign at each handicapped parking space indicated on the drawings. Install additional Van Space sign at designated spaces shown on the plans.
- D. In general, all traffic control signs shall be installed at 72” (inches) from the finished ground to the bottom of the sign unless otherwise noted on the plans or directed by the Engineer.
- E. Install all LED traffic signals, metal brackets, flasher cabinet, electrical and data conduits and wiring, sign posts, and grounding rod for barrier warning light installations.

END OF SECTION 324000

SECTION 344100 – ROADWAY SIGNALING AND CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Traffic Signals.
- B. Control Equipment.

1.2 RELATED SECTIONS

- A. Section 324000 – Traffic Control Signs
- B. Section 321723 - Pavement Markings.

1.3 REFERENCES

- A. CTDOT 817 - Standard Specifications for Roads, Bridges and Incidental Construction.
- B. CTDOT-Supplemental Specifications to the Standard Specifications
- C. CTDOT-Special Provisions to the Standard Specifications
- D. . CTDOT- Standard Installation and Guide Sheets
- E. Appendix A – Preliminary Intersection Signalization Specifications.

1.4 SUBMITTALS

- A. Provide four (4) copies of supplier’s printed product data clearly marked to indicate all proposed materials and equipment
- B. Manufacturers Certificate: Certify that all products and equipment meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials and equipment shall conform to CTDOT standards and requirements.
- B. All materials and equipment shall conform to final CTDOT approved plans and specifications.

PART 3 - EXECUTION

3.1 PREPARATION, INSTALLATION AND OPERATION

- A. All work shall be done in accordance with CTDOT standards and requirements.
- B. All work shall be done in accordance with final CTDOT approved plans and specifications.

END OF SECTION 324000

CT Air National Guard
Route 20 at Walnut Drive
East Granby, CT
May 25, 2018

NTC Traffic Signals

8-14

APPENDIX A

PRELIMINARY INTERSECTION SIGNALIZATION SPECIFICATIONS

NOTICE TO CONTRACTOR - TRAFFIC SIGNALS

The Contractor is hereby notified that certain conditions pertaining to the installation of new signals and maintenance of traffic signal operations are required when relevant, as part of this contract.

Qualified/Unqualified Workers

U.S. Department of Labor

Occupational Safety & Health Administration (OSHA) www.osha.gov

Part Number 1910

Part Title Occupational Safety & Health Administration

Subpart S

Subpart Title Electrical

Standard Number 1910.333

Title Selection and use of work practices

Completion of this project will require Contractor employees to be near overhead utility lines. All workers and their activities when near utility lines shall comply with the above OSHA regulations. In general, unqualified workers are not allowed within 10 feet of overhead, energized lines. It is the contractor's responsibility to ensure that workers in this area are qualified in accordance with OSHA regulations.

The electric distribution company is responsible to provide and install all necessary anchors and guy strands on utility poles. It is the Contractors responsibility to coordinate with the utility company to ensure proper placement of the anchor.

The Controller Unit (CU) shall conform to the current edition of the Functional Specifications for Traffic Control Equipment. The Functional Specifications require the CU meet NEMA Standard Publication No. TS2-1992 Type 2. The Functional Specifications are available on the Departments' web site <http://www.ct.gov/dot/site/default.asp>, click on "Doing Business with CONNDOT", under Engineering Resources click on "Traffic Engineering", Scroll down to Traffic Documents click on "Functional_Specifications_for_Traffic_Control_Equip.pdf".

The contractor will be held liable for all damage to existing equipment resulting from his or his subcontractor's actions. A credit will be deducted from monies due the Contractor for all maintenance calls responded to by Department of Transportation personnel.

The 30 Day Test on traffic control equipment, as specified in Section 10.00, Article 10.00.10 - TESTS, will not begin until the items listed below are delivered to the Department of Transportation, Traffic Signal Lab in Rocky Hill.

Four (4) sets of cabinet wiring diagrams. Leave one set in the controller cabinet.
All spare load switches and flash relays.

SECTION 1.05 - CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings and Shop Drawings are supplemented as follows:

Sub article 1.05.02 - (2) is supplemented by the following:

Traffic Signal Items:

When required by the contract documents or when ordered by the Engineer, The Contractor shall prepare and submit product data sheets, working drawings and/or shop drawings for all traffic signal items, except Steel Span Poles and Mast Arm Assemblies when applicable, to the Division of Traffic Engineering for review before fabrication. The packaged set of product data sheets, working drawings and/or shop drawings shall be submitted in an electronic portable document format (.pdf).

The packaged set submitted in an electronic portable document format (.pdf) shall be in an individual file with appropriate bookmarks for each item. The electronic files for product data sheets shall be created on ANSI A (8 ½” x 11”; 216 mm x 279mm; letter) sheets. Working drawings and shop drawings shall be created on ANSI B (11” x 17”; 279 mm x 432 mm; ledger/tabloid) sheets.

Please send the pdf documents via email to:

DOT.TrafficElectrical@ct.gov

Steel Span Poles and Mast Arm Assemblies:

When these items are included in the project, the submission for Steel Span Poles and Mast Arm Assemblies shall follow the format and be sent to the “Engineer of Record” as described in the Steel Span Pole and Steel Mast Arm Assembly special provision.

SECTION 1.06 CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

Traffic Signal Items:

For the following traffic signal items the contractor shall submit a complete description of the item, shop drawings, product data sheets and other descriptive literature which completely illustrates such items presented for formal review. Such review shall not change the requirements for a certified test report and materials certificate as may be called for. All documents shall be grouped into one separate file for each group of items as indicated by the Roman numerals below (for example, one pdf file for all of the pedestal items). The documents for all of the traffic signal items shall be submitted at one time, unless otherwise allowed by the engineer.

- I. 1003206 – Light Standard (15' Bracket, 30' Mounting Height)
- II. 10080XX – Rigid Metal Conduit
1013008 – 1 ¼" Liquid Tight Flexible Metal Conduit
- III. 11020XX – Aluminum Pedestals
- IV. 11050XXA – Traffic Signals, Span Mounted - LEDs, Housings and Hardware
11051XXA – Traffic Signals, Mast Arm Mounted - LEDs, Housings and Hardware
11052XXA – Traffic Signals, Pole Mounted - LEDs, Housings and Hardware
11053XXA – Traffic Signals, Pedestal Mounted - LEDs, Housings and Hardware
11055XXA – LED Traffic Signal Lamp Unit
- V. 1105503A – Flasher Cabinet
- VI. 11060XXA – Pedestrian Signals - LEDs, Housings, and Hardware
11070XXA – Pedestrian Pushbutton & Sign - Button, Housings & Sign (Type)
11070XXA – Accessible Pedestrian Signal & Detector - Button, Housings & Sign (Type)
- VII. 1108115A – Full Actuated Controller, 8-Phase – Cabinet and Components
- VIII. 1108578A – Full Actuated Controller, 8-Phase (Modified) – Cabinet and Components
- IX. 1108649A – Advanced Transportation Controller Model 2070
- X. 1108660A - Ethernet Switch

- XI. 11XXXXXA – Optical Pre-Emption - Emitter, Detector, Phase Selector and Chassis
1114201A – Auxiliary Equipment Cabinet
- XII. 11XXXXXA – Siren pre-emption - Detector, Phase Selector and Confirmation Light
- XIII. 11114XXA – Loop Detector Amplifier, Sealant, Wire and Lead in Wire
- XIV. 1111404A – Microwave Vehicle Detector
- XV. 11114XXA – Wireless Vehicle Detector - FLEX Transceiver, Transceiver, Receiver,
Sensor, MCCC, ECCC and MCCCEAB
- XVI. 1111600A – Extension Bracket
11122XXA – Vehicle Detection - Camera Assembly, Processor and Monitor
- XVII. 1112214A – IP Video Camera Assembly (CCTV)
- XVIII. 1112241A – Fiber Optic Cable Splice Enclosure
- XIX. 111339XA – Cable closure (Type)
- XX. 1113XXXXA – Cable - Control Cable, Comm., CAT6, VC, Detector Cable (optical)
11134XXA – Control Cable – Communication Interconnect
1114101 – Messenger Wire
- XXI. 111711XA – Rectangular Rapid Flashing Beacon
- XXII. 1116100A – Internally Illuminated Sign (LED)

SECTION 1.06 CONTROL OF MATERIALS

Article 1.06.07 - Certified Test Reports and Materials Certificate.

Add the following:

- 1) For the materials in the following traffic signal items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, then Materials Certificates shall be required to identify the shipment.

Steel Span Pole Anchor Bolts
Steel Span Poles

Steel Combination Span Poles
Steel Combination Span Pole Anchor Bolts

- 2) For the materials in the following traffic signal items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Steel Combination Span Pole
Steel Span Poles

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.13 - Contractor's Responsibility for Adjacent Property, Facilities and Services is supplemented as follows:

The following company and representative 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:

Mr. Augusto Grazuna
District 1 Electrical Supervisor
Department of Transportation
Hartford, Connecticut
(860) 566-3156/3157

Mr. David Moriarty
District 4 Electrical Supervisor
Department of Transportation
Southbury, Connecticut 06488
(203) 264-9590

Mr. Thomas Derway
CoxCom, Inc.
801 Parker Street
Manchester, CT 06238
(860) 432-5040

Mr. Thomas Woronik
Eversource Energy
22 East High Street
East Hampton, CT 06424
(860) 267-3891

Ms. Lynn DeLucia
Frontier Communications
1441 North Colony Road
Meriden, CT 06450-4101
(203) 238-5000

Mr. Eric Clark
Lighttower Fiber Networks
1781 Highland Avenue
Cheshire, CT 06410
(203) 649-3904

Mr. Thomas Costa
Eversource Energy – Gas Distribution
157 Cordaville Road
Southborough, MA 01772
(203) 238-5000

Mr. Richard Norris
The Metropolitan District
555 Main Street, P.O. Box 800
Hartford, CT 16142-0800
(860) 278-7850

The following Department representative shall be contacted by the Contractor to coordinate an inspection of the service entrance into the controller/flasher cabinet for controllers within the State right-of-way, when ready for inspection, release, and connection of electrical service. The local Building Department shall be contacted for electrical service inspections for controllers located on Town roads located within the respective municipality.

Mr. Michael LeBlanc
Property & Facilities
Department of Transportation
Newington, CT 06111
860-594-2238
e-mail: Michael.LeBlanc@ct.gov

Please provide the electrical service request number provided by the power company. This is a Work Request (WR) Number provided by Eversource (formerly Northeast Utilities [CL&P]) or a Work Order Number provided by United Illuminating (UI). For State-owned traffic signals in CL&P territory, contact the Department's Traffic Electrical Unit to obtain the WR Number. For State-owned traffic signals in UI territory, contact the Department's Traffic Electrical Unit to obtain a Request for Metered Service to provide to UI to obtain the Work Order Number. The street address is required for release to local power companies (Groton Utilities or Wallingford Electric).

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.03 - Prosecution of Work:

Add the following:

The Contractor will not be allowed to install traffic signal or pedestrian heads until the controllers are on hand and ready for installation. Once installation of this equipment commences, the Contractor shall complete this work in a most expeditious manner.

The Contractor shall notify the project engineer on construction projects, or the district permit agent on permit jobs, when all traffic signal work is completed. This will include all work at signalized intersections including loop replacements, adjusting existing traffic signals or any relocation work including handholes. The project engineer or district permit agent will notify the Division of Traffic Engineering to coordinate a field inspection of all work. Refer to Section 10.00 – General Clauses for Highway Illumination and Traffic Signal Projects, Article 10.00.10 and corresponding special provision.

SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNAL PROJECTS

Article 10.00.10 Section 3. Functional Inspection, first paragraph after the 2nd sentence: Add the following:

The contractor shall have a bucket truck with crew on site during the Functional Inspection to make any necessary aerial signal adjustments as directed by the Engineer.

Article 10.00.12 - Negotiations with utility company: Add the following:

The contractor shall give notice to utility companies a minimum of 30 days prior to required work or services to the utility company. Refer to Section 1.07 – Legal Relations and Responsibilities for the list of utility companies and representatives the contractor shall use.

The Contractor shall perform all work in conformance with Rules and Regulations of Public Utility Regulatory Authority (PURA) concerning Traffic Signals attached to Public Service Company Poles. The Contractor is cautioned that there may be energized wires in the vicinity of the specified installations. In addition to ensuring compliance with NESC and OSHA regulations, the Contractor and/or its Sub-Contractors shall coordinate with the appropriate utility company for securing/protecting the site during the installation of traffic signal mast arms, span poles or illumination poles.

When a span is attached to a utility pole, the Contractor shall ensure the anchor is in line with the proposed traffic signal span wire. More than 5 degree deviation will lower the holding strength and is not allowed. The Contractor shall provide any necessary assistance required by the utility company, and ensure the anchor and guy have been installed and properly tensioned prior to attaching the span wire to the utility pole.

ITEM #0202451A - TEST PIT EXCAVATION

Description:

Excavate and backfill a designated area to determine the exact location of utility facilities which are near a proposed foundation.

Materials:

Compacted Granular Fill: Article M.02.02
Bituminous Concrete Materials: Article M.04

Construction Methods:

Keep affected utility owner apprised of proposed test pit excavation.

Excavate only as authorized and as directed by the Engineer. The size, depth and location will be as authorized by the Engineer.

If rock greater than 0.5 c.y. (cu.m) is encountered, the Engineer will determine if it must be removed and the method. Do not use explosives. See the pertinent construction methods of Section 2.02.03. When concrete must be removed, reinforced or not, it ~~shall will~~ be considered, measured, and paid for as rock in foundation excavation.

If unsuitable backfill material is excavated, dispose as directed by the Engineer. Replace with suitable backfill and compact in accordance with Section 2.14.

Repair all damaged bituminous pavement in accordance with Section 4.06.03. Sawcut the edges to neat lines if there will be no subsequent excavation at the test pit for a foundation.

Method of Measurement:

Test pit excavation will be measured at the contract unit price per cubic yard (cubic meter) for the material actually removed from within the limits specified as directed by the engineer.

When necessary, rock in foundation excavation will be measured at the contract price per vertical foot (vertical meter) for the rock actually removed in accordance with Article 2.02.04.

Basis of Payment:

This work will be paid for at the contract unit price per cubic yard (cubic meter) for "Test Pit Excavation", which price shall include excavation, unsuitable material disposal, compacted backfill, bituminous pavement, sawcut, pavement repair, all utility costs, all equipment, tools, labor and work incidental thereto. The volume excludes the volume of material that is measured as Rock In Foundation Excavation.

Pay Item
Test Pit Excavation

Pay Unit
c.y. (cu.m)

ITEM #1105001A - 1 WAY, 1 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105003A - 1 WAY, 3 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105180A - 1 WAY, 1 SECTION BI-COLORED ARROW

ITEM #1105203A - 1 WAY, 3 SECTION POLE MOUNTED TRAFFIC SIGNAL

ITEM #1105303A - 1 WAY, 3 SECTION PEDESTAL MOUNTED TRAFFIC SIGNAL

ITEM #1105490A - 1 WAY, 1 SECTION TRAFFIC SIGNAL SIGN MOUNTED

Article 11.05.03 – Construction Methods:

Add the following paragraph:

Circular indications that have an identification mark (such as an arrow) on the top of the lens shall be installed with that mark at the 12 o'clock position.

Article M.16.06 - Traffic Signals

Sub Article 3 - Housing:

In the last sentence, between the words “housing” and “shall” add “and all internal hardware”.

Add the following after the last paragraph.

Each section of the housing shall be provided with a removable visor. The visor shall be the cap type, unless otherwise noted on the plan. The visor shall be a minimum .05 inch (.13 mm) thick. The visor shall be the twist on type and secured to the signal by four equidistant flat tabs screwed to the signal head.

Sub Article 4 - Brackets:

Add the following at the end of the last paragraph:

Install a 2” wide yellow retroreflective strip (Type IV sheeting) along the perimeter of the face of the backplate.

Delete Sub Article 5 - Optical Unit and **Sub Article 6** – Lamp Socket and replace with the following:

Optical Unit, Light Emitting Diode:

(a) General:

Only Optical Units that meet the requirements contained herein supplied by the below manufacturers that have been tested by the Department's Signal Lab will be accepted. Final approval for model numbers will be done at the time of the catalog cut submittals.

Duralight
Trastar, Inc.
860 N. Dorothy Dr., Suite 600
Richardson, TX 75081

GE Lighting Solutions
Corporate Headquarters
1975 Noble Road Building 338E
East Cleveland, OH 44112-6300

Dialight
1501 Foute 34 South
Farmingdale, NJ 07727

Leotek
726 South Hillview Drive
Milpitas, CA 95035

The materials for Light Emitting Diode (LED), Optical Unit, circular and arrow, shall conform to the following:

- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement for circular indications dated June 27, 2005.
- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement for arrow indications dated July 1, 2007.

Section 4, Adjustable Traffic Signals and General Housing sections of the **Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs**. Where the Department of Transportation Functional Specifications conflict with this Special Provision or the 2005/2007 ITE Performance Specifications, this Special Provision and the 2005/2007 ITE Performance Specifications shall govern.

The Optical Unit shall have an Incandescent look and be made up of a smooth surfaced outer shell, multiple LED light sources, a filtered power supply and a back cover, assembled into a sealed unit.

The Optical Unit shall be certified as meeting the 2005/2007 ITE Specifications by Intertek Testing Services, Inc. (ITSNA, formerly ETL) or another organization currently recognized by the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL.) The Optical Unit shall perform to the requirements of the ITE Specification for a minimum of 60 months.

A “Swing Test” will be performed by the Department to ensure no significant dimming or blanking occurs, until the lamp is obscured by the visor. All L.E.D Lamps will be subjected to further field testing for reliable operation.

The Arrow Optical Unit shall be “Omni-Directional” so that it may be oriented in a right, left or straight configuration without degradation of performance.

(b) Electrical Requirement:

Operating voltage:

80 to 135 Volts AC with cutoff voltage (no visible indication) below 35Volts AC.

Power requirements:

Circular Indications: 12”, (300 mm) – no more than 16 Watts

Circular Indications: 8”, (200mm) - no more than 16 Watts

Arrows Indications: 12”, (300mm) - no more than 16 Watts

Power Supply:

Fused and filtered to provide excess current protection and over voltage protection from electrical surges and transient voltages.

(c) Photometric Requirement:

Beam Color:

Meet 2005/2007 ITE Specifications

(d) Mechanical Requirements:

Diameter:

The Circular Optical Unit shall fit into standard 12” (300mm) or 8” (200mm) housing.

The Arrow Optical Unit shall fit 12” (300mm) housings only.

Enclosure:

UV (Ultraviolet) stabilized polycarbonate back cover.

Clear lens cover for all Red, Yellow and Green Circular Optical Units.

For Arrow Optical Units the arrow indication segment of the lens shall be clear.

Enclosure sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

Clearly mark on the housing the following information:

- Manufacturer & model number
- Date of manufacture (must be within one year of installation)

The model number shall end with the number of LEDs used to comprise the unit as the last digits of the model number. Example, if the unit comprised of 3 LEDs and the model is x12y, then the new model number shall read x12y3.

Operating temperature:

Meet 2005/2007 ITE Specification

Wiring: L.E.D. lamps shall have **color coded 16 AWG wires** for identification of heads as follows:

RED L.E.D. Lamps	RED with WHITE neutral
YELLOW L.E.D. Lamps	YELLOW with WHITE neutral
GREEN L.E.D. Lamps	GREEN or Brown with WHITE neutral
RED L.E.D. ARROWS	RED/WHITE with WHITE neutral
YELLOW L.E.D. ARROWS	YELLOW/WHITE with WHITE neutral
GREEN L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE with WHITE neutral
GREEN/YELLOW LED ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral

Wires shall be terminated with a Block Spade, 6-8 stud/ 16-14 wire size.

All Circular Optical Units shall be supplied with a minimum 40" pigtail and all Arrow Optical Units Supplied with a minimum 60" pigtail.

Sub Article 9 - Painting:

Third coat: Replace the first two sentences with the following:

All brackets and hardware shall be painted yellow by the manufacturer. The color shall be No. 13538, Federal Standard No. 595.

ITEM #1107007A - PEDESTRIAN PUSHBUTTON AND SIGN (PIEZO)

Article 11.07.05: Basis of Payment:

Insert the following after the word saddle: “Extension Brackets,”

Article M16.08 - Pedestrian Push Button:

Delete the entire section except for painting and replace with the following:

A. General

- Size and force compliant with ADA, Section 14.2.5, Crossing Controls.
- Tamper-proof, and Vandal-proof, Weatherproof, Freeze-proof, Impact-resistant design and construction.
- Completely insulated to preclude electrical shock under any weather conditions.
- Wire entrance through the rear.
- Stainless steel mounting hardware.

B. Actuation

1. Mechanical:

- Single momentary contact switch with tactile feedback.
- Rated at 10 amps, 125 volts.
- Normally open, closed when actuated.

2. Piezo:

- Either non-movable or minimal movement (< 1/16” (1.6)) pressure activation.
- Audible confirmation beep to correspond with circuit closure.
- Minimum 100,000,000 actuations.

C. Housing

- Die cast aluminum meeting requirements of ASTM B85.
- Designed to attach 9" x 12" (230 x 300) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available hardware to either pedestal top-mount or pole side-mount on diameter range of 3½" (89) to 15" (380).
- Available extension bracket of a size indicated on the plan – 18” maximum.

D. Finish

- Method: Either

1. Painted with 3 coats of infrared oven-baked paint before assembly.

- Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
- Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
- Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.

2. Electrostatic powder coated after chemically cleaned.

Article M.16.08 Painting:

Third coat: Replace with the following:

All brackets and hardware shall be painted yellow by the manufacturer. The color shall be No. 13538, Federal Standard No. 595.

ITEM #1108115A - FULL ACTUATED CONTROLLER 8 PHASE

Article 11.08.01 - Description: Delete the second paragraph and replace with the following:

This item shall consist of furnishing and installing an actuated controller, which shall be a completely digital solid state unit, for controlling the operation of the traffic signals.

The controller shall be completely furnished with the number of phases called for in the item. The cabinet to house the controller shall be completely wired and all sub-bases shall be complete with load switches and flash relays as specified in the **Functional Specifications For Traffic Control Equipment**. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing indicated on the plans. A time switch shall be installed in each cabinet.

Article 11.08.03 – Construction Methods: Delete the entire second paragraph.

Article M.16.09 - Controllers: Add the following sub-articles:

2. Actuated Controllers: The purpose of this sub-article is to set forth minimum design and operating requirements for the materials and components for a digitally timed actuated controller.

Ventilation:

For cabinets that will be painted other than Department-approved gray, the cabinet ventilation shall include two intakes, exhausts, filtrations, two fans, and one thermostat assembly. Each electric fan shall be equipped with ball or roller bearings and with a capacity of at least 100 cfm. The fans shall be mounted inside the front top of the cabinet ventilation holes. The fans shall be controlled by one manually adjustable thermostat.

The Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs the material for the Controller Assembly. The Functional Specifications are advertised biennial for vendors to provide equipment to the State on a low bid basis. All underlined text indicates an addition or revision to these specifications from the previous version. The Functional Specifications are available on the Departments website.

The following sections of the **Notice to Bidders**, pages 1 - 10, shall apply to contract supplied traffic controllers: 12, 15, 16, 17, 18, & 19.

Item 1108115A – FULL ACTUATED CONTROLLER 8 PHASE shall conform to the requirements of Section 1, pages 11 – 94. The Controller Unit (CU) shall conform to the requirements of Item 1D1, CONTROLLER (PRE-EMPTION TYPE), pages 29 – 31. All cabinets shall conform to the specifications of the “D” CABINET REQUIREMENTS, pages 78 – 84.

Controllers in a closed loop system shall conform to the requirements of Section 27, INTERNAL CLOSED LOOP SYSTEM FOR EXISTING NAZTEC SYSTEM, pages 162 – 185, in addition to the above requirements.

The solid state time switch shall conform to Section 13. FOUR CIRCUIT SOLID STATE TIME CLOCK WITH TIME BASE COORDINATION OPTION TC/TBC, pages 140 - 143.

Traffic signal equipment which has not been previously approved to meet the requirements of the Functional Specifications for the above items, will not be approved for use on this contract.

Several parts of Item 1 of the Functional Specifications do not apply to contract supplied and developer supplied traffic controllers. The specifications which are to be disregarded are listed below.

- Item 1A-1 - Controller, Two Phase Microprocessor Keyboard Entry
- Type 6 Conflict Monitor
- Item 1A-2 - Two Phase Type "A" Cabinet

Supplemental specifications listed below, have been added for material and controller operations which the Department of Transportation does not include in the Functional Specifications for Traffic Control Equipment.

- U.C.F. Time Switch Flash Command Procedure
- Time Clock/Time Base Installation Requirements
- 24 Volt Relay Type A
- 110 Volt Relay Type F
- Type G
- Time Delay Relay
- Non-Actuated Advance Green Phase
- Actuated Advance Green Phase
- Non-Actuated Clearance / Lag Green Phase
- Actuated Clearance / Lag Green Phase
- Flashing Stop Ahead Sign
- Max II Actuation By Pedestrian Call

UNIFORM CODE FLASH COMMAND PROCEDURE

1. Activate the **MINIMUM RECALL** input to the controller to ensure cycling prior to transferring to flashing operation.
2. Omit all non-actuated and actuated artery advance phases.
3. Omit phases 1 & 5 of all quad sequences.
4. Activate the **STOP TIME** input to the controller, upon entering flash, to prevent cycling.
5. Transfer to flash at the end of the last side street all red condition (at the point the artery **ON** output becomes active).
6. Special technical notes on the intersection plan supercede the above requirements.

TC/TBC INSTALLATION REQUIREMENTS

The following requirements are to be observed when engineering the installation of TC/TBC:

1. a. Circuit 1 shall be designated FLASH and be reserved for night flash command.
b. Circuit 2 shall be designated MAX 2 and be reserved for Max 2 command.
c. Circuit 3 shall be designated COORD and shall select coordinated operation of the intersection.
d. Circuit 4 shall be the yield, and force off command to the controller.
2. All clock outputs shall be active to select the function specified. For example; If the TC/TBC were removed for repair, no inputs would be applied to the controller. The intersection will then operate non-coordinated, in Max 1. Programming the TC/TBC without cycle and offset is not an acceptable method to create a non-coordinated operation. Refer to the typical hookup diagram.
3. All TC/TBC clock installations shall be wired as detailed in figure 1. This method is used for both full and semi actuated operation.
4. Midnight resync shall occur at 12:00 AM.
5. A program card shall be completed indicating all input steps and settings. Four copies shall be provided. One copy left in the cabinet. Three delivered to the engineer along with the cabinet wiring diagrams.

TIME CLOCK / TIME BASE COORDINATION

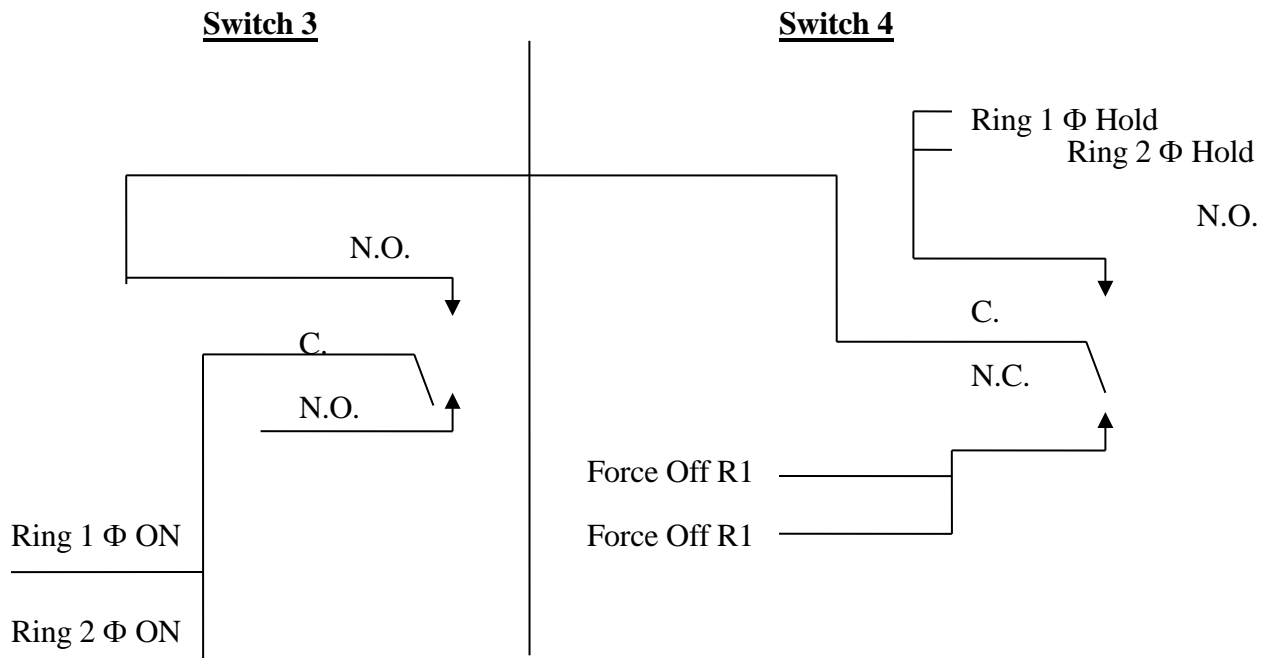


FIG. 1

24 VOLT RELAY

All 24 Volt relays shall meet the requirements of one of the following two types. Diodes shall be installed across the coils of all direct current relays to shunt the reverse voltage generated when the coil de-energizes. All diodes shall be general purpose ECG 125 1000prv @ 25A or equivalent, rated at least .5 amp forward biased. Diodes shall be external to the relay, not enclosed in the dust cover.

TYPE A: Midland Ross, Midtex 155-92 or equivalent.

DESCRIPTION:

This relay shall be enclosed in a clear polycarbonate removable dust cover. It shall have a mechanical life of more than 100,000 operations at rated load.

CONTACTS:

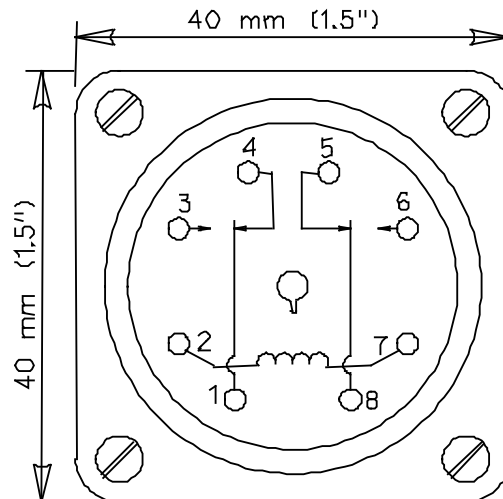
The contacts shall be 2 form C (D.P.D.T), U.L. rated at 5 amps 120 volts A.C. The contacts shall be pure fine silver (gold flash). There shall be no tungsten (lamp) load on the contacts of this relay.

COIL: The coil shall operate on 24 V.D.C. and have no less than 450 OHMS impedance.

SIZE: The relay shall be no larger than 65mm(2.5") H x 40mm(1.5") L x 40mm(1.5") W.

BASE: This relay shall have an eight pin octal plug-in base with the pin designation shown below:

1. Common (1)
2. Coil
3. Normally open (1)
4. Normally closed (1)
5. N.C. (2)
6. N.O. (2)
7. Coil (2)
8. Comm.



Bottom View And Wiring Diagram

SOCKET: The socket shall be a closed back, screw terminal type. The front mounted screws shall be 6-32 capable of accepting #14 AWG wire.

110 VOLT RELAY

All 110 volt relays shall meet the requirements of one of the following two types. Across the coil of each relay there shall be a molded suppressor rated at .1uf - 47 ohm @ 600V to suppress electrical noise created by the energization / de-energization of the relay.

TYPE F: Midland Ross, Midtex 136-62T3A1 or equivalent

DESCRIPTION:

Relays of this type shall function as flash transfer, power switching and signal drive. Other uses are acceptable, however, type G relays cannot be used for the above applications.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 10mm(3/8") diameter silver cadmium oxide, rated at 20 Amps @ 117 VAC resistive.

COIL:

The coil shall operate on 110 VAC. No semi-conductors will be allowed in the coil circuit of this relay.

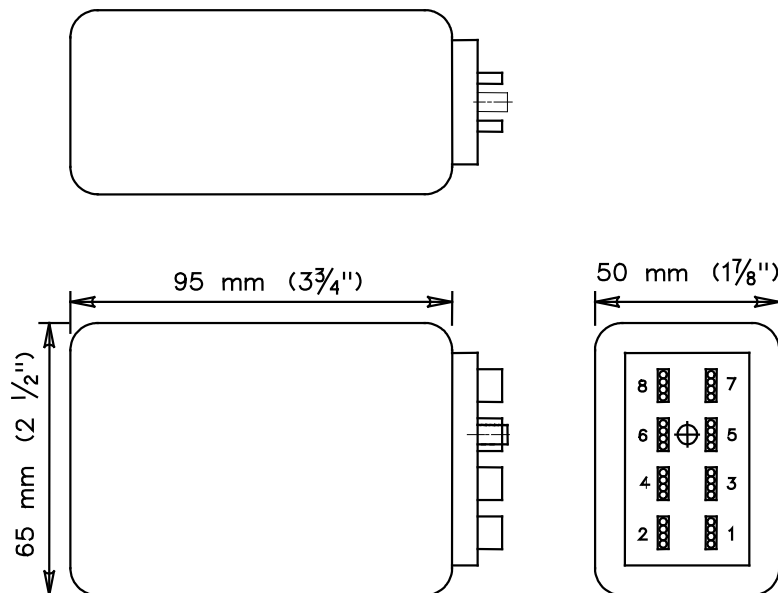
SIZE:

The relay shall be enclosed in a clear plastic dust cover. The overall dimensions shall be no larger than 63mm(2 1/2") x 94mm(3 3/4") x 47mm(1 7/8") as illustrated below.

BASE:

This relay shall have an eight blade plug-in base, Ventron Beau Plug P-5408 or equivalent with the pin designations as shown below:

1. Coil
2. Coil
3. N.C. 1
4. N.C. 2
5. Comm. 1
6. Comm. 2
7. N.O. 1
8. N.O. 2



SOCKET:

The socket shall be Ventron Beau Plug S-5408 or equivalent, contacts rated at 15 Amps @ 1750 VRMS.

TYPE G: Magnecraft, W 88 ACXP-8 or equivalent

DESCRIPTION:

Relays of this type shall function in low current switching applications such as interconnect interface or pre-emption circuits. A clear polycarbonate plastic enclosure shall cover the relay mechanism.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 5mm (3/16") diameter gold flashed, silver alloy, rated at 10 Amps @ 120 VAC resistive.

COIL:

The coil shall operate on 120 Volts AC and require a nominal 3 VA.

SIZE:

Height, length and width dimensions shall be the same as the 24 volt relay Type A: 35mm (1 3/8") x 60mm (2 3/8") x 35mm (1 3/8").

BASE:

The base shall be an octal plug with the pin designations the same as the 24 volt relay Type A.

SOCKET:

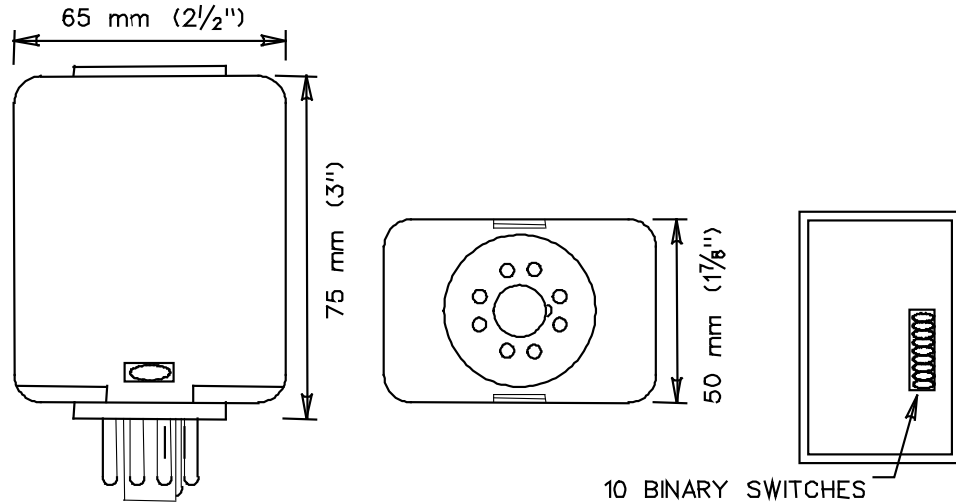
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

120 VAC SSAC TDM120A or equivalent
24 VDC SSAC TDM24DL or equivalent

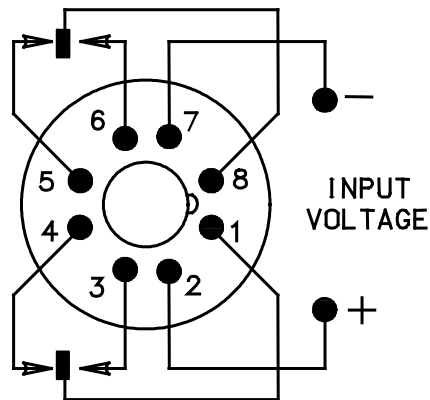
DESCRIPTION:

The time delay relays shall be self enclosed, plug-in, delay on operate type. They shall be digitally timed and adjustable by the use of dip switches located on the top of the case. The timing range shall be 1 to 1023 seconds in 1 second intervals. The time delay relays shall have an internal double pole double throw relay with form "C" contacts rated at 10 amps 120 volts AC. They shall operate accurately in a temperature range of -20 to +65 degrees C. A 120 volt AC input shall initiate timing of the 120 VAC TDR and a 24 VDC input shall initiate timing of the 24 VDC TDR. Removal of the input voltage shall reset the timer. Maximum dimensions of the case shall be as shown below.



SOCKET:

The socket shall be a standard octal base (8 pin) with screw terminal connectors. The pin designation shall be as shown below.



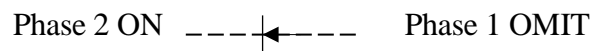
NON-ACTUATED ADVANCE GREEN PHASE

OCTAL (8 PIN) BASE

Where the timing and sequence indicates an advance green phase that always precedes the phase in recall (usually phase 2), and that either is fixed timed or is to be extended only, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the advance phase OMIT input.
2. If the advance phase is to be extendable, it shall be in minimum recall. If the advance phase is fixed timed, it shall be in maximum recall. A different advance time may be selected by switching to maximum 2.

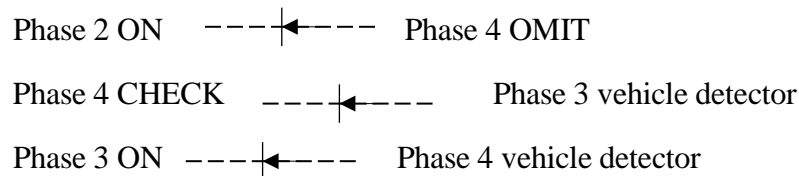
Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



Where the timing and sequence indicates an advance phase that is fixed timed (not extendable), and that always precedes either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The recall phase (usually Phase 2) ON output shall be diode connected to the advance phase's, parent phase OMIT input.
2. The parent phase CHECK output shall be diode connected to the advance phase vehicle detector input.
3. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication on the parent phase.
4. The advance phase shall be in the non-lock mode. The advance time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the advance for phase 4, in non-lock mode.
Phase 4 (parent phase) is the minor street, in non-lock mode.

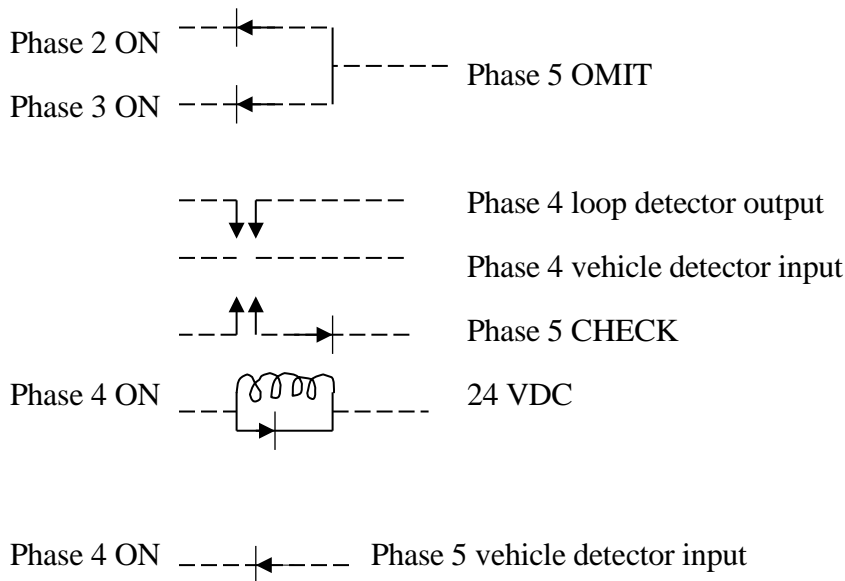


ACTUATED ADVANCE GREEN

Where the timing and sequence indicates an advance green phase that is to be extended only, and is to always precede either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The phase ON outputs of all phases that could precede the advance phase, shall be diode connected to the parent phase OMIT input.
2. The parent phase CHECK output shall be diode connected, through the normally closed contacts of a relay, to the advance phase vehicle detector input. The advance phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the advance phase ON output, which in turn will switch the vehicle detector input from the parent phase CHECK circuit to the loop detector.
4. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication from the parent phase.
5. The advance phase shall be in the non-lock mode.

Example: Phase 2 is the artery, in recall.
Phase 3 is the pedestrian phase.
Phase 4 is the advance for phase 5, in non-lock.
Phase 5 (parent phase) is the minor street, in non-lock.



The 24 volt relay shall be Type C as previously described in these specifications.

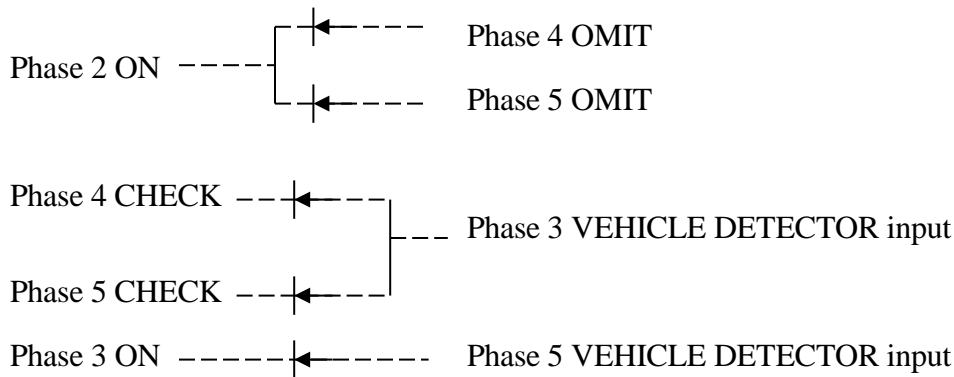
NON-ACTUATED CLEARANCE PHASE

NON-ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates a non-actuated clearance phase or a lagging green phase that always follows the phase in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to all appropriate phase OMIT inputs except the clearance phase.
2. The remaining actuated phases shall have their CHECK outputs diode connected to the clearance phase vehicle detector input.
3. The clearance phase ON output shall be diode connected to the following phases vehicle detector input (if the phase is in non-lock mode). This will prevent the controller from returning to the parent phase from the clearance phase without servicing the minor street.
4. The clearance phase shall be in the non-lock mode.
5. The clearance, or lag green time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the clearance phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



Where the timing and sequence shows a non-actuated clearance phase or lagging green phase following either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the following clearance phase vehicle detector input. This insures the clearance phase will always follow the parent phase.
2. The clearance phase shall be in the non-lock mode.
3. The clearance, or lag green time shall be selected from the minimum green interval.



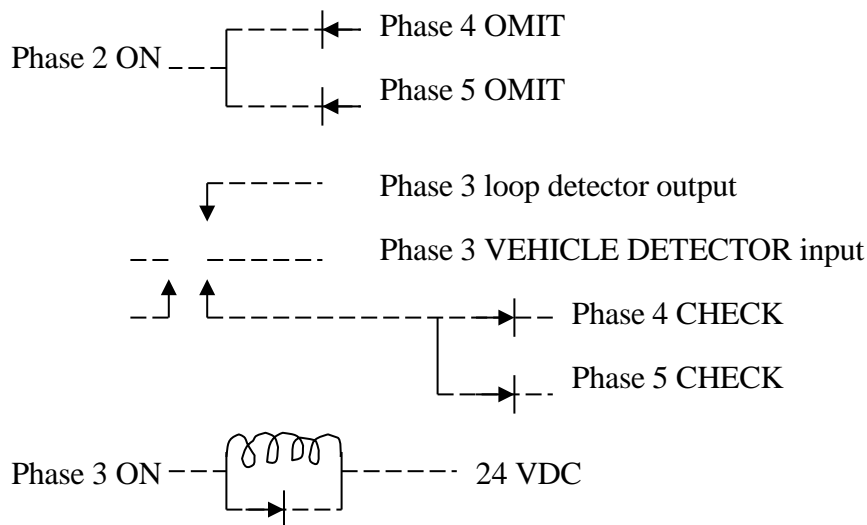
ACTUATED CLEARANCE PHASE

ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates an actuated lagging green phase that is to be extended only, and always follows another phase, the following guidelines shall be in effect:

1. The parent phase (usually phase 2) ON output shall be diode connected to the phase OMIT inputs of all phases that could follow the lag phase.
2. The CHECK outputs of all phases that could follow the lag phase shall be diode connected, through the normally closed contacts of a relay, to the lag phase vehicle detector input. The lag phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the lag phase ON output which in turn will switch the phase detector input from the CHECK circuits to the loop detector.
4. The lag phase shall be in the non-lock mode.

Example: Phase 2 (parent phase) is the artery, in recall.
Phase 3 is the lag phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



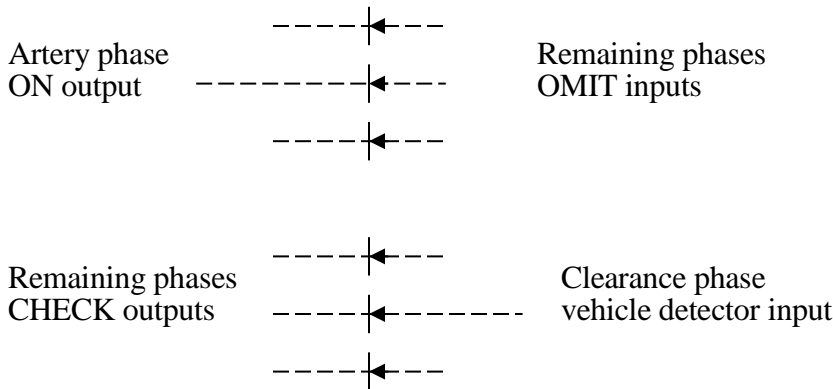
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

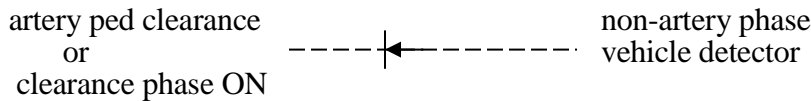
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

The following phase shall be used for the clearance time. These phases shall be overlapped. The green indication will be maintained by the overlap feature and the following phase green time will be the stop ahead sign clearance.

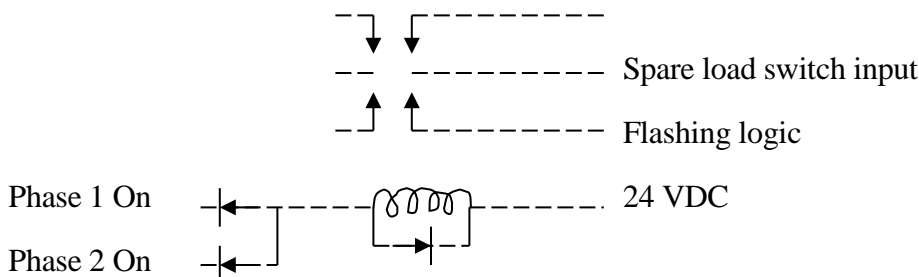
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the non-lock mode.



If the non-artery phases are in the non-lock mode, a call must be forced to the non-artery phase once the controller leaves the artery Hold interval (either artery walk or artery green). This prevents a false "Stop Ahead" indication if a vehicle turns right on red during the flashing sign clearance interval.



Unless otherwise shown on the plans, the 110 VAC flash power shall be from a spare load switch in the controller cabinet. The load switch input shall be driven with the flashing logic output from the controller. The flashing logic output shall be disconnected from the load switch during the intervals the sign is inactive.



Typical drive circuit for "WHEN FLASHING STOP AHEAD" sign

TIME BASE COORDINATION
MAX II ACTUATION BY PEDESTRIAN CALL

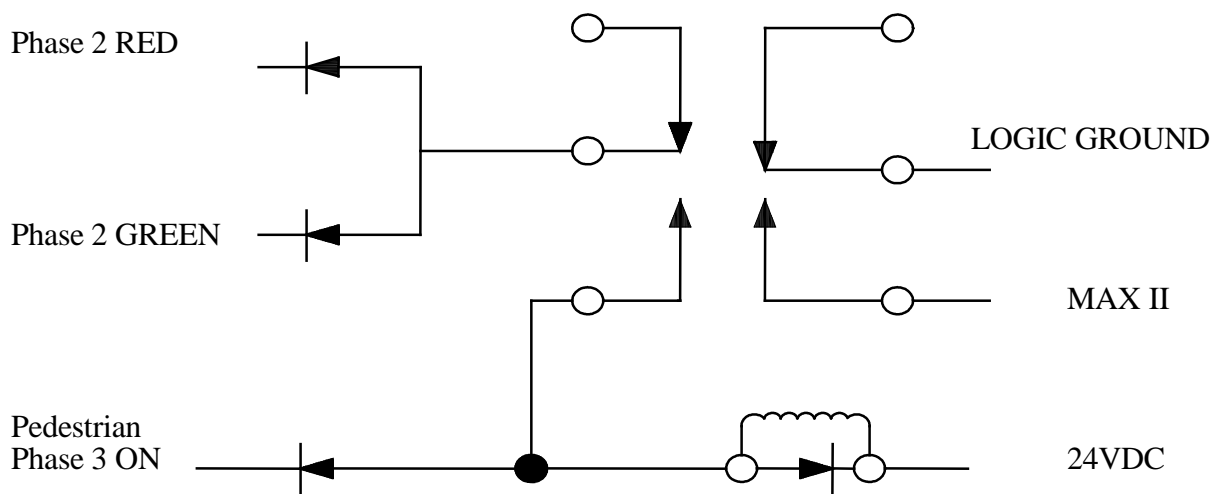
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double cycling.

Where indicated on the plans the exclusive pedestrian phase will call MAX II. The minor movement max 2 times are set low so that the total phase times do not exceed the coordination cycle length.

Install a 24 volt relay connected to the inputs and outputs as shown on the following schematic.

Operation: When the controller advances to the exclusive pedestrian phase, the relay is actuated and latched. MAX II timing is selected for one complete cycle, until the relay is unlatched by the artery yellow (absence of red or green).

Example: Phase 2 is the artery. Phase 3 is the exclusive pedestrian phase.



ITEM #1108722A - VEHICLE EMITTER

ITEM #1108724A - PHASE SELECTOR

ITEM #1112410A - DETECTOR (TYPE A)

ITEM #1112470A - PRE-EMPTION SYSTEM CHASSIS

ITEM #1113550A - DETECTOR CABLE (OPTICAL)

SYSTEM DESCRIPTION:

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be activated at a minimum distance of 1,800 feet (548.6m) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 40 feet (12.2m) of the detector or at the intersection.

The system shall consist of the following components:

- A. Vehicle Emitter which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction. If the municipality presently uses optical pre-emption, the emitters shall be of the same manufacture currently used by the Town.
- B. Phase Selector (minimum 2 channel) which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A pre-emption system chassis shall house two phase selectors.
- C. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.

Detector (Type A), 1 Direction, 1 Channel

- D. Detector Cable (Optical).

System Operation:

- A. The operating sequence shall be initiated when the optical detector receives the required optical energy signal from the Emitter.
- B. The phase selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.
- C. The phase selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.

- D. The phase selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.
- E. The phase selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

System Components:

A. Vehicle Emitter:

The emitter assembly consists of an emitter and power supply and an emitter control switch assembly. The emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation.

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.
2. Shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.
3. Shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, transmission safety switch.
4. Shall operate over an ambient temperature range of minus 30⁰ F. to plus 165⁰ F. (minus 34⁰ C to plus 74⁰ C)
5. Shall operate in 5 to 95 % humidity.
6. Shall be a pulsed optical energy source with a controlled repetition rate of 10Hz to 14 Hz and adjustable intensity.
7. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.
8. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. Optical Detector:

The optical detector receives the high intensity optical pulses produced by the emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the phase selector. The optical detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures.

1. Shall be of solid state construction.
2. Shall operate over an ambient temperature range of minus 30⁰ F. to plus 165⁰ F.
(minus 34⁰ C to plus 74⁰ C)
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 5 to 95 % humidity.
5. Shall have a cone of detection of not more than 13 degrees. The detector and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

C. Phase Selector:

The phase selector supplies power to and receives electrical signals from the optical detector. When detector signals are recognized as a valid call, the phase selector causes the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by activating the pre-empt input to the controller.

The phase selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the phase selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the phase selector will release the controller to follow normal sequence operation.

1. Shall include an internal power supply to supply power to the optical detectors.
2. Shall have minimum two-channel operation with the capability of interfacing with an additional phase selector for expansion of channels of operation.
3. Shall have adjustable detector range controls for each channel of operation, from 40 feet (12m) to 1800 feet (548m).
4. Shall have solid state indicator lights for power on and channel called.
5. Shall operate over an ambient temperature range of minus 30⁰ F. to plus 165⁰ F.
(minus 34⁰ C to plus 74⁰ C)
6. Shall operate in 5 to 95 % humidity.

D. Pre -Emption System Chassis:

1. Card cage/slot shall provide all the necessary hardware and harnessing required to allow simple wiring of phase selector to detector outputs and controller inputs..
2. Shall have harness to carry 115VAC and card outputs.
3. Shall include terminal block/strip for connecting the detectors.

E. Detector Cable (Optical):

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 167⁰ F. (75 deg. C).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 1000 feet (305m).
9. Capacitance from one conductor to other two conductors and shield not to exceed 48 pf/ft. (157pf/m).
10. Jacket: 600 volts, 176⁰ F. (80 deg. C), minimum average wall thickness – 0.045” (1.14mm).
11. Finished O.D.: 0.3” (7.62mm) max.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The Contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The Contractor shall secure from the manufacturer a guarantee for the equipment for a period of sixty (60) months, which time shall commence from the date of delivery. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required range and emitter intensity for the emergency vehicle operation.

Construction Methods:

All equipment except the vehicle emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturers’ instructions. The vehicle emitter assembly shall be delivered to a designated town representative. Installation of the vehicle emitter assembly shall be the responsibility of the town.

Traffic signals owned and maintained by the State that have optical pre-emption equipment owned and maintained by the town shall have an Auxiliary Equipment Cabinet (AEC) attached to the controller cabinet. The optical pre-emption equipment shall be housed in the AEC. Traffic signals owned and maintained by the town do not require an AEC to house the pre-emption equipment.

Detector cables shall be continuous with no splices between the optical detector and the AEC.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the contractor or the designated representative for the best possible line of sight.

If not present in an existing traffic controller cabinet, the following items shall be installed and connected, in conformance with the current Functional Specifications for Traffic Control Equipment, "D" Cabinet Requirements (Pre-emption Type):

- Controller "D" harness and adapter.
- Pre-emption termination panel with terminal block and relay bases.
- Pre-emption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Pre-emption test buttons, mounted on the pre-emption termination panel.

All connections from the phase selector to the "D" harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the phase selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided. If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

Test the Pre-emption System at the semi-final inspection According to the following Guidelines:

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection
2. Request a fire department representative and an emergency vehicle, which has an emitter to conduct the test. If not available, the contractor shall provide an emitter.
3. In the presence of the Engineer and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
 - * Confirm that the emitter activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
 - * Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter shall initiate pre-emption at a minimum distance of 1800 FT. (548.6m).

- * Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.
- 4. Document the test. Provide the Engineer and, upon request, the municipality copies of the test results.

If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the town.

Method of Measurement:

Optical Detectors, Phase Selectors, System Chassis will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) will be measured by the number of linear feet (meters) supplied, installed and accepted. Vehicle Emitters will be measured by the number of each supplied to the Town and accepted.

Basis of Payment:

Payment for Optical Detectors, Phase Selector, System Chassis and Detector Cable (Optical) will include the item unit cost, including all manufacturer's required mounting hardware and the cost of installation and supervision by the manufacturer or his designated representative, including travel and subsistence, and all materials, equipment and labor incidental thereto. Payment for termination panel, "D" harness, test buttons, program chart (or print out) and revised cabinet wiring diagrams shall be included in the item PRE-EMPTION SYSTEM CHASSIS. Payment for Vehicle Emitters will include the item unit cost only.

<u>Pay Items</u>	<u>Pay Units</u>
Vehicle Emitter	Ea.
Detector (TYPE A)	Ea.
Phase Selector	Ea.
Detector Cable (Optical)	L.F. (m)
Pre-Emption System Chassis	Ea.

ITEM #1111600A — EXTENSION BRACKET

ITEM #1112210A — CAMERA ASSEMBLY

ITEM #1112259A — VIDEO DETECTION PROCESSOR

ITEM #1113901A — CAMERA CABLE

Description: Furnish and install a Video Image Detection System (VIDS) as shown on the plans or as directed by the Engineer. The VIDS consists of a Camera Assembly (CA), Video Detection Processor (VDP) and Camera Cable. The Extension Bracket item may be included in the Contract, as determined by the Engineer.

Materials: All hardware shall be new, corrosion-resistant. All equipment shall be current production.

Camera Assembly:

Camera:

- Full Color camera.
- Fixed mount pan and tilt unit bracket.
- Image Sensor: 0.25-inch to 0.5-inch, charge-coupled device (CCD).
- Sensitivity: Full peak-to-peak video with 1 lux to 3 lux incandescent illumination on the image sensor faceplate.
- Active picture elements (pixels): 720(H) x 480 (V), minimum.
- Resolution: Minimum 470 lines horizontal and 330 lines vertical, National Television Standards Committee (NTSC) equivalent.
- Automatic white balance: Automatic white balance sensor through the lens for color balancing.
- Video Signal format: EIA-170 composite video output at 1 Volt peak-to-peak.
- Output impedance: 75 Ohms nominal.
- Signal to noise ratio: Greater than 45dB.
- Lens mount – standard 3mm to 16 mm C or CS-mount and compatible with the camera.

Camera Enclosure:

- Constructed of aluminum (painted or powder coated) or polycarbonate.
- Environmentally sealed housing.
- Adjustable sunshield should be provided.
- Internal Heater, window defroster.

Extension Bracket:

- Single arm [10 feet or less], or Truss type [10 feet or greater].
- Vertical Pole mount (8 feet or greater)
- Length shown on plan.
- Clamp-on attachment to pole shaft 1 foot from top of span pole.
- Clamp on attachment to mast arm according to site survey determination.

- Designed to support minimum 30 lbs., 2 s.f. end load with minimal movement from wind.
- Schedule 40, 2 inch IPS galvanized pipe.
- Heavy duty galvanized finish
- Refer to detail drawing contained herein.

Video Detection Processor:

Functional:

- Receive inputs from a minimum of 2 cameras through the front of the VDP.
- Sense vehicle activity from minimum 8 detection zones per camera.
- Sense departing vehicle activity as well as approaching vehicle activity.
- Emulate minimum 4 “contact closure” loop amplifier outputs in pulse, presence, delay, delay inhibit, and extend mode as specified in NEMA TS 1, Section 15.
- Include image stabilization that corrects for video movement.
- Include automatic shadow cancellation of stationary shadows and moving shadows.
- Place a vehicle call in the event of loss of video from CA or loss of power to VDP.
- Accept standard analog NTSC color or monochrome video signal (1 volt peak to peak, 75 ohm) from the CA or a video recording device.
- Provide output of standard analog NTSC color or monochrome video signal through a video out female RCA/BNC style connector (1 volt peak to peak, 75 ohm) which may be switched to either video input.

Accuracy (Compared to actual vehicle observation of video over ½ hour time period).

- Occupancy: 20% true occupancy.
Example: If observed occupancy is 20%, reported occupancy must be between 16% and 24%.
- Volume: 95% true counts under normal weather conditions.
90% true counts under adverse weather conditions (rain, snow, fog).
- Demand (presence) at stop bar: 98 % under all weather conditions.
- Speed: 20% true speed as measured by radar gun.
- Maintain above accuracy throughout nighttime and day-night-day (dusk-dawn) transition.

Detection Zone Programming:

- Serial communication with the PC through front panel mounted USB/ Ethernet/ EIA-232 port.
- Menu driven procedure on the PC, using Windows operating system supported by the Department.
- Configure, label and adjust the detection zone with the cabinet mounted Video Detection Monitor (VDM), using a standard detachable keyboard/mouse. Capable of displaying a NTSC formatted signal.
- Minimum data rate of 9600 bits/second.
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Ability to upload and down load program configuration file.
- Superimpose detection zone on real time video image from selected camera with time stamping capabilities.

- Ability to monitor real time video and adjust zones while VDP is actuating the traffic controller.
- Visual confirmation of detection by highlighting detection zone symbols.

Physical:

- Either shelf-mounted, stand-alone design or modular card rack design.
- Double row 22 pin (44 terminal) edge connector, Cinch Jones 50-44A-30M or equivalent, which mates with NEMA TS 1 detector rack system.
- Standard BNC connectors for video input and BNC/ RCA video output.
- LED indications to monitor all detector outputs.
- Side- or rear-mounted connectors and controls are not allowed on stand-alone units.

Peripherals:

- Separable Keypad and Joystick or Computer Mouse including all necessary cables for connectivity to VDP.

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.
 - Vibration: Section 3.13.3, Section 3.13.8.
 - Shock: Section 3.13.4, Section 3.13.9.
 - Transients, Temperature, Voltage and Humidity: Section 3.13.7.
 - Power Interruption: Section 3.13.10.

Surge Protection:

Camera Side:

- In the junction box, provide in-line surge protectors designed to protect externally mounted cameras unless CA is equipped with built-in surge protection.
- Provide 3-stage protection. Primary gas discharge tube (GDT), secondary Silicon Avalanche Diode (SAD) and over current protection with solid state resettable fuses (positive temperature coefficient or PTC)

Cabinet Side:

- In the cabinet, provide in-line surge protectors designed to protect all VDP's.
- Electrical Characteristics for Camera and Cabinet side surge protection:

Operating Voltage	5 VDC
Clamping Voltage	6 VDC
Operating Current	0.15A
Peak Surge Current	20 kA (8x20microS)
Frequency Range	0 to 20 MHz
Insertion Loss	<0.1dB at 20 MHz
Response Time	<0.5 ns
Connection Type	BNC, 50/75 Ohm
Operating Temperature	-40°C to +85°C
Certifications	UL 497B Listed

Camera Cable:

- Supply the CA power and return the video signal to the VDP.
- Composite construction or as recommended by camera manufacturer.

- Coaxial:
 - 20 AWG, solid conductor.
 - Polyethylene foam dielectric.
 - Minimum 95% bare copper braid shield.
- Power/ Control:
 - 5 conductors 18 AWG, 7 strand conductor, shielded.
- Polyethylene or polyvinyl chloride jacket.
- Other type cable may be substituted at the request of the VDP manufacturer.
- Connectors:
 - Use compression type connectors with compression tool to make connections.

Documentation: (VDP, VDM and CA)

Provide to the **Department of Transportation Office of Maintenance** 3 copies of equipment manuals furnished by the manufacturer, which include the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams.
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.
- Configuration file in an USB storage device

Construction Methods:

Site Survey: Perform a site survey with the VDP manufacturer at all VIDS locations. The purpose of the survey is to optimize the performance of the VIDS equipment when it is installed and insure that it will meet the accuracy requirements previously specified. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (VDP and CA): Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

Install VIDS equipment in accordance with the manufacturer's instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. Install extension bracket to meet minimum CA manufacturer's recommendations. Tighten extension bracket bolts according to manufacturer's torque specifications. The location of the CA shown on the plans may be revised as a result of the site survey. VDM and peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper

clearance(s) surrounding video monitor to allow for accessible connections and space for access to surrounding equipment.

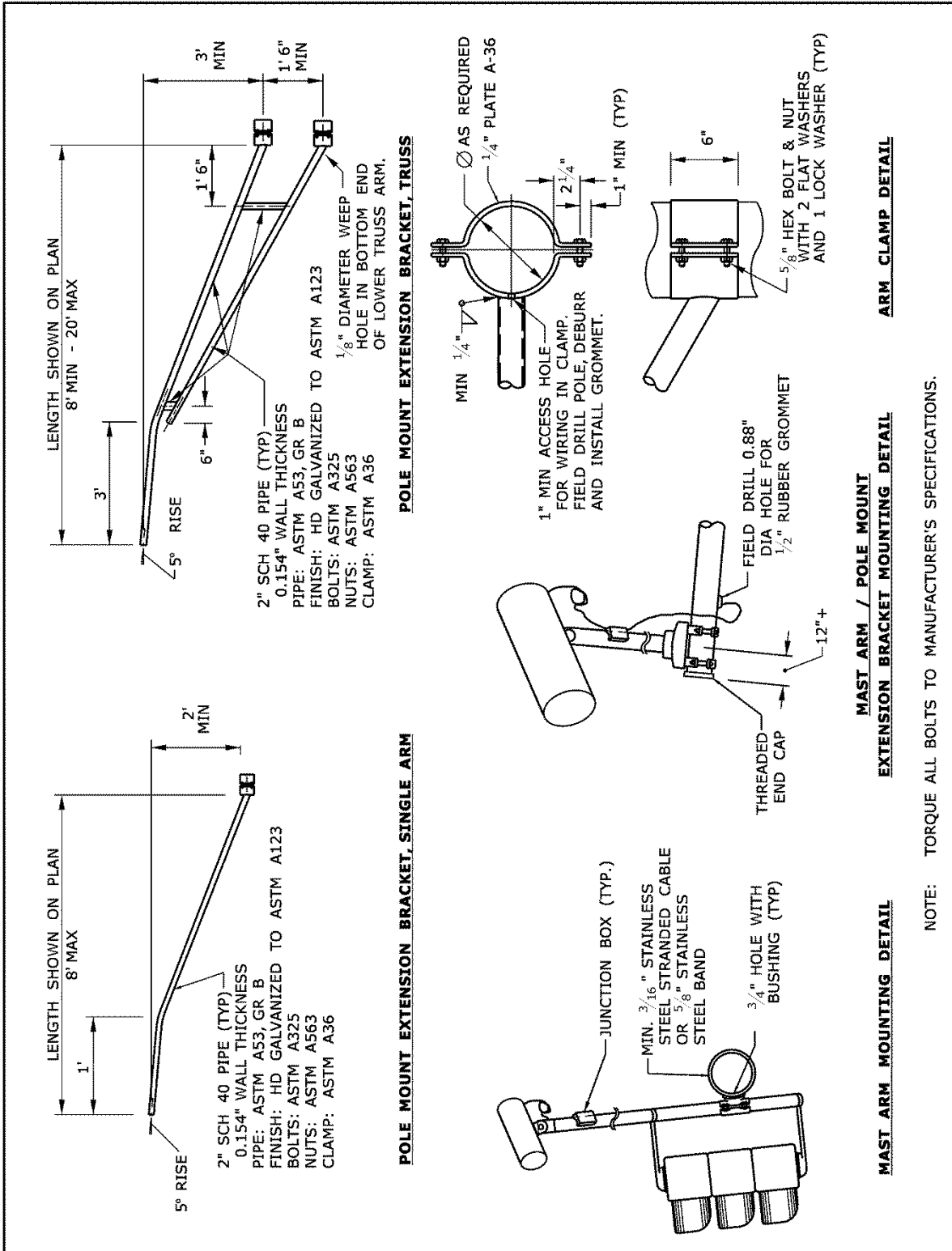
Method of Measurement:

1. The Extension Bracket will be measured for payment by the number of brackets furnished, installed and accepted.
2. The Camera Assembly will be measured for payment by the number of cameras furnished, installed operational and accepted.
3. The Video Detection Processor will be measured for payment by the number of units furnished, installed, operational and accepted.
4. Camera Cable will be measured for payment by the number of linear feet of cable furnished, installed and accepted.

Basis of Payment:

1. The Contract price for each "Extension Bracket" shall include all labor, tools and equipment necessary to attach the bracket to a pole shaft and/or mast arm.
2. The Contract price for each "Camera Assembly" shall include the camera, enclosure, brackets used to attach the CA to a support structure or extension bracket, documentation, warranty, labor, tools and equipment necessary to provide the specified video signal to the VDP.
3. The Contract price for each "Video Detection Processor" shall include the manufacturer's site survey, unlimited number of necessary VIDS configuration software and licenses, card rack frame, power supply, peripherals and all miscellaneous hardware such as PC interface cable with connectors, documentation, warranty, labor, tools and equipment necessary to make the VIDS fully operational.
4. The Contract price per linear foot of "Camera Cable" shall include all connectors, labor, tools and equipment necessary to install the cable between the CA and the VDP.

Pay Item	Pay Unit
Camera Assembly	ea.
Extension Bracket	ea.
Video Detection Processor	ea.
Camera Cable	l.f.



ITEM# 1111470A TIME CLOCK

DESCRIPTION:

This item shall consist of furnishing and installing a Time Clock/Time Base Coordination (TC/TBC) unit within a traffic signal cabinet in conformity with these specifications.

MATERIALS:

The four circuit TC/TBC shall conform to the current requirements of the Department of Transportation Functional Specifications for Traffic Control Equipment, Four Circuit Solid State Time Clock With Time Base Coordination Option TC/TBC.

CONSTRUCTION METHODS:

The TC/TBC harness shall be connected into the controller cabinet wiring in a neat and orderly manner. Refer to the TC/TBC INSTALLATION REQUIREMENTS included in the special provisions to Item #1108115A - Full Actuated Controller 8 Phase. All connections shall be to terminals. Splices will not be allowed. The TC/TBC hookup complete with pin number, function and cabinet terminal number shall be recorded in the form of a hookup chart, on 216 mm x 280 mm (8.5"x11") paper. The location, location number, date of revision, project number, TC/TBC manufacturer and model number shall also be recorded on the hookup chart. A program card shall be completed indicating all input steps and settings. Four copies of the hookup chart and program card shall be furnished to the Engineer with one each left in the cabinet. Revise controller timings as shown on the plan.

METHOD OF MEASUREMENT:

This work will be measured for payment by the number of Time Clock/Time Base Coordinators installed; operating in a time base system as designed, and accepted.

BASIS OF PAYMENT:

This work shall be paid for at the contract price each for "Time Clock" which price shall include all materials, labor, tools, 4 copies each of the hookup chart and program card, controller timing changes, and all work incidental thereto.

ITEM #1112288A – IP VIDEO DETECTION CAMERA ASSEMBLY

Description: Furnish and install an IP (Internet Protocol) Video Detection Camera Assembly (IPVDCA) as shown on the plans or as directed by the Engineer. The IPVDCA consists of an IP Video Detection Camera, lens, enclosure, mounting hardware and equipment necessary to provide the specified video signal to the video detection processor.

Materials: All hardware shall be new, corrosion resistant. All equipment shall be current production.

IP Video Detection Camera Assembly:

Camera:

- Use appropriate CS-mount lens to provide adequate detection
- Single Power Over Ethernet (POE) connection for power and data collection
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum
- Heated camera
- IP addressable

Camera Enclosure:

- Tamper proof constructed of aluminum
- IP66-rated camera housing

Camera Mounting Hardware:

- Swivel bracket for dual plane adjustment for leveling
- Hybrid terminal junction box with surge
- Astro-Brac banded bracket

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly
- Pass the following NEMA TS 2 tests and applicable test procedures
 - Vibration: Section 3.13.3, Section 3.13.8
 - Shock: Section 3.13.4, Section 3.13.9
 - Transients, Temperature, Voltage and Humidity: Section 3.13.7
 - Power Interruption: Section 3.13.10

Construction Methods:

Site Survey: Perform a Site Survey with the IPVDCA manufacturer's representative for all IPVDCA locations prior to installation. The purpose of the Survey is to optimize the performance of the IPVDCA equipment when it is installed and ensure that it will meet the accuracy requirements specified. Prior to installation, submit the results of the Site Survey to the Engineer in a report which lists all IPVDCA locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Install IPVDCA equipment in accordance with the manufacturer's instructions and the attached details to achieve the detection zones in the location(s) determined as a result of the Site Survey.

Documentation: (IPVDCA)

Provide to CTDOT Office of Maintenance three (3) copies of equipment manuals furnished by the manufacturer, including the following:

- Installation and operation procedures
- Performance specifications (functions, electrical, mechanical and environmental) of the unit
- Schematic diagrams (point to point wiring)
- Pictorial of component layout on circuit board
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA
- Troubleshooting, diagnostic and maintenance procedures

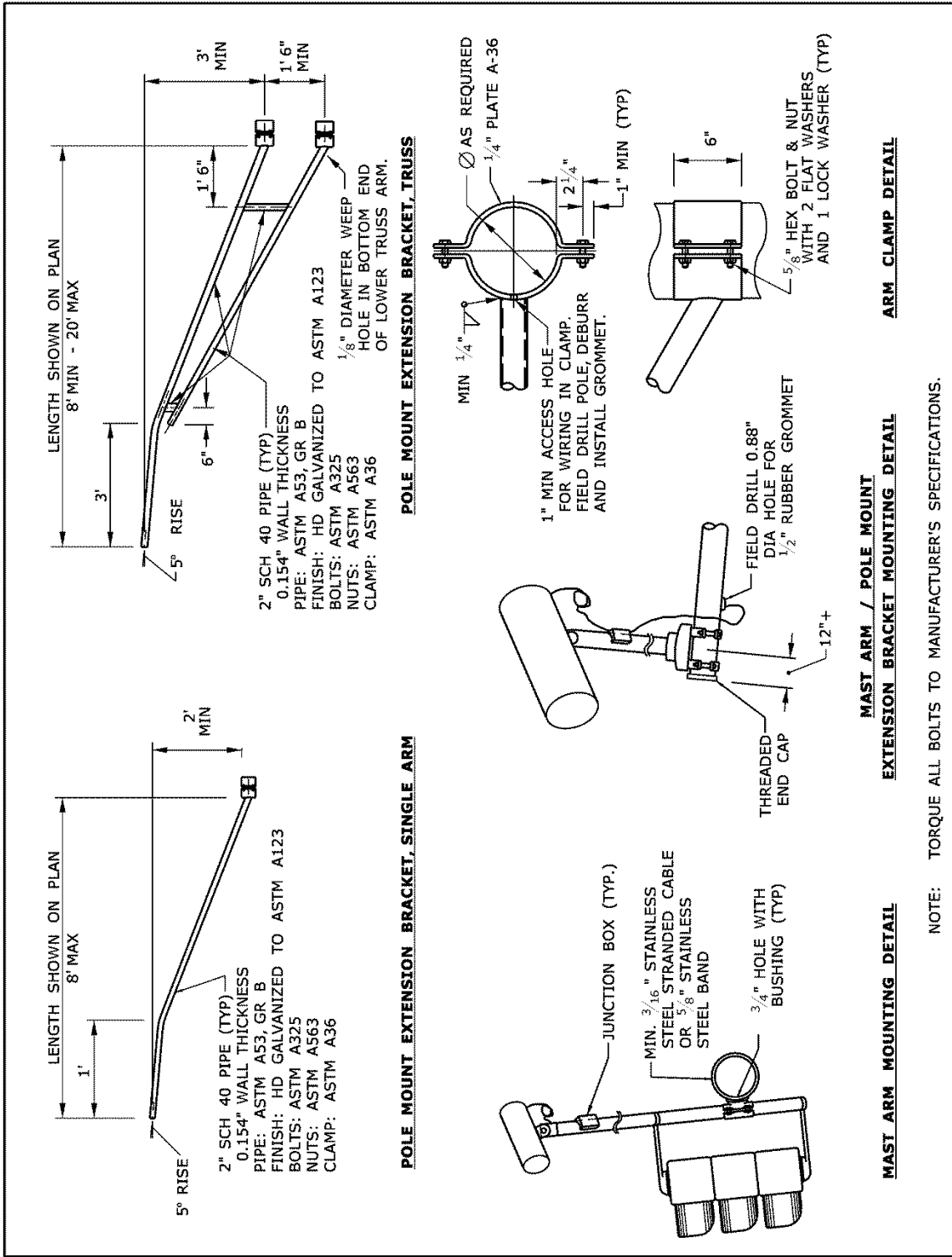
Warranties and Guarantees: (IPVDCA)

Provide warranties and guarantees to the CTDOT Office of Maintenance in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Method of Measurement: The IP Video Detection Camera Assembly will be measured for payment as the number of each assembly of IP video cameras, lenses, enclosures and mounting hardware furnished, installed, operational and accepted.

Basis of Payment: This item will be paid at the Contract unit price for each “IP Video Detection Camera Assembly” complete and accepted, which price shall include the Site Survey, IP video camera, lens, enclosure, brackets used to attach the IP video camera to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the video detection processor.

Pay Item	Pay Unit
IP Video Detection Camera Assembly	ea.



NOTE: TORQUE ALL BOLTS TO MANUFACTURER'S SPECIFICATIONS.

FILENAME: X:\1999_CTDOT_STANDARDS\Traffic\Bx11_PLANS\EXTENSION_BRACKETS\TR_DET_EXT_BRACKET.dgn MODEL: VIDEO

ITEM #1114201A - AUXILIARY EQUIPMENT CABINET

Description:

Furnish and install an Auxiliary Equipment Cabinet (AEC), on a traffic control cabinet at the location shown on the plans and in accordance with the conditions set forth.

Materials:

- Conform to NEMA 3R enclosure specifications
- Type 5052-H32, 3.175mm (0.125") sheet aluminum
- Finish painted in accordance with the current D.O.T. specifications of Traffic Control Cabinets
- Seams continuously welded and ground smooth
- Dimensions as shown on D.O.T. **Standard** Sheets
- Door secured with Corbin lock - Ct. # 2.
- Continuous door hinge, 2.4mm (0.093") thick aluminum with 0.64mm (0.025") stainless steel hinge pin
- Door sealed with oil resistant gasket
- Back panel approximately 330mmH X 229mmW (13"H X 9"W)
- Rust and corrosion resistant mounting hardware
- Screened Vent

Construction Methods:

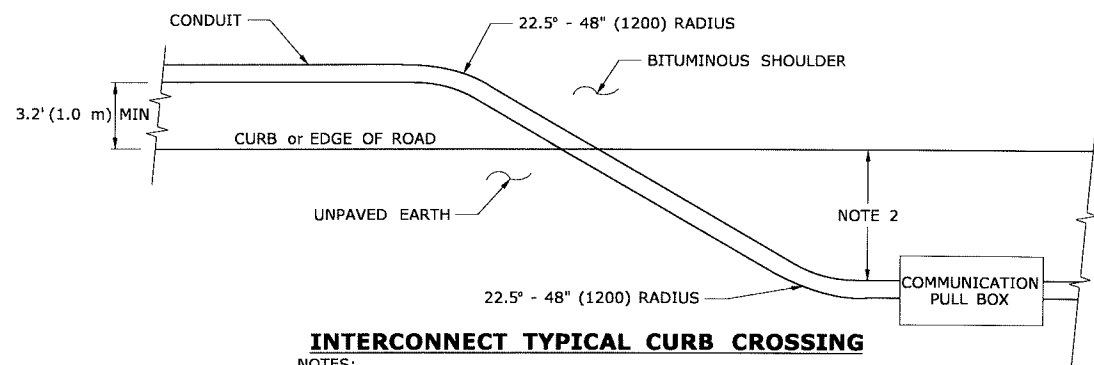
Mount the AEC on the left side of the controller cabinet, when facing the door. Confirm that the inside of the cabinet wall is clear, so that the installation of the AEC will not damage any equipment inside the controller cabinet. Drill a 25mm (1") hole in the back of the AEC and through the side of the controller cabinet. Install a close nipple through the 25mm (1") hole. Apply clear silicon caulk to both ends of the close nipple. Tighten lock-nuts and fiber bushings. Apply additional caulk if necessary to prevent moisture from entering controller cabinet and auxiliary equipment cabinet.

Method of Measurement:

This item shall be measured for payment by the actual number of Auxiliary Equipment Cabinets installed and accepted on traffic control cabinets.

Basis of Payment:

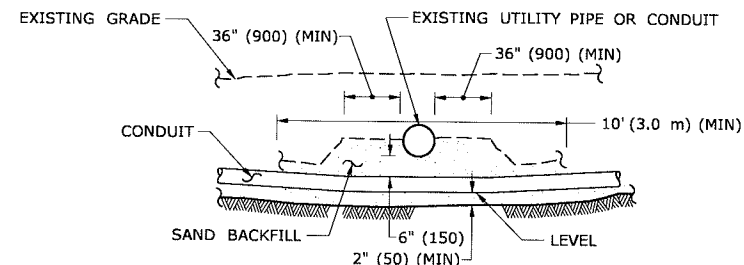
This item shall be paid for at the contract unit price each for "Auxiliary Equipment Cabinet" which price shall include mounting hardware, close nipple, insulated bushings, tools, and incidentals.



INTERCONNECT TYPICAL CURB CROSSING

NOTES:

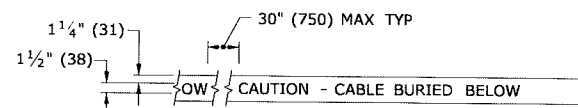
1. RESTORE AREAS DISTURBED BY TRENCH TO ORIGINAL CONDITION.
2. INSTALL PULL BOX A MINIMUM OF 10' (3.0 m) FROM CURB UNLESS OTHERWISE SHOWN ON PLANS OR DIRECTED BY ENGINEER.



CROSSING UNDER EXISTING UTILITY

NOTES:

1. WHEN ENCOUNTERED AT APPROXIMATELY THE SAME DEPTH, CROSS BENEATH.
2. PROTECT & SUPPORT EXPOSED EXISTING UTILITY.



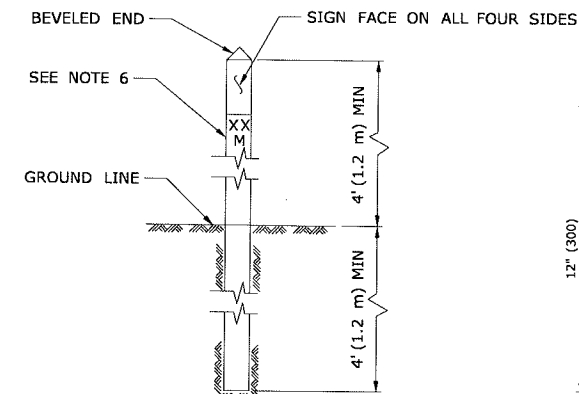
DETECTABLE WARNING TAPE

NOTE:

STANDARD SPECIFICATIONS, ARTICLE: 1.05.15

1. TAPE COLORS:

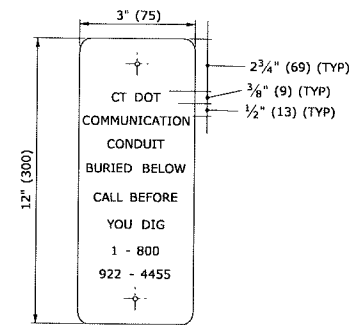
- COMMUNICATION - ORANGE BACKGROUND / BLACK LEGEND
- POWER - RED BACKGROUND / BLACK LEGEND



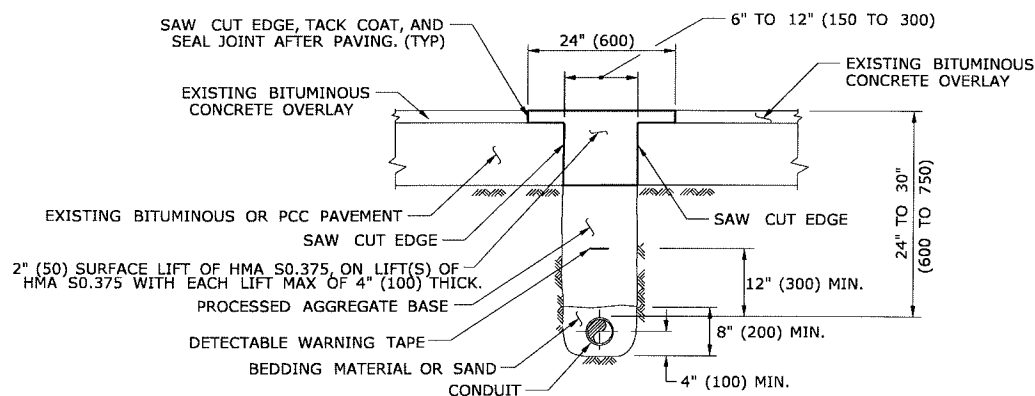
INTERCONNECT CONDUIT IDENTIFICATION POST

NOTES:

1. 4" x 4" (100 x 100) NOMINAL, PRESSURE TREATED WOOD POST.
2. ATTACH SIGN TO POST WITH 1/4" x 1 1/4" (6 x 31) STAINLESS STEEL LAG SCREW WITH NYLON WASHER ON FACE OF SIGN.
3. SIGN COLORS: BACKGROUND - ORANGE (RETROREFLECTIVE) LEGEND - BLACK (OPAQUE).
4. INSTALL POST APPROX 24" (600) FROM RMC IN VICINITY OF EACH PULL BOX.
5. INSTALL POSTS BETWEEN PULL BOXES, APPROX 10' (3.0 m) OFF CURB. SPACE POSTS 1500± (460 m±) APART.
6. PERMANENTLY ATTACH STAINLESS STEEL NUMBERS INDICATING DISTANCE TO TRENCH IN FEET (METERS) CONTAINING COMMUNICATION CABLE. ATTACH NUMBERS TO SIDE OF POST FACING SIGN. INCLUDE "M" SUFFIX IF METERS.



SIGN FACE DETAIL
SIGN # 41-4669

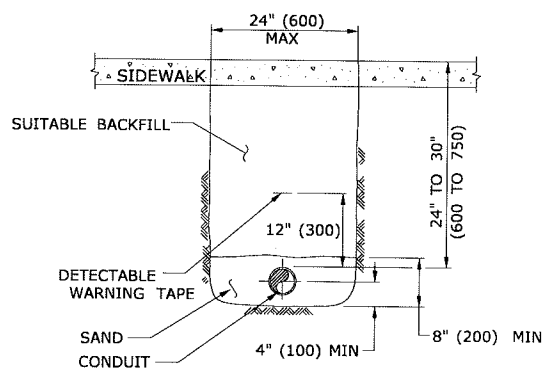


PAVEMENT - BITUMINOUS CONCRETE OR OVERLAVED PORTLAND CEMENT CONCRETE

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 3.04 & 4.06.03

1. TOTAL HOT MIX ASPHALT (HMA) THICKNESS TO MATCH EXISTING BITUMINOUS CONCRETE AND PORTLAND CEMENT CONCRETE (PCC) THICKNESS.
2. WHEN ALLOWED BY ENGINEER, USE CONTROLLED LOW STRENGTH MATERIAL (CLSM) AS BEDDING MATERIAL. TOP OF CLSM AT LEAST 20" (500) BELOW SURFACE.

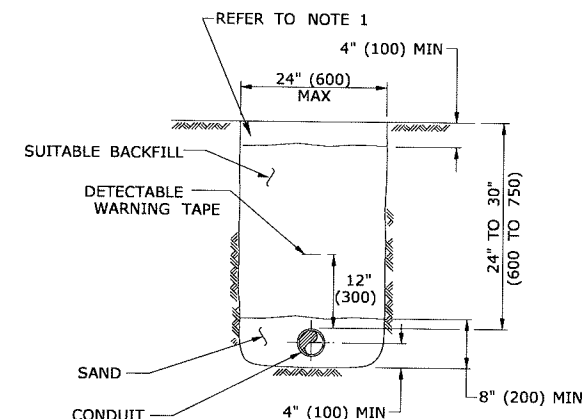


SIDEWALK

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.21 & 9.22

1. WHERE CONCRETE SIDEWALK DAMAGED OR CUT, REPLACE THE ENTIRE SECTION BETWEEN JOINTS. REPLACEMENT SIDEWALK IS PAID FOR AT THE CONTRACT UNIT PRICE FOR "CONCRETE SIDEWALK".



EARTH

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.50

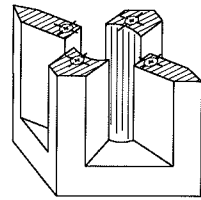
1. IN MOWED AREAS: PLACE TOPSOIL, FERTILIZER, SEED, & MULCH.

GENERAL NOTES:

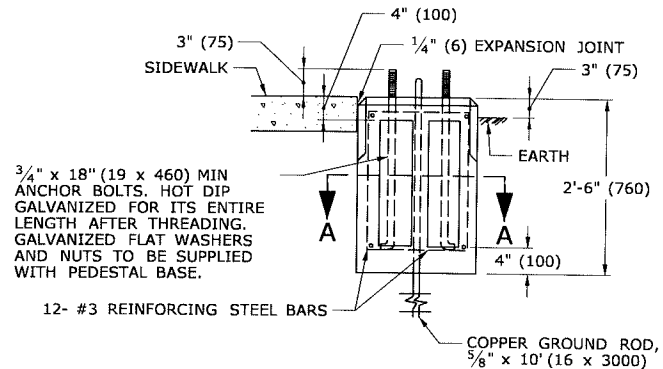
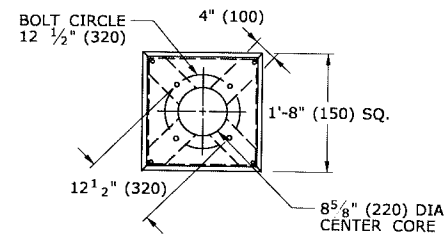
1. TOP OF CONDUIT NO LESS THAN 24" (600) DEEP.
2. COMPACT BACKFILL IN ≤ 6" (150) LIFTS. HAND COMPACTION NOT PERMITTED.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:
--- RMC (RIGID METAL CONDUIT)

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm. - UNDER 1" TO NEAREST 1 mm.				SUBMITTED BY: NAME/DATE/TIME: <i>Tracy L. Fogarty</i> Tracy L. Fogarty 2012.05.01 12:54:42-04'00'		STANDARD SHEET TITLE: CTDOT STANDARD SHEET TRENCHING & BACKFILLING, ELECTRICAL CONDUIT		STANDARD SHEET NO.: TR-1001_01	
NOT TO SCALE		FILENAME: CTDOT.TRAFFIC_STD.dgn MODEL: TR-1001_01		APPROVED BY: NAME/DATE/TIME: Timothy M. Wilson 2012.05.09 10:23:34-04'00'		OFFICE OF ENGINEERING					
1 4-2012 REVISED BITUMINOUS CONCRETE TO HMA, & MINOR REVISIONS.		REVISION DESCRIPTION		REV. DATE		Plotted Date: 4/14/2012					



PICTORIAL SECTION A-A



3/4" x 18" (19 x 460) MIN ANCHOR BOLTS. HOT DIP GALVANIZED FOR ITS ENTIRE LENGTH AFTER THREADING. GALVANIZED FLAT WASHERS AND NUTS TO BE SUPPLIED WITH PEDESTAL BASE.

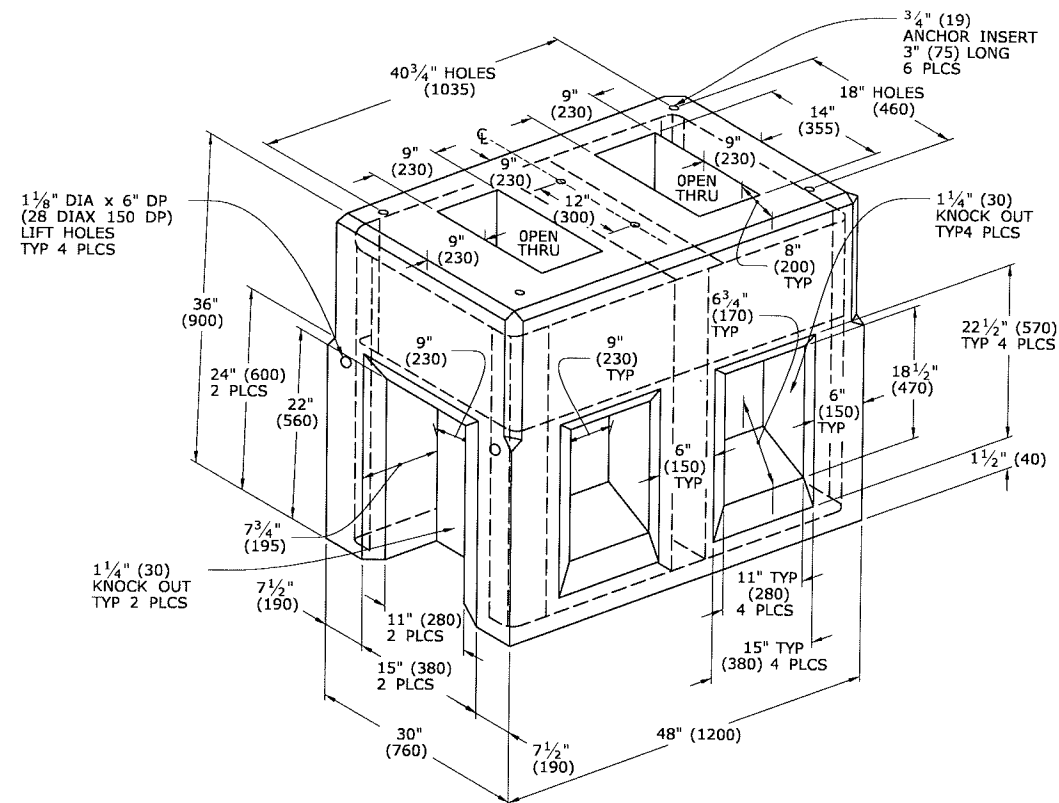
12- #3 REINFORCING STEEL BARS

COPPER GROUND ROD, 5/8" x 10' (16 x 3000)

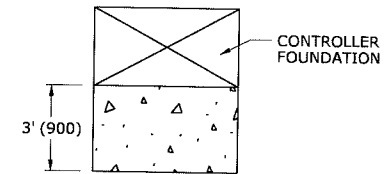
TRAFFIC CONTROL FOUNDATION PEDESTAL - TYPE I - PRECAST

NOTES:

PLACE NO. 6 CRUSHED STONE IN CENTER OPENING AFTER CONDUITS AND GROUND ROD HAVE BEEN INSTALLED.

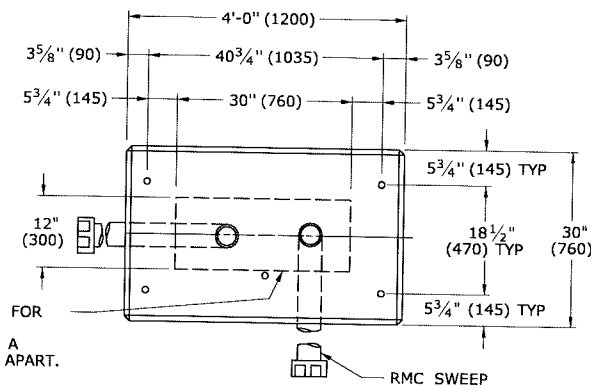


TRAFFIC CONTROL FOUNDATION CONTROLLER - TYPE IV - PRECAST

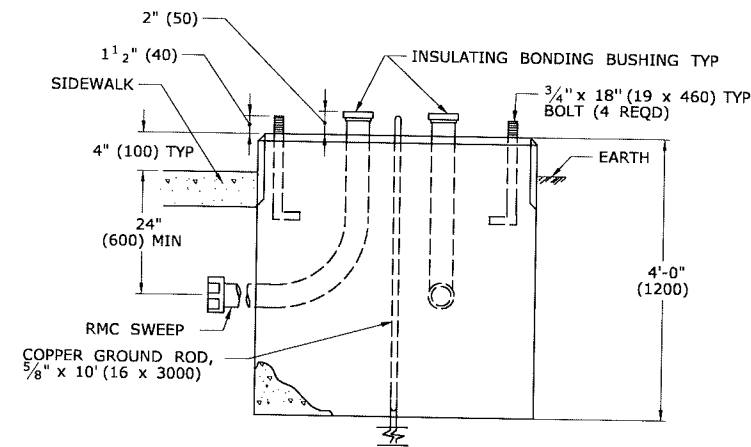


INSTALL PRECAST OR CAST IN PLACE CONCRETE SIDEWALK ON CABINET DOOR SIDE OF CONTROLLER FOUNDATION. PITCH SIDEWALK 1/4" PER FOOT (20 PER METER) AWAY FROM THE CONTROLLER FOUNDATION. REFER TO HIGHWAY STANDARD SHEET HW-921.01 FOR SIDEWALK CONSTRUCTION.

TYPICAL CONCRETE SIDEWALK AT CONTROLLER FOUNDATION



AREA OF LIMITATION FOR CONDUIT SWEEPS. SEPARATE CONDUITS A MINIMUM OF 2" (50) APART.



TRAFFIC CONTROL FOUNDATION CONTROLLER - TYPE IV - CAST IN PLACE

NOTES:

INSTALL FOUNDATION ON 6" (150) OF COMPACTED GRAVEL IN ACCORDANCE WITH SECTION 2.14. LEVEL FOUNDATION WITH A PROJECTION OF 4" (100) ABOVE FINISHED GRADE. INSTALL COPPER GROUND ROD: 5/8" x 10' (16 x 3000). PLACE NO. 6 CRUSHED STONE IN THE CENTER OPENINGS AFTER THE CONDUITS AND GROUND ROD HAVE BEEN INSTALLED. THE OPENINGS SHALL BE CAPPED WITH A 2" (50) GROUT LEVEL WITH THE TOP OF THE FOUNDATION AND NEATLY FINISHED. THE GROUT SHALL CONFORM WITH THE REQUIREMENTS OF ARTICLE M.3.01-12. CONCRETE: CLASS "A" CONFORMING TO ARTICLE M.03.01. #4 REBAR 2" (50) MIN COVER AROUND ALL OPENINGS, 3-#4 REBARS IN EACH CORNER. CONDUITS SHALL NOT PROJECT MORE THAN 2" (50) ABOVE FOUNDATION.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:	
	PROPOSED CONTROLLER
	EXISTING CONTROLLER
	PROPOSED STEEL SPAN POLE
	EXISTING STEEL SPAN POLE

REV.	DATE	REVISION DESCRIPTION
2	1-2014	REMOVED SPAN POLE FOUNDATION DETAILS, REVISED TYPICAL CONCRETE SIDEWALK AT CONTROLLER FOUNDATION.
1	4-2012	MINOR REVISIONS.

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DIMENSIONS ARE IN ENGLISH ("') & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm. - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE



Filename: CTDOT_TRAFFIC_STD.DGN Model: TR-1002_01

SUBMITTED BY:	NAME/DATE/TIME:
	Tracy L. Fogarty 2014.01.07 16:12:06-05'00'
APPROVED BY:	NAME/DATE/TIME:
	Charles S. Harlow 2014.01.08 09:02:54-05'00'

CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

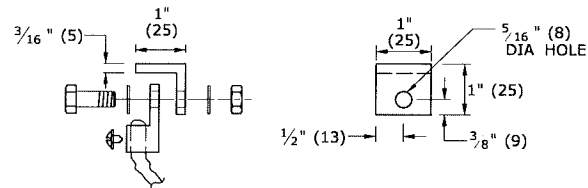
STANDARD SHEET TITLE:
TRAFFIC CONTROL FOUNDATIONS

STANDARD SHEET NO.:

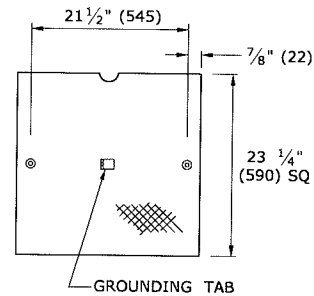
TR-1002_01

COVER NOTES:

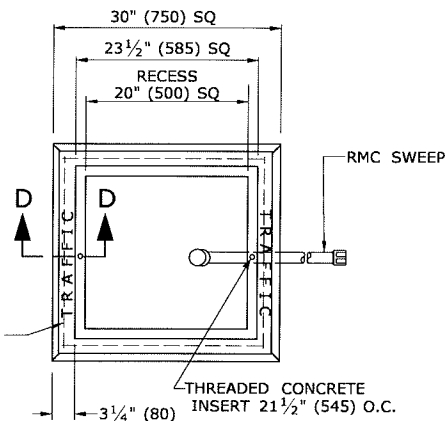
- GROUNDING TAB WELDED TO BOTTOM CENTER OF COVER WITH 3/16" (5) WELD (3 SIDES).
- ATTACH 6' (2 m) LENGTH OF NO. 8 GROUND WIRE TO GROUNDING TAB WITH CONDUCTOR CONNECTOR, 1/4" - 20 X 3/4" (M6 X 20) LG SST HEX HEAD BOLT, AND SST FLAT WASHER. ATTACH FREE END OF GROUND WIRE TO CONDUIT BONDING BUSHING IN HANDHOLE.
- CONDUCTOR CONNECTOR: COPPER ALLOY BODY, BRASS SCREW, BRASS OR COPPER ALLOY PRESSURE PLATE.
- COVER SCREW INSERT: 3/8"-16 (9-16), 1 1/2" L (37L), STAINLESS STEEL.
- COVER SCREW: 3/8"-16 (9-16), 1" L (25L), FLAT HEAD, SLOTTED, STAINLESS STEEL.



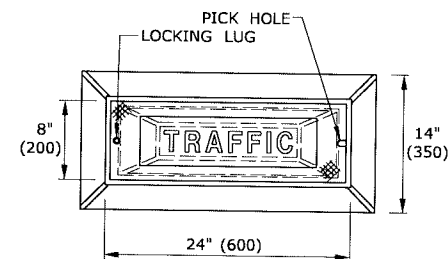
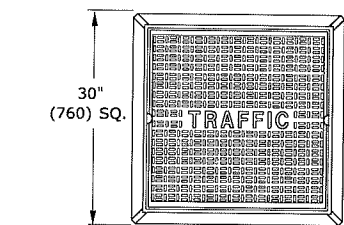
**STEEL GROUNDING TAB
w/ CONDUCTOR CONNECTOR**



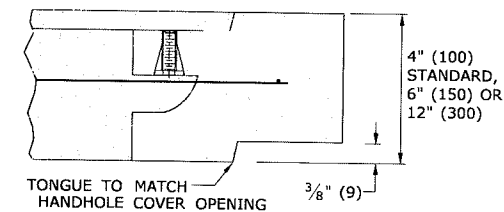
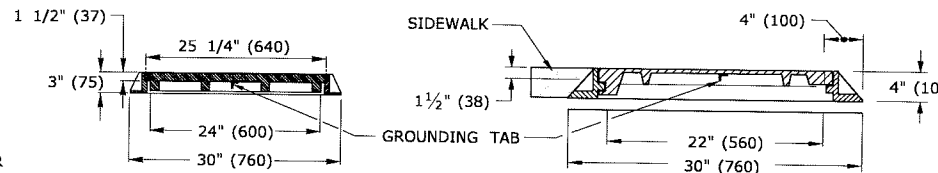
**NON SKID FLOOR PLATE
GALVANIZED STEEL, 3/8" (10)**



PLAN VIEW



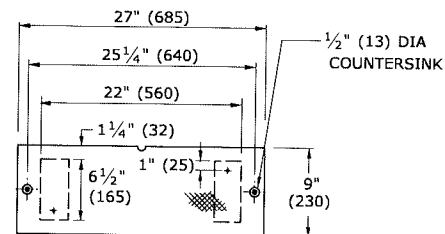
**CAST IRON
HANDHOLE COVERS**



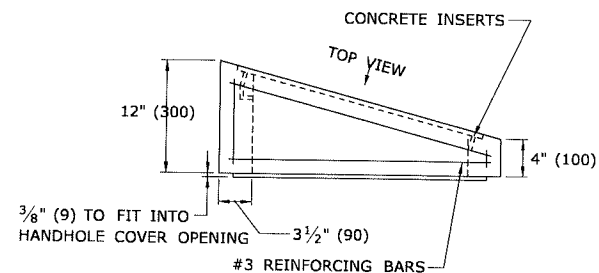
**SECTION A-A
HANDHOLE EXTENSIONS**
4 - #8 REINFORCING BARS REQ'D

HANDHOLE NOTES:

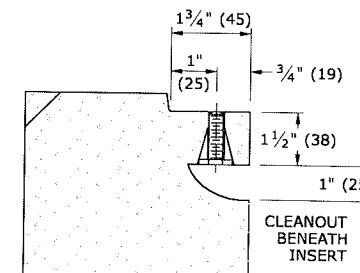
- MINIMUM CLASS "C" CONCRETE.
- COMPLETE TYPE II HANDHOLE:
IN EARTH AREAS, CONSISTS OF A BASE SECTION WITH 4" (100) HANDHOLE EXTENSION, IN SIDEWALK AREAS, CONSISTS OF A BASE SECTION WITH 4" (100) CAST IRON COVER.
- PLAN VIEW DIMENSIONS, SECTION VIEW, & DETAILS, SAME FOR BASE SECTION, EXTENSIONS & BANK ADAPTER.
- GROUT AROUND ALL CONDUITS.



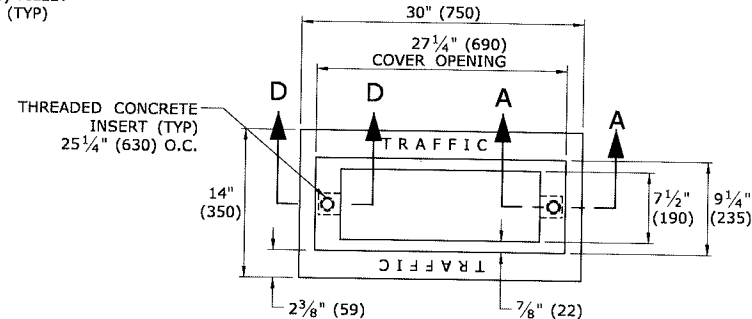
C-CHANNEL 0.250" (13), A-36



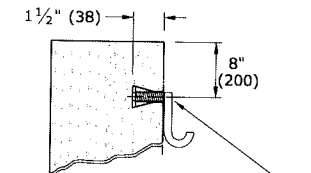
BANK ADAPTER



SECTION D-D

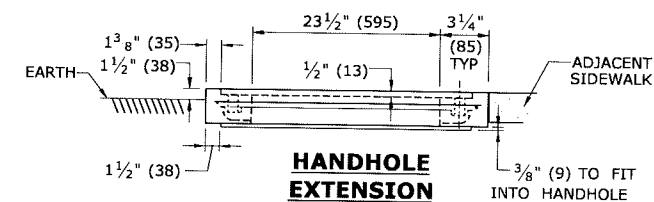


PLAN VIEW

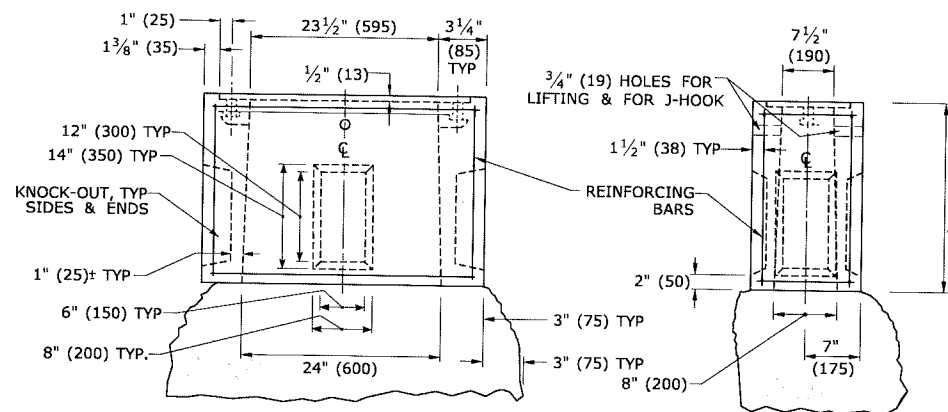


INSERT DETAIL

TYP IN TWO PLACES FOR ALL HANDHOLES



**HANDHOLE
EXTENSION**



**BASE SECTION
CONCRETE HANDHOLE TYPE II**

- INSTALL 30" (750) SIDE PARALLEL TO ROAD UNLESS OTHERWISE NOTED.
- INSTALL HANDHOLES APPROX. 12" (300) BEHIND CURB OR IF NO CURB, 24" (600) BEHIND EDGE OF ROAD UNLESS OTHERWISE SPECIFIED.
- CAST THE WORD "TRAFFIC" INTO TOP EDGE OF HANDHOLE, 1 1/2" (38) LETTERS.
- WHERE AN EXISTING CONCRETE SIDEWALK SLAB ABUTTING A HANDHOLE IS DAMAGED OR CUT DURING INSTALLATION, REPLACE THE ENTIRE SIDEWALK SECTION.
- 12-#3 REINFORCING BARS REQUIRED FOR ALL HANDHOLES. (8 HORIZONTAL, 4 VERTICAL)

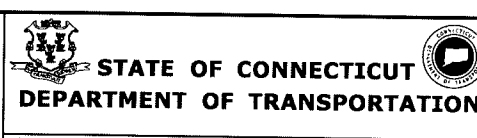
LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

- PROPOSED HANDHOLE
- EXISTING HANDHOLE

REV.	DATE	REVISION DESCRIPTION
2	4-2014	REVISED HANDHOLES NOTES, ADDED NOTE #6. ADDED 'J' HOOK TO INSERT DETAIL.
1	4-2012	CAST IRON COVER: CHANGED BOLT TO PICK HOLE. ADDED EXTENSIONS, C-CHANNEL, CONDUCTOR CONNECTOR & MINOR REVISIONS.

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DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm).
OVER 1" TO NEAREST 5 mm
UNDER 1" TO NEAREST 1 mm.



SUBMITTED BY: *Tracy L. Fogarty* NAME/DATE/TIME: Tracy L. Fogarty, P.E. 2014.04.25 16:01:09-04'00'

APPROVED BY: NAME/DATE/TIME: Digitally signed by Charles S. Harlow, P.E. Date: 2014.04.29 14:26:25-04'00'

**CTDOT
STANDARD SHEET**

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: **CONCRETE HANDHOLE**

STANDARD SHEET NO.: **TR-1010_01**

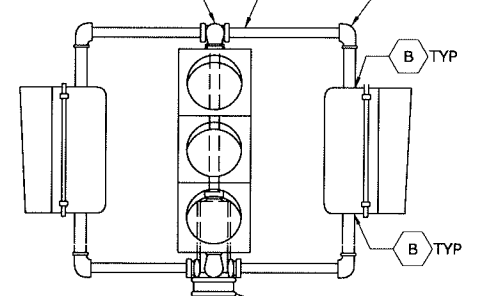
Plotted Date: 4/11/2014

NOT TO SCALE

Filename: CTDOT-TRAFFIC-STD.DGN Model: TR-1010.01

1 1/2" (38) SSIDE
OUTLET TEE, IRON, TYP

1 1/2" (38) NIPPLE, STEEL, TYP

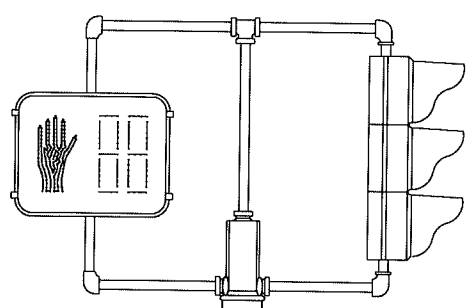


SERRATED ELL, IRON, TYP

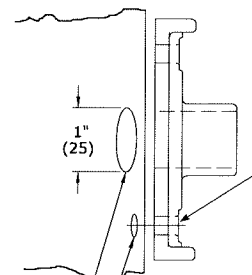
B TYP

B TYP

POST TOP MOUNTED
ADAPTER WITH TERMINAL
COMPARTMENT, IRON



POST TOP MOUNTED
ADAPTER WITH TERMINAL
COMPARTMENT, IRON



INDENT, TO HOLD
BANDING IN PLACE. (TYP)

DRILL, INSTALL SET
SCREW OR PIN

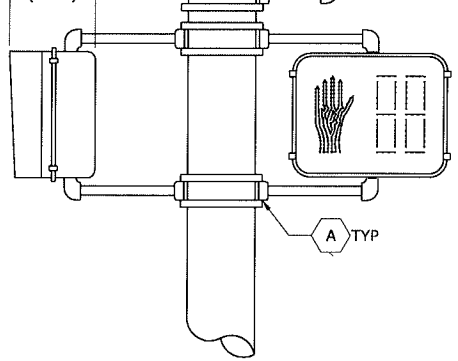
DRILL & DEBURR

A DETAIL

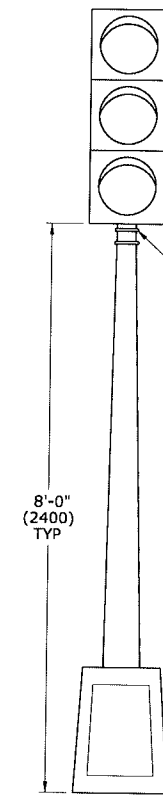
3/4" (19) STAINLESS
STEEL BANDING AND BUCKLE, TYP

1 1/2" (38) HUB PLATE, IRON
TOP AND BOTTOM, TYP

10"±
(250±)



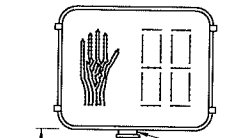
A TYP



POST TOP MOUNTED
ADAPTER, IRON

8'-0"
(2400)
TYP

**ONE WAY TRAFFIC SIGNAL
PEDESTAL MOUNTED**



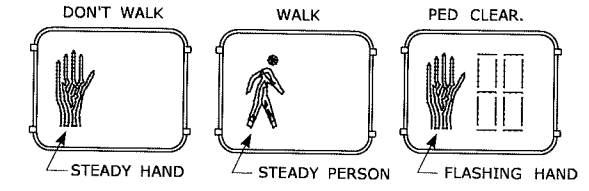
FILL TOP OF PEDESTAL WITH
EXPANSION AEROSOL FOAM
AFTER WIRES HAVE BEEN
INSTALLED.

POST TOP MOUNTED
ADAPTER, IRON

8'-0"
(2400)
TYP

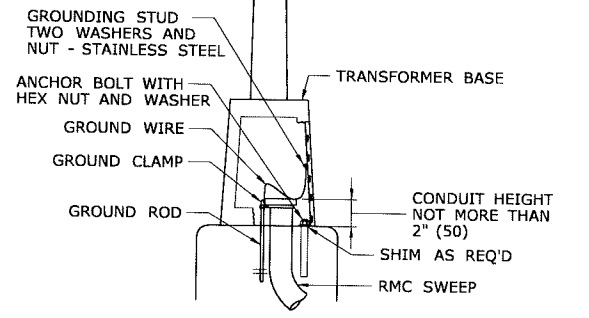
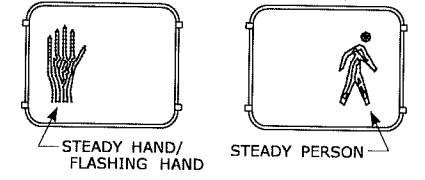
NOTE:
PEDESTAL MOUNTED ONE WAY VEHICLE
SIGNAL SHALL BE MOUNTED SAME AS
ONE WAY WALK SIGNAL.

**ONE WAY WALK SIGNAL
PEDESTAL MOUNTED**

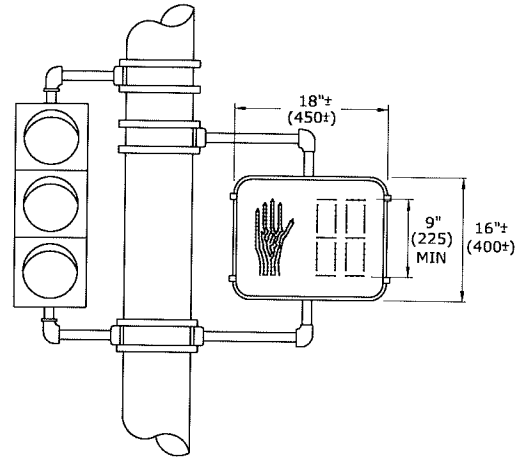


TYPICAL INDICATION WHEN LIT

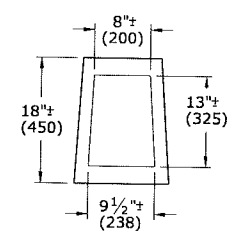
NON-COUNTDOWN DISPLAY, ONLY WHEN SHOWN ON PLAN.
DON'T WALK/PED CLEAR.



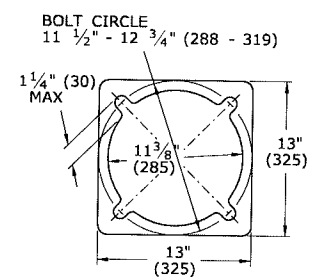
**ALUMINUM PEDESTAL
INSTALLATION DETAIL**



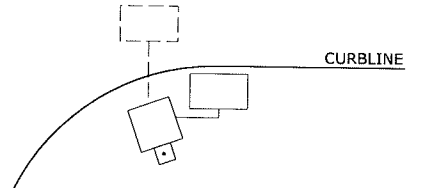
**ONE WAY TRAFFIC SIGNAL
POLE MOUNTED**



**ALUMINUM PEDESTAL
DOOR OPENING DETAIL**



PEDESTAL BASE PLAN



WHEN PEDESTALS OR SPAN POLES ARE INSTALLED CLOSE TO THE CURB,
SIDE MOUNT PEDESTRIAN OR TRAFFIC SIGNALS TO AVOID VISOR DAMAGE
FROM TURNING VEHICLES.

- NOTES:
- A SECURE LOWER HUB PLATE WITH STAINLESS STEEL SET SCREW OR PIN PRIOR TO BANDING TO PREVENT MOVEMENT. INSTALL CABLE THROUGH BOTTOM OF HUB PLATE.
 - B REFER TO CTDOT TRAFFIC STANDARD SHEET, TR-1105.01, TRAFFIC SIGNALS & CABLE ASSIGNMENTS.
 - C IF THREADED, MIN 1" (25) THREADED INTO BASE, SECURED WITH STAINLESS STEEL SET SCREWS.
 - D BASE DESIGNED AS BREAK-AWAY.

INCANDESCENT WALK SIGNAL LAMPS ARE 67 WATTS, RATED AT 8000 HOURS LAMP LIFE.
LED WALK SIGNAL LAMPS ARE MAXIMUM 15 WATTS, WARRANTED AT 5 YEAR LIFE.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:		□	PEDESTRIAN SIGNAL
□		□	PEDESTAL MOUNTED, TRAFFIC & PEDESTRIAN SIGNALS
□		□	ALUMINUM PEDESTAL
□		□	POLE MOUNTED, TRAFFIC & PEDESTRIAN SIGNALS
□		□	TRAFFIC SIGNAL

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- OVER 1" TO NEAREST 5 mm
- UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: *Tracy L. Fogarty* NAME/DATE/TIME: Tracy L. Fogarty 2012.05.01 12:55:27-04'00'

APPROVED BY: *Timothy M. Wilson* NAME/DATE/TIME: Timothy M. Wilson 2012.05.09 10:24:58-04'00'

**CTDOT
STANDARD SHEET**

OFFICE OF ENGINEERING

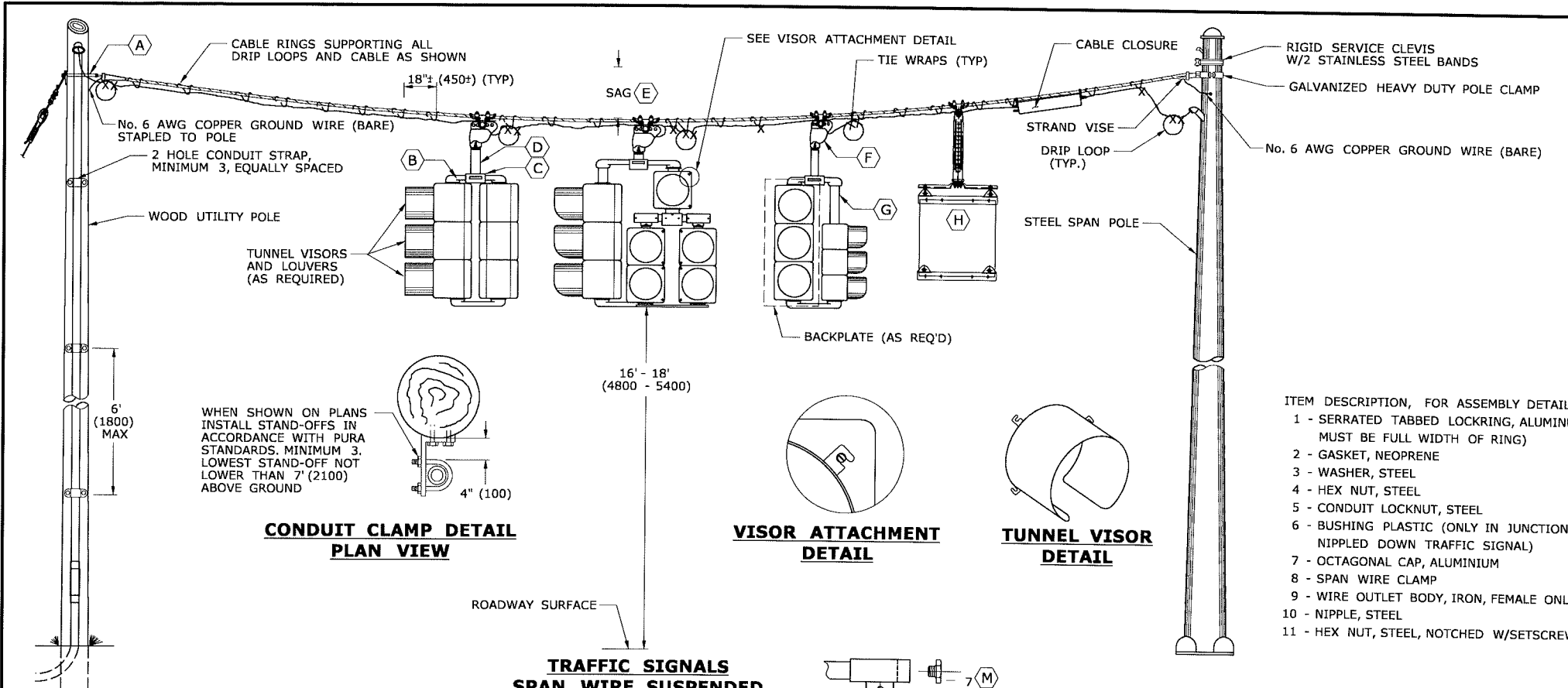
STANDARD SHEET TITLE:
PEDESTALS, PEDESTRIAN SIGNALS

STANDARD SHEET NO.:
TR-1102_01

2	4-2012	MINOR REVISIONS.
1	1-2010	INCLUDED COUNTDOWN PEDESTRIAN SIGNALS.
REV.	DATE	REVISION DESCRIPTION

Plotted Date: 4/14/2012

Filename: CTDOT_TRAFFIC_STD.dgn Model: TR-1102_01



TRAFFIC SIGNAL CABLE COLOR ASSIGNMENTS					
SIGNAL ASSEMBLY & CABLE USED	SIGNAL FUNCTION	ARTERY 1	ARTERY 2	SIDE STREET 1	SIDE STREET 2
2 - WAY 9 CONDUCTOR	RED	RED		BLACK	
	YELLOW	ORANGE		WHITE \ BLACK	
	GREEN	GREEN		BLUE	
	SPARE	GREEN\BLACK		RED \ BLACK	
	NEUTRAL	WHITE			
3 - WAY 12 CONDUCTOR	RED	RED	RED \ BLACK	BLACK	
	YELLOW	ORANGE	ORANGE \ BLACK	WHITE \ BLACK	
	GREEN	GREEN	GREEN \ BLACK	BLUE	
	SPARE	BLUE\BLACK	BLACK \ WHITE		
	NEUTRAL	WHITE			
4 - WAY 15 CONDUCTOR	RED	RED	RED \ BLACK	BLACK	RED \ WHITE
	YELLOW	ORANGE	ORANGE \ BLACK	WHITE \ BLACK	BLACK \ WHITE
	GREEN	GREEN	GREEN \ BLACK	BLUE	GREEN \ WHITE
	SPARE	BLUE\BLACK		BLUE \ WHITE	
	NEUTRAL	WHITE			

WHEN SHOWN ON PLANS INSTALL STAND-OFFS IN ACCORDANCE WITH PURA STANDARDS. MINIMUM 3. LOWEST STAND-OFF NOT LOWER THAN 7" (2100) ABOVE GROUND

**CONDUIT CLAMP DETAIL
PLAN VIEW**

**VISOR ATTACHMENT
DETAIL**

**TUNNEL VISOR
DETAIL**

- ITEM DESCRIPTION, FOR ASSEMBLY DETAILS
- 1 - SERRATED TABBED LOCKRING, ALUMINUM (TAB MUST BE FULL WIDTH OF RING)
 - 2 - GASKET, NEOPRENE
 - 3 - WASHER, STEEL
 - 4 - HEX NUT, STEEL
 - 5 - CONDUIT LOCKNUT, STEEL
 - 6 - BUSHING PLASTIC (ONLY IN JUNCTION BOX OR NIPPLED DOWN TRAFFIC SIGNAL)
 - 7 - OCTAGONAL CAP, ALUMINIUM
 - 8 - SPAN WIRE CLAMP
 - 9 - WIRE OUTLET BODY, IRON, FEMALE ONLY
 - 10 - NIPPLE, STEEL
 - 11 - HEX NUT, STEEL, NOTCHED W/SETSCREWS

PEDESTRIAN SIGNAL CABLE COLOR ASSIGNMENTS		
SIGNAL ASSEMBLY & CABLE USED	SIGNAL FUNCTION	WIRE COLOR
WALK SIGNAL W/ PUSHBUTTON 7 CONDUCTOR	DON'T WALK	RED
	WALK	GREEN
	NEUTRAL FOR WALK SIGNAL	WHITE
	PEDESTRIAN PUSHBUTTON	BLACK
	NEUTRAL FOR PUSHBUTTON	ORANGE
WALK SIGNAL W/ PUSHBUTTON 7 CONDUCTOR	SPARE CONDUCTOR	WHITE \ BLACK
	SPARE CONDUCTOR *	BLUE \ BLACK
	RED	RED
	YELLOW	ORANGE
	GREEN	GREEN
7 CONDUCTOR	NEUTRAL FOR TRAFFIC SIGNAL	WHITE
	PEDESTRIAN PUSHBUTTON	BLACK
	NEUTRAL FOR PUSHBUTTON	WHITE \ BLACK
	SPARE CONDUCTOR *	BLUE \ BLACK

* IF 14/7 FEEDS MORE THAN ONE BUTTON, SPLIT THE BUTTONS AND USE BLUE WITH BLACK TRACER FOR THE ADDITIONAL BUTTON.

TABLE NOTES:

1. INSTALL SEPARATE CABLE BETWEEN CLOSURE AND EACH TRAFFIC SIGNAL ASSEMBLY. WIRE EACH TRAFFIC SIGNAL SECTION SEPARATELY BACK TO CABLE CLOSURE. JUMPERS BETWEEN TERMINALS ARE NOT ALLOWED EXCEPT ON NEUTRAL CONDUCTORS.
2. WIRE ALL SIGNALS, SAME DIRECTION FROM CONTROLLER, SEPARATELY WITH CONDUCTORS IN 21 CONDUCTOR CABLE, EVEN IF INDICATIONS ARE IDENTICAL.
3. CABLES THAT FEED PEDESTRIAN INDICATIONS, PUSH BUTTONS, AND DETECTORS BYPASS CABLE CLOSURE.
4. REFER TO STANDARD SHEET TR-1113.01 FOR CABLE CLOSURE - TYPE A.

NOTES:

- SERVICE CONDUCTORS: THW, THWN OR XHHW. INDIVIDUAL WIRES MAY BE USED IN LIEU OF MULTI-CONDUCTOR CABLE.
- ALL WORK ON UTILITY POLES MUST COMPLY WITH CURRENT PURA REGULATIONS AND NESC RULES.
- (A) ATTACH SPAN AT LEAST 12" (300) BELOW LOWEST POWER COMPANY ATTACHMENT, AND AT LEAST 40" (1000) ABOVE HIGHEST COMMUNICATIONS ATTACHMENT, UNLESS OTHERWISE DIRECTED ON PLANS.
 - (B) ELBOW OR "T" FITTING MUST HAVE NOTCH FOR SERRATED TABBED LOCKRING.
 - (C) TOP BRACKET CENTER HUB SHALL BE MIN 4" (100) ROUND AND 3" (75) DEEP OR EQUAL VOLUME. SERRATION CAST IN HUB OR TABBED OR SERRATED LOCKRING, TOP OPENING NOT THREADED.
 - (D) NIPPLE LENGTH DEPENDS ON SPAN HEIGHT.
 - (E) SAG OF SPAN TO BE 5%+ LENGTH, UNLESS OTHERWISE ALLOWED BY ENGINEER.
 - (F) FACE ALL ENTRANCE FITTINGS TOWARD CABLE CLOSURE UNLESS SIGNAL ASSEMBLY IS UNBALANCED AND A BALANCE ADJUSTER IS USED.
 - (G) INSTALL EXTENSION NIPPLE ON TOP OF SIGNAL HOUSING SO BOTTOM OF ALL SIGNALS ARE EVEN.
 - (H) REFER TO TYPICAL "SIGN FACE SHEET ALUMINUM, R-SERIES SIGNS", AND TO TR-1208.03 FOR SIGN HANGER ASSEMBLY. MAXIMUM SIGN SIZE 24" X 24" (600 X 600). ALL STAINLESS STEEL HARDWARE. SECURE LOUVERS TO TUNNEL VISORS WITH 3 STAINLESS STEEL SCREWS.

**TRAFFIC SIGNALS
SPAN WIRE SUSPENDED**

**SPAN WIRE HANGER
ASSEMBLY DETAIL**

**TWO WAY, THREE WAY
& FOUR WAY NIPPLE DOWN
ASSEMBLY DETAIL**

**UPPER CENTER
SUPPORT DETAIL**

DIRECT ASSEMBLY DETAIL

**3 BOLT
BRACKET ASSEMBLY**

**BOTTOM "T" BRACKET
FOR 2 WAY DOGHOUSE**

**BOTTOM BRACKET FOR
3 WAY DOGHOUSE**

○ PROPOSED WOOD SPAN POLE	● PROPOSED UTILITY POLE	— CABLE CLOSURE
◻ EXISTING WOOD SPAN POLE	◐ EXISTING UTILITY POLE	— SPAN MOUNTED SIGN
◼ PROPOSED STEEL SPAN POLE	◑ POLE ANCHOR & GUY	— SPAN MOUNTED TRAFFIC SIGNAL
◫ EXISTING STEEL SPAN POLE		

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NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

FILENAME: CTDOT_TRAFFIC_STD.DGN Model: TR-1105.01

SUBMITTED BY: NAME/DATE/TIME:
Tracy L. Fogarty Tracy L. Fogarty, P.E. 2015.05.05 12:30:30-04'00'

APPROVED BY: NAME/DATE/TIME:
Charles S. Harlow, P.E. 2015.05.12 15:26:44-04'00'

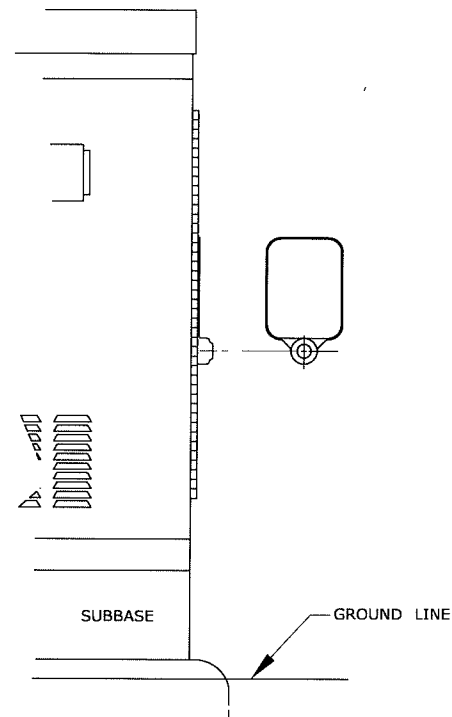
CTDOT
STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
**TRAFFIC SIGNALS
& CABLE ASSIGNMENTS**

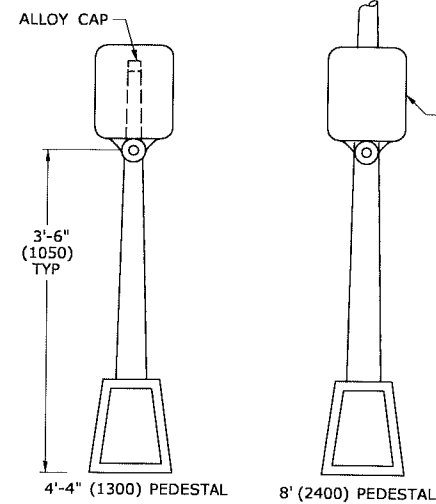
STANDARD SHEET NO.:
TR-1105_01

REV.	DATE	REVISION DESCRIPTION
3	3-2015	REMOVED STRAIN INSULATOR.
2	5-2013	MINOR REVISIONS.
1	4-2012	MINOR REVISIONS.

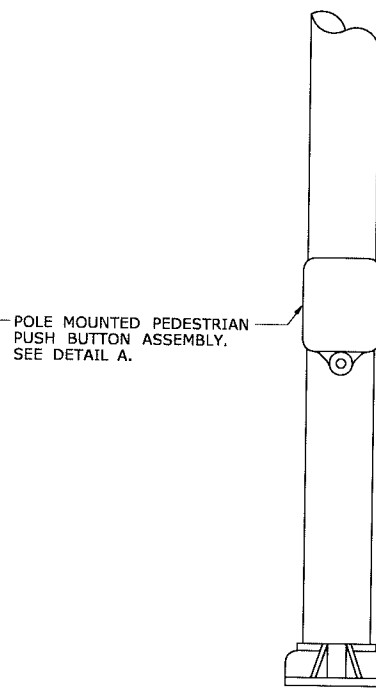
Plotted Date: 3/19/2015



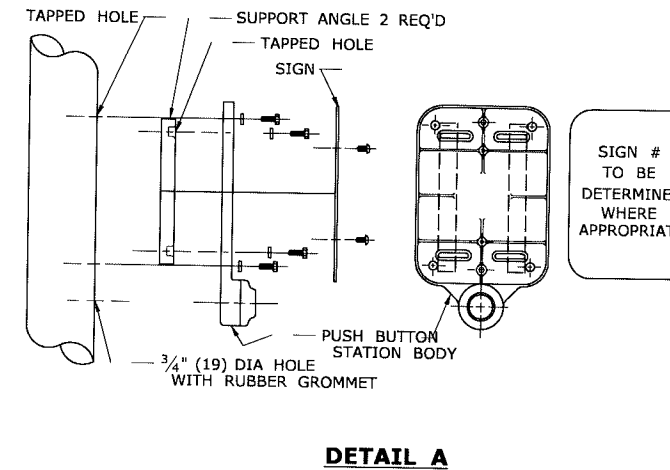
SURFACE MOUNTED



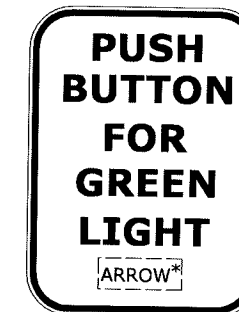
PEDESTAL MOUNTED



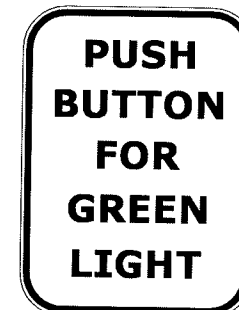
SPAN POLE/MAST ARM MOUNTED



DETAIL A



SIGN # 31-0833
* USE APPROPRIATE ARROW UNLESS OTHERWISE NOTED ON PLAN.

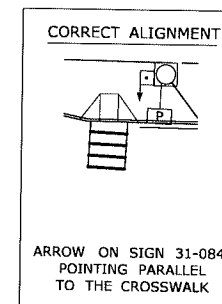


SIGN # 31-0835

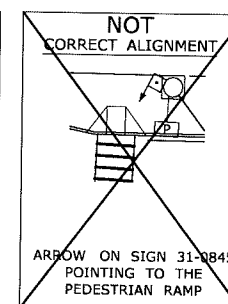
FOR CROSSING WITH SIDE STREET GREEN

GENERAL NOTES:

3'-6" (1050) FROM FINISHED GRADE SUCH AS SIDEWALK TO CENTER OF PUSH BUTTON.
 PUSH BUTTON INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN, CURRENT EDITION GOVERNS.
 4'-4" (1300) PEDESTAL TO INCLUDE ALLOY CAP SECURED WITH STAINLESS STEEL SET SCREW.

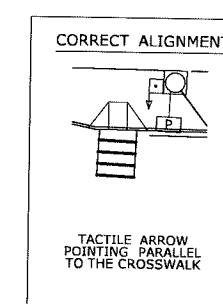


ARROW ON SIGN 31-0845 POINTING PARALLEL TO THE CROSSWALK

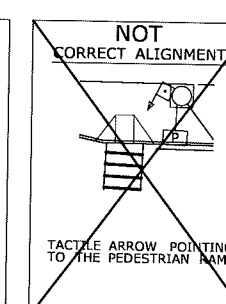


ARROW ON SIGN 31-0845 POINTING TO THE PEDESTRIAN RAMP

PEDESTRIAN PUSH BUTTON ALIGNMENT

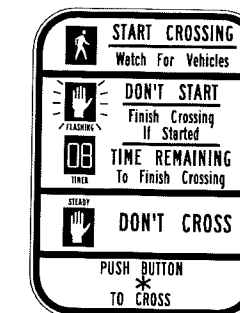


TACTILE ARROW POINTING PARALLEL TO THE CROSSWALK



TACTILE ARROW POINTING TO THE PEDESTRIAN RAMP

ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR



SIGN # 31-0845
* USE APPROPRIATE ARROW UNLESS OTHERWISE NOTED ON PLAN.

EXAMPLE ALIGNMENTS FOR EXCLUSIVE PEDESTRIAN PHASE

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

	PEDESTRIAN PUSH BUTTON
	PEDESTRIAN PUSH BUTTON, PEDESTAL MOUNTED
	PEDESTRIAN PUSH BUTTON, POLE MOUNTED

REV.	DATE	REVISION DESCRIPTION
2	4-2014	ADDED PEDESTRIAN EXAMPLE ALIGNMENTS
1	4-2012	MINOR REVISIONS & UPDATED SIGN #31-0845.

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 - OVER 1" TO NEAREST 5 mm
 - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT
 DEPARTMENT OF TRANSPORTATION

Submitted by: Tracy L. Fogarty, P.E.
 2014.04.25 16:01:49-04'00'

Approved by: Charles S. Harlow, P.E.
 Digitally signed by Charles S. Harlow, P.E.
 Date: 2014.04.29 14:27:01-04'00'

Filename: CTDOT_TRAFFIC_STD.DGN Model: TR-1107.01

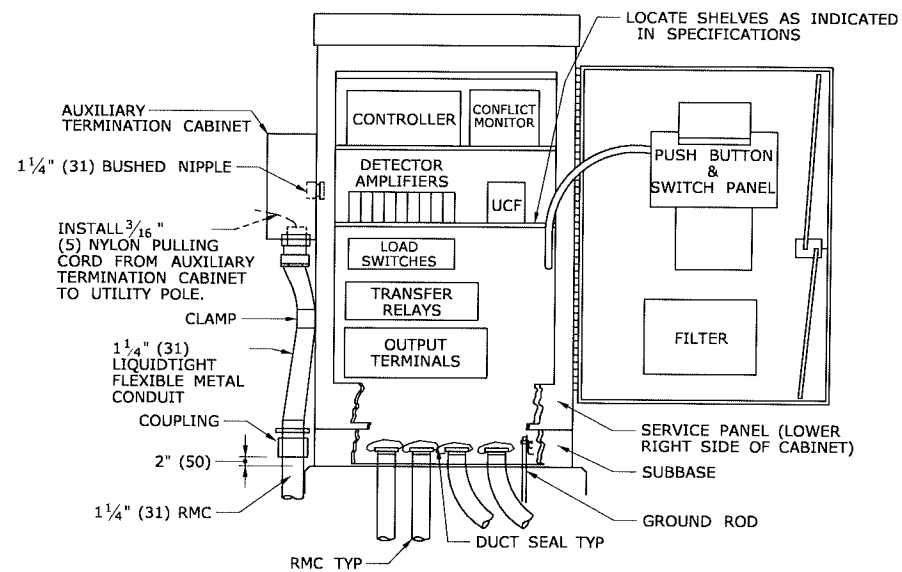
CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: PEDESTRIAN PUSH BUTTONS

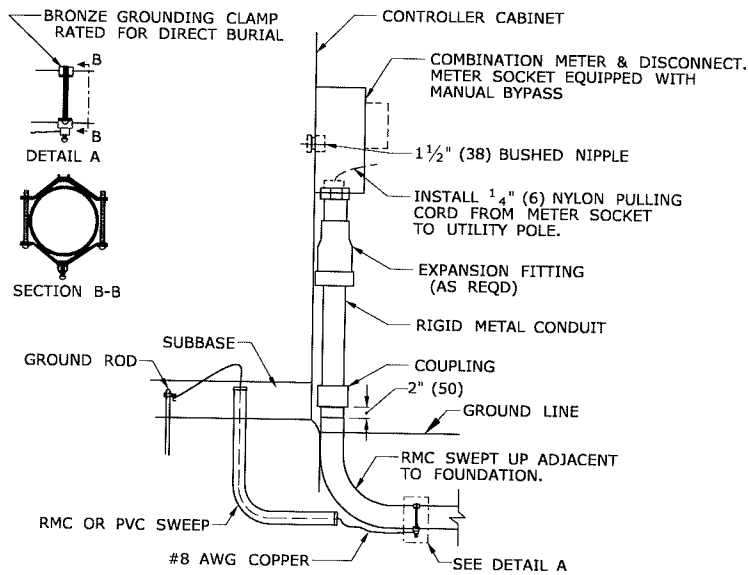
STANDARD SHEET NO.: TR-1107_01

Plotted Date: 4/25/2014

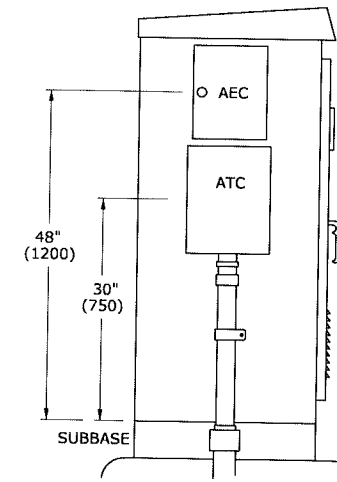


PROVIDE A MINIMUM CLEARANCE OF 6" (150) FROM THE CABINET BASE TO ALL COMPONENTS AND TERMINALS.

TYPICAL BASE MOUNTED CONTROLLER ON TYPE IV FOUNDATION



CONTROLLER CABINET WITH METERED SERVICE

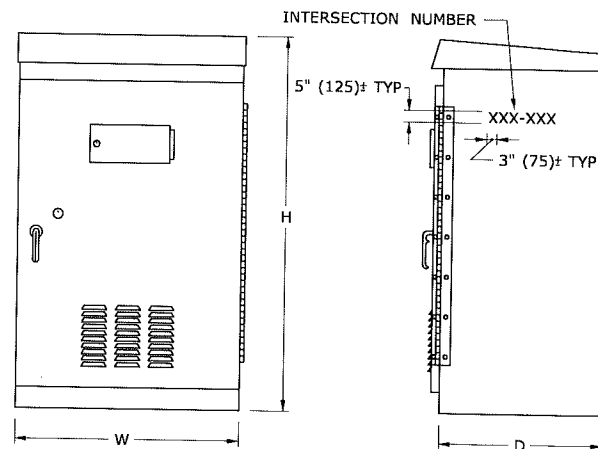


AUXILIARY EQUIPMENT CABINET (AEC) AUXILIARY TERMINATION CABINET (ATC)

CABINET TYPE	HEIGHT	WIDTH	DEPTH
ATC	16"(400)	12"(300)	6"(150)
AEC	14"(350)	11"(275)	11"(275)

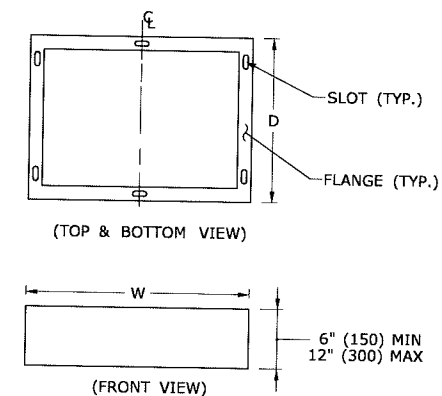
GENERAL NOTES:

- GROUT ALL BASES AFTER MOUNTING ON FOUNDATIONS, WHERE NECESSARY. 3'-0" (900) FROM SIDEWALK TO BOTTOM OF CONTROLLER.
- INSTALL PEDESTALS AND POLES SO THAT DOORS AND COVERS ARE ON THE SIDE AWAY FROM THE STREET, UNLESS OTHERWISE SPECIFIED.
- INSTALL CABINET SO THAT DOOR OPENS FIELD SIDE UNLESS OTHERWISE NOTED ON PLANS. CAULK SEAM BETWEEN SUBBASE AND FOUNDATION.
- STENCIL SIX DIGIT INTERSECTION NUMBER, USING BLACK PAINT ON SIDE, FRONT OR BACK OF CABINET MOST VISIBLE FROM THE ROAD.



BASE MOUNTED TRAFFIC CONTROLLER (TYPE B, D & E)

CABINET TYPE	DEPTH		WIDTH		HEIGHT	
	MIN	MAX	MIN	MAX	MIN	MAX
B	17" (425)	19" (475)	30" (750)	34" (850)	52" (1300)	56" (1400)
D	25" (625)	27" (675)	42" (1050)	45" (1125)	54" (1350)	59" (1475)
E	17" (425)	19" (475)	30" (750)	32" (800)	49" (1225)	52" (1300)



SUBBASE

SLOT AND FLANGE DIMENSIONS TO BE PER MANUFACTURER.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

	CONTROLLER ASSEMBLY
	AUXILIARY EQUIPMENT CABINET
	AUXILIARY TERMINATION CABINET

REV.	DATE	REVISION DESCRIPTION
2	5-2013	REVISED SUBBASE.
1	4-2012	REVISED CABINET TYPES & MINOR REVISIONS.

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Plotted Date: 5/15/2013

DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm. - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

FILENAME: CTDOT_TRAFFIC_STD.dgn Model: TR-1108_01

SUBMITTED BY: Tracy L. Fogarty 2013.07.29

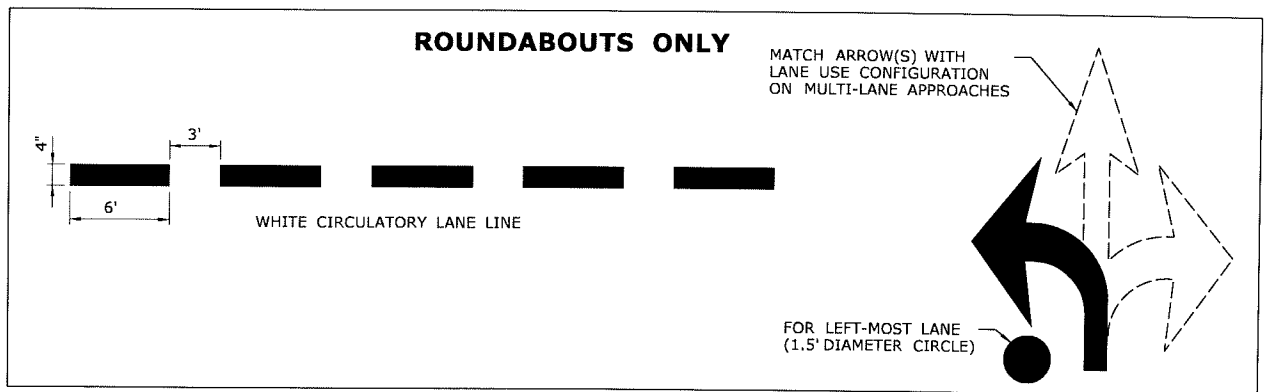
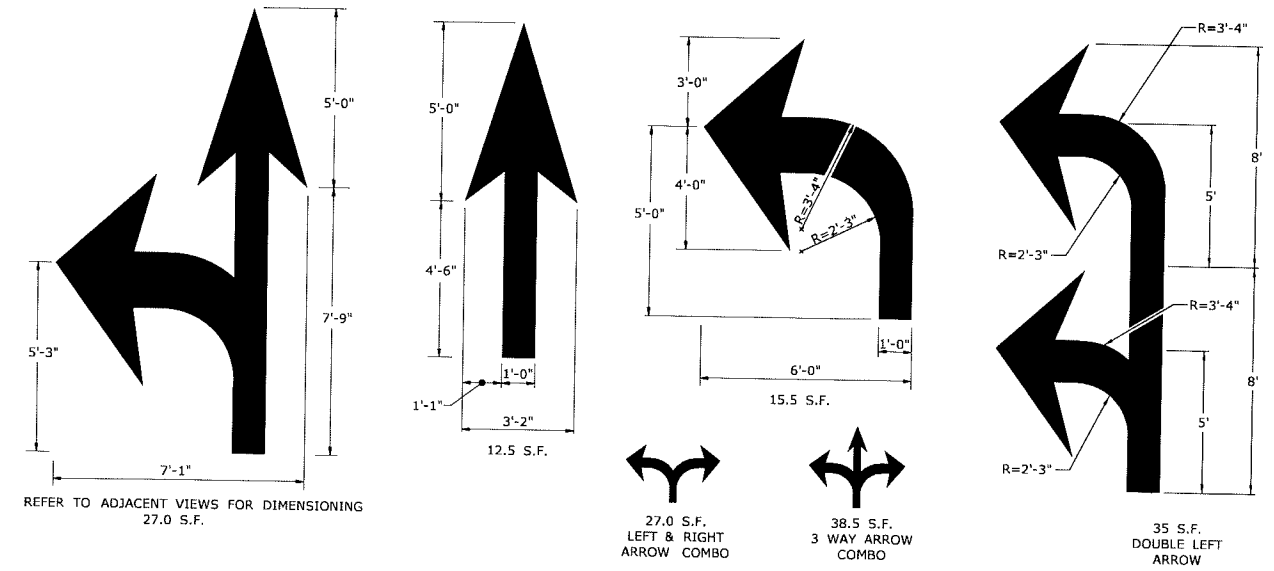
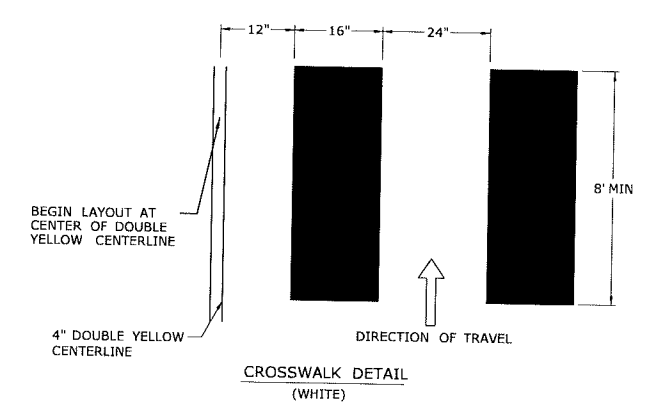
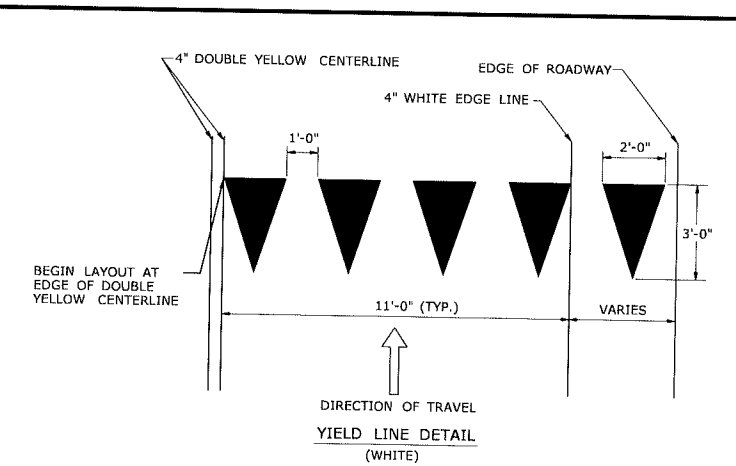
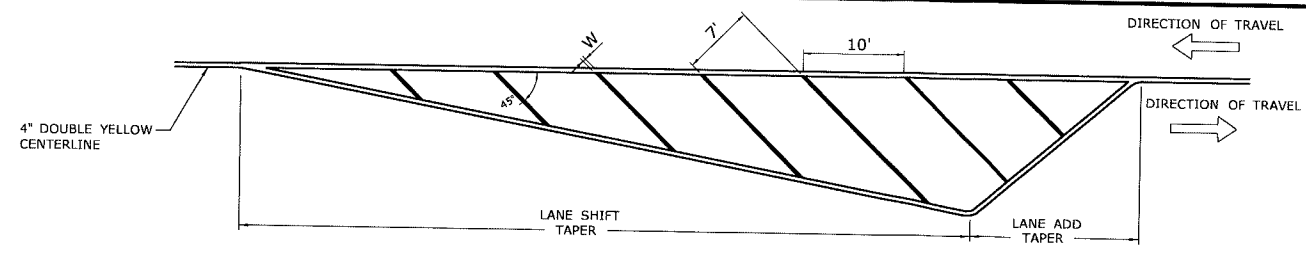
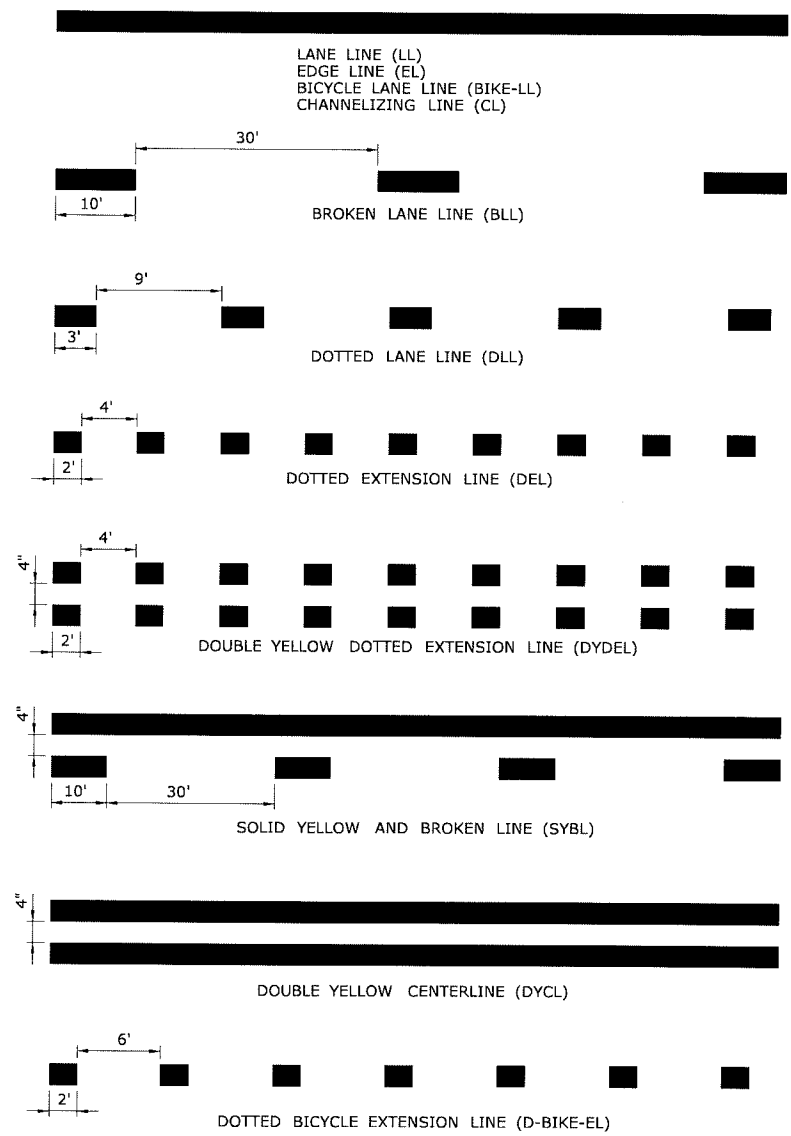
APPROVED BY: Charles S. Harlow 2013.07.29 14:59:45-04'00'

CTDOT STANDARD SHEET

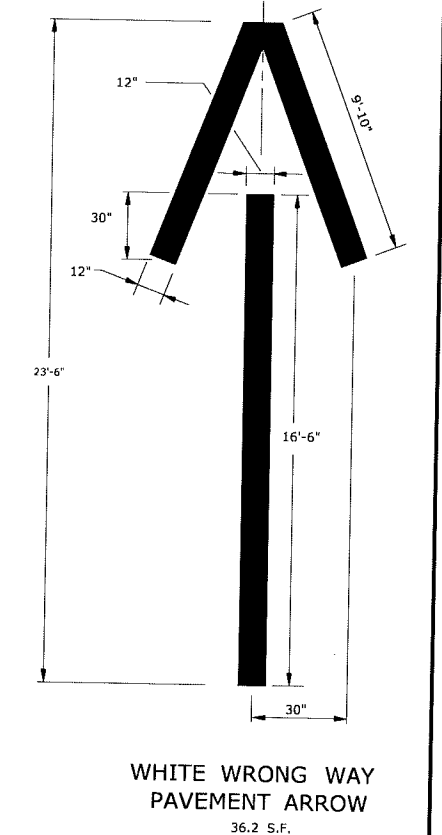
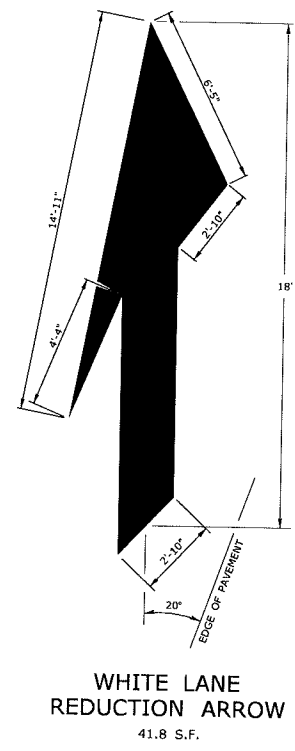
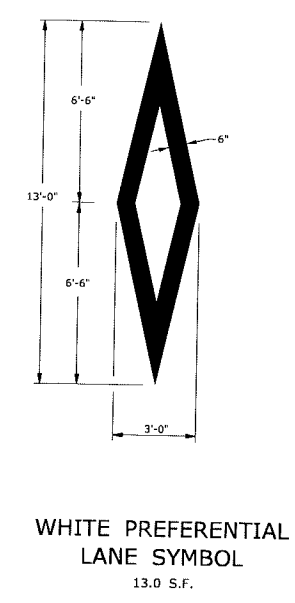
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: CONTROLLERS

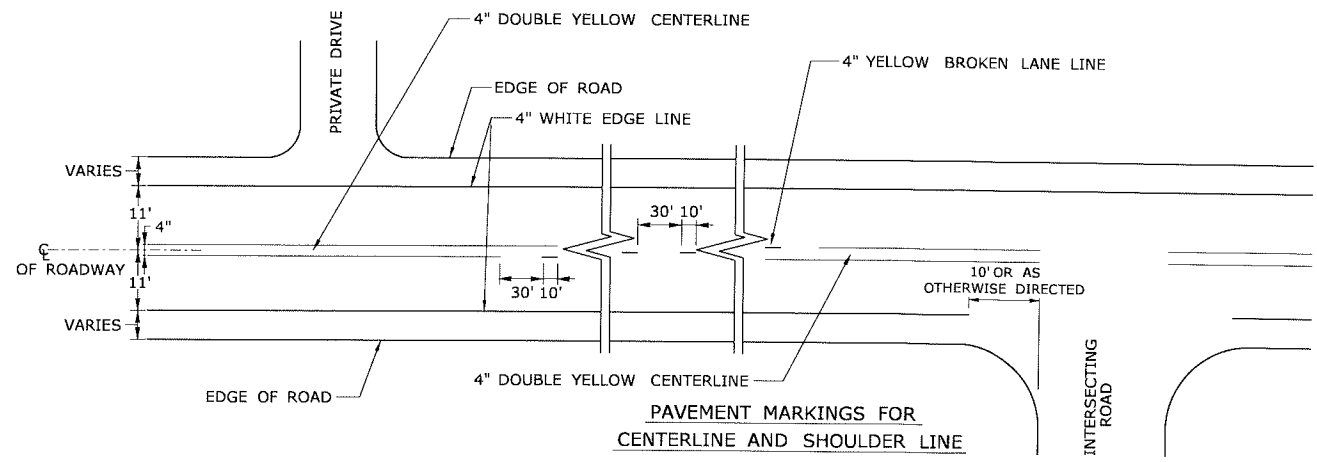
STANDARD SHEET NO.: TR-1108_01



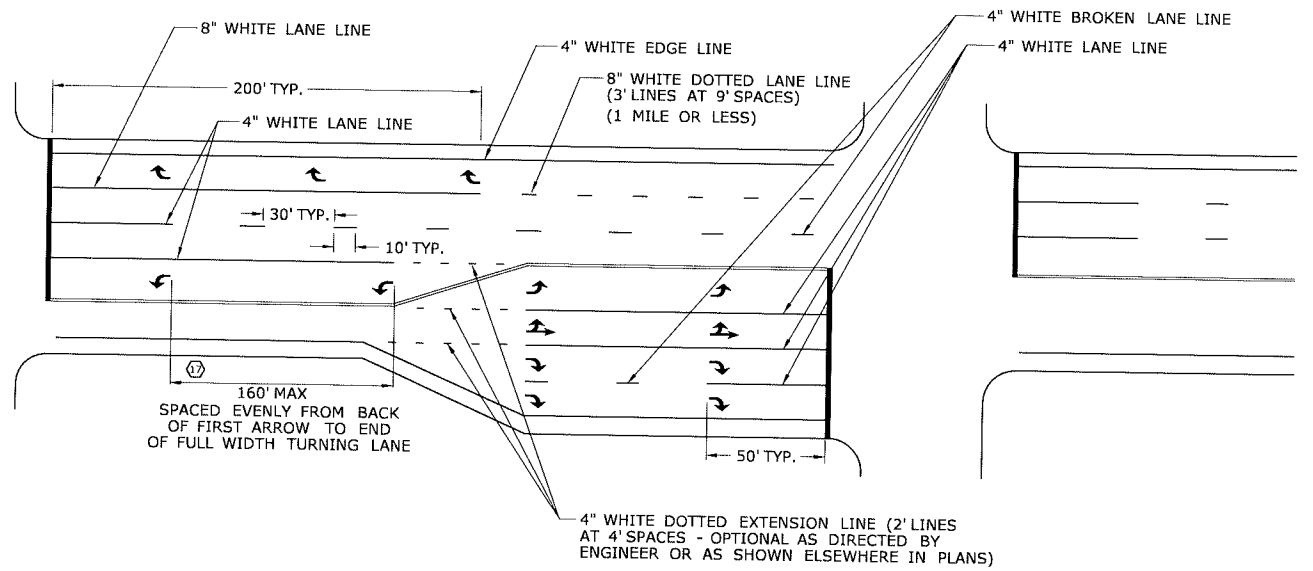
- NOTES :
1. AREA OF PAVEMENT MARKINGS AS INDICATED IS APPROXIMATE.
 2. RIGHT TURN PAVEMENT MARKING ARROWS ARE MIRROR IMAGE OF LEFT TURN PAVEMENT MARKING ARROWS.



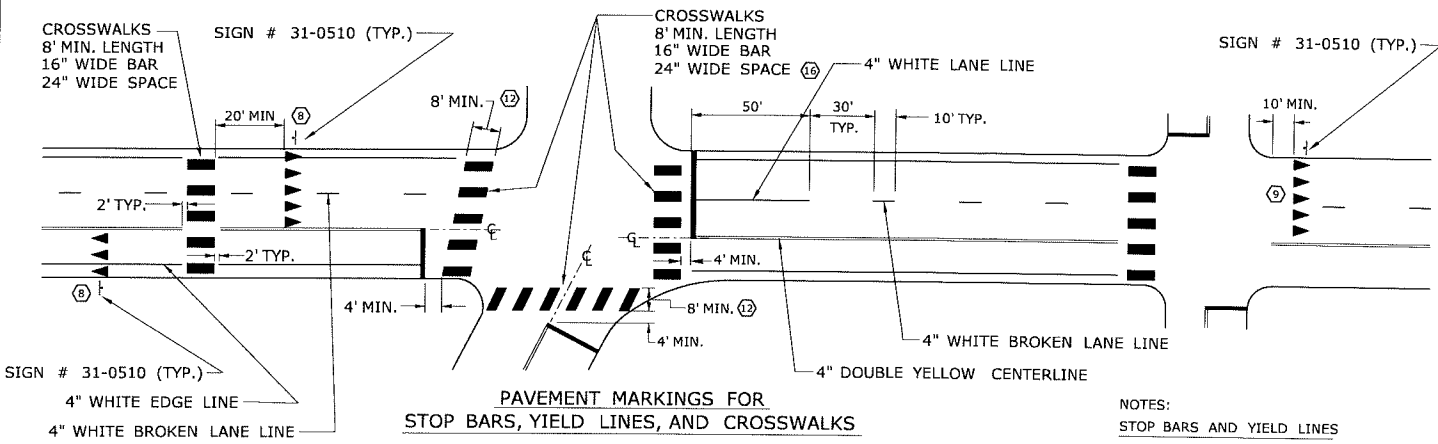
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED. Plotted Date: 4/3/2017		NOT TO SCALE		STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION FILENAME: TR-1210_04.dgn MODEL: CT_CIVIL_2D_Sheet		SUBMITTED BY: Mark F. Makuch, P.E. DATE: 2017.04.19 11:11:04-04'00"		NAME/DATE/TIME:		CTDOT STANDARD SHEET OFFICE OF ENGINEERING		STANDARD SHEET TITLE: PAVEMENT MARKING LINES AND SYMBOLS		STANDARD SHEET NO.: TR-1210_04	
REV.	DATE	REVISION DESCRIPTION													



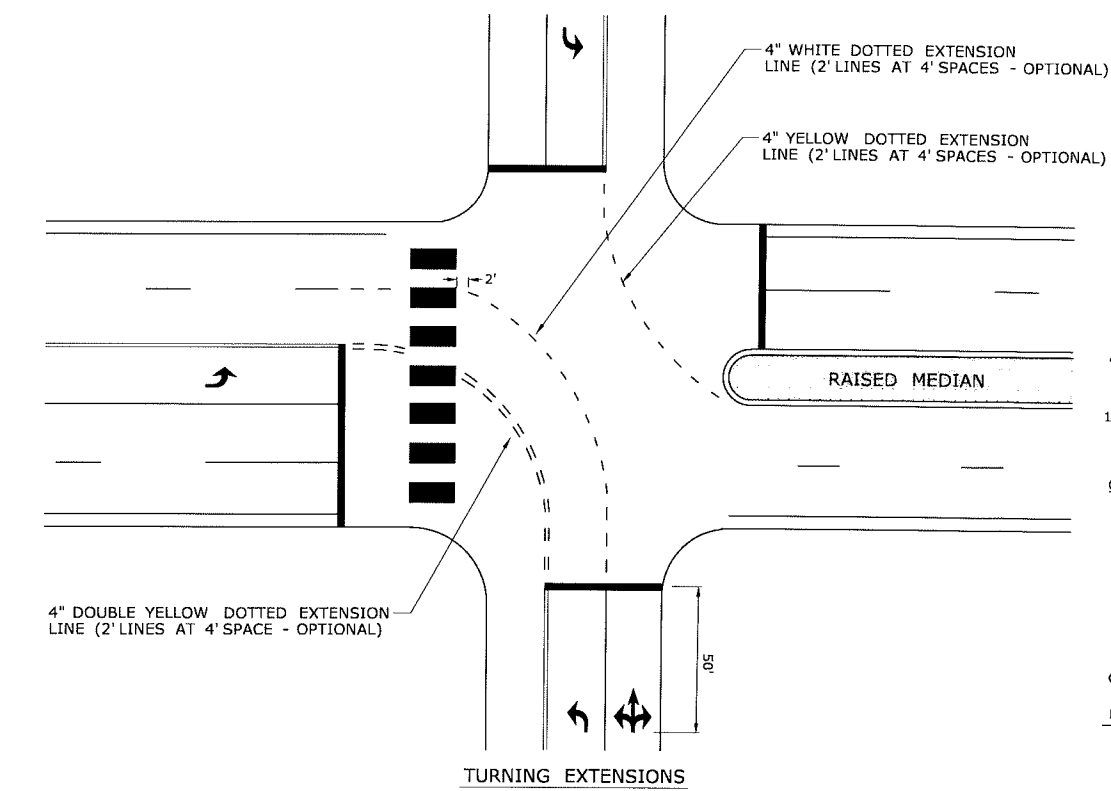
PAVEMENT MARKINGS FOR CENTERLINE AND SHOULDER LINE



PAVEMENT MARKINGS FOR TURNING LANES AND ROAD LANE-DROP



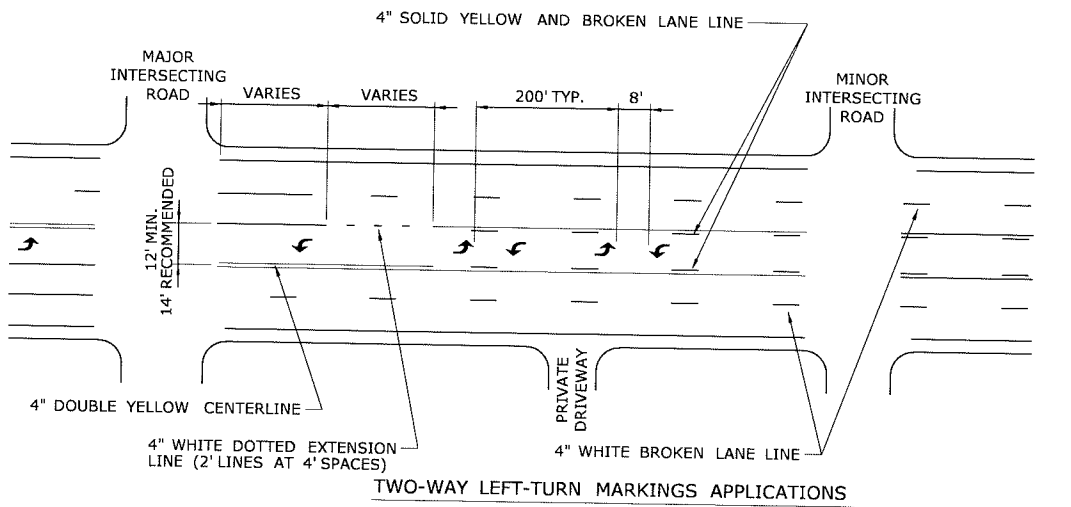
PAVEMENT MARKINGS FOR STOP BARS, YIELD LINES, AND CROSSWALKS



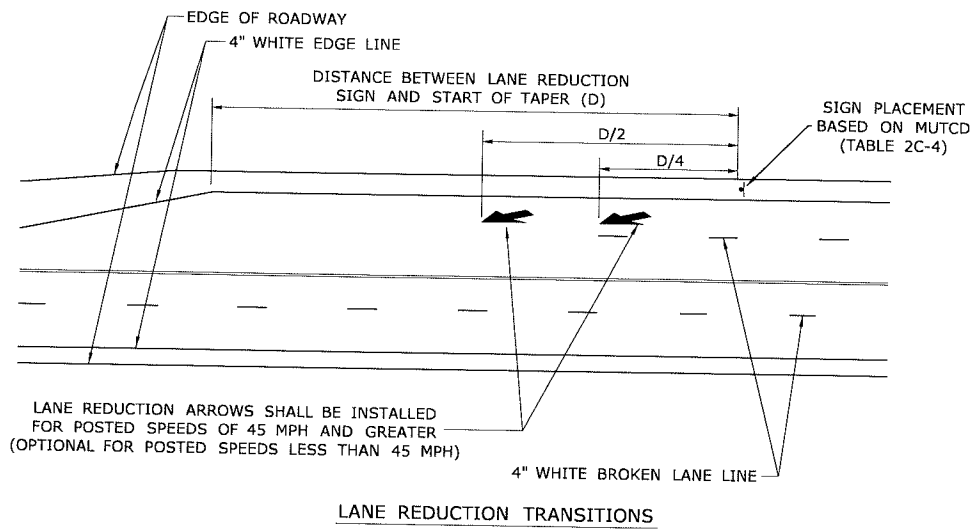
TURNING EXTENSIONS

NOTES:

- STOP BARS AND YIELD LINES**
- STOP BARS AND YIELD LINES SHALL BE WHITE.
 - STOP BARS SHALL BE 12" MIN. UNLESS OTHERWISE NOTED ON PLANS.
 - STOP BARS TO BE PLACED A MINIMUM OF 4' IN ADVANCE OF THE NEAREST EDGE OF CROSSWALK AND SHOULD BE PLACED 90° TO THE CENTERLINE OF THE ROADWAY.
 - IN THE ABSENCE OF A MARKED CROSSWALK THE STOP BAR SHOULD BE PLACED 90° TO THE CENTERLINE OF THE ROADWAY, AT THE DESIRED STOPPING POINT AT LEAST 5' AND NO MORE THAN 30' FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.
 - THE STOP SIGN SHOULD BE PLACED IN LINE WITH THE STOP BAR. HOWEVER, IF THE STOP SIGN CANNOT BE LOCATED EXACTLY WHERE VEHICLES ARE EXPECTED TO STOP, THE STOP BAR SHOULD BE PLACED AT THE STOPPING POINT.
 - FOR STOP BARS AT RAMPS SEE DETAILS "R", "S", "T", & "U" AND NOTES ON TRAFFIC STANDARD SHEET TR-1210 07 "PAVEMENT MARKINGS FOR DIVIDED HIGHWAYS EXIT RAMPS".
 - FOR YIELD LINE INSTALLATIONS, ONLY FULL TRIANGLES ARE TO BE INSTALLED.
 - MID-BLOCK CROSSWALKS ARE CROSSWALKS LOCATED MORE THAN 50 FEET FROM A SIGNALIZED OR UNSIGNALIZED INTERSECTION. YIELD LINES ASSOCIATED WITH MIDBLOCK CROSSWALKS SHOULD BE INSTALLED 20 TO 50 FEET IN ADVANCE OF THE NEAREST CROSSWALK LINE OR AS DIRECTED BY THE ENGINEER. SIGN # 31-0510 IS REQUIRED.
 - FOR CROSSWALKS AT UNSIGNALIZED INTERSECTIONS WITH MINOR STREET STOP CONTROL, YIELD LINES SHALL BE INSTALLED ON MULTI-LANE APPROACHES, BUT NOT SINGLE LANE APPROACHES.
 - THE YIELD SIGN SHOULD BE PLACED IN LINE WITH A YIELD LINE. HOWEVER, IF THE YIELD SIGN CANNOT BE LOCATED EXACTLY WHERE VEHICLES ARE EXPECTED TO YIELD, THE YIELD LINE SHOULD BE PLACED AT THE YIELDING POINT.
- CROSSWALKS**
- CROSSWALK MARKINGS SHALL BE WHITE.
 - AT LOCATIONS WHERE THE CROSSWALK IS SKEWED, BARS TO BE PARALLEL TO C AND ENDS OF BARS TO BE PARALLEL. THE LENGTH OF THE BARS WILL VARY DEPENDING ON THE ANGLE OF SKEW.
 - BARS SHOULD BE NO CLOSER THAN 1' FROM EDGE OF ROAD.
 - ONLY FULL LENGTH BARS ARE TO BE INSTALLED.
 - DECORATIVE CROSSWALKS SHALL BE BANDED FROM CURB TO CURB WITH A MINIMUM 12" WIDE WHITE TRANSVERSE LINE ALONG EACH EDGE.
 - 24" WIDE SPACE TO BE CENTERED ON YELLOW CENTERLINE.
- PAVEMENT MARKINGS FOR TURNING LANES**
- INSTALL AT LEAST TWO ARROWS PER LANE WHERE STORAGE LENGTH IS GREATER THAN 150 FEET.



TWO-WAY LEFT-TURN MARKINGS APPLICATIONS



LANE REDUCTION TRANSITIONS

REV.	DATE	REVISION DESCRIPTION

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Plotted Date: 4/3/2017

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

FILENAME: TR-1210_08.DGN MODEL: TR-1210_05

SUBMITTED BY: Mark F. Makuch, P.E. 2017 04 19 11:14:11 04'00'

APPROVED BY: Gregory M. Dvorosh, P.E. 2017 04 20 13:29:03 04'00'

CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: PAVEMENT MARKINGS FOR NON FREEWAYS

STANDARD SHEET NO.: TR-1210_08