MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

FTA GRANT NO. 560001
ARRA PROJECT

CONTRACT SPECIFICATIONS
for
MBTA CONTRACT NO.

FRANKLIN STATION ROOF REPLACEMENT
FRANKLIN, MASSACHUSETTS

MARCH 2013

KLEINFELDER CONSULTANTS, INC.
215 First St.
Cambridge, MA 02142

SECTION 01000

CONSTRUCTION FOREWARD

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL

A. The Work shall be performed in accordance with the following documents as issued by the Massachusetts Bay Transportation Authority:

1. The Contract Specifications which includes applicable Sections of Divisions 1 through 10.

2. The following Contract Drawings:
   - T-1 Cover Sheet
   - D-1 Roof Demolition Plan
   - A-1 Roof Plan
   - A-2 Exterior Elevations (1 of 2)
   - A-3 Exterior Elevations (2 of 2)

B. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents

1.2 CONTRACT DESCRIPTION, COMMENCEMENT AND COMPLETION TIMES

A. Furnish all labor, materials, equipment and incidentals and make construction complete and ready for operation as indicated on the drawings and specified herein.

B. Project Location: 75 Depot Street, Franklin, MA

C. The Work includes, but is not limited to, removal and replacement of the Franklin Station roof. The Contractor shall furnish all labor, materials, services, tools, equipment, engineering and incidentals necessary to completely remove the existing shingle roofing and install a new asphalt shingle roofing system as specified herein. The work includes: removing and disposing of existing shingle roofing; installing new asphalt shingle roofing, underlayment and copper flashings; removing and repairing damaged wood trim, canopy framing and sheathing as directed by the Engineer (allowance item); removing and disposing of wood roof gutters and installing new copper-lined wood gutters to match existing; removing and disposing of asbestos-containing materials identified in an environmental report (see Appendix A); removing and disposing of asbestos-containing materials in the attic and other asbestos-containing materials not identified in the environmental report as directed by the Engineer (allowance item); installing new snow guards; and cleaning of the existing roof gutter downspouts.

D. The Contractor shall be responsible for any repairs that may directly affect manufacturer's recommendations for installation and warranties.

E. The Contractor will be responsible for verifying the precise dimensions shown on the drawings which are not surveyed quantities, but are given only to indicate-the order of magnitude of the project.

F. Permits and Fees: Apply for, obtain, and pay for permits, fees, and utility company back charges required to perform the work. Submit copies to the Engineer. The Contractor shall be responsible for obtaining a building permit for the work.

G. Codes: Comply with applicable codes and regulations of authorities having jurisdictions. Submit copies of inspection reports, notices and similar communications to the Engineer.

H. Prior to the start of work, the Contractor must have completed MBCR "Right of Way" training.

I. The Contractor's Superintendent shall be a Licensed Construction Supervisor.

J. The Contractor shall survey the sites and verify all proposed and existing conditions, including their dimensions and elevations. Any existing condition that is not consistent with the Specifications or that will not provide the required accessibility and operations clearances shall be identified and submitted to the Engineer for direction.

K. The Contractor shall coordinate the proposed work of all disciplines before the work is installed.

1.3 PROJECT SCHEDULE

A. The Contractor shall commence the Work within 10 days of receipt of a Notice to Proceed from the Authority.

B. All work shall be substantially complete by June 30, 2013, unless the date of substantial completion is otherwise extended in writing by the Authority.

C. All work must be completed by August 15, 2013, unless otherwise extended in writing by the Authority.

1.4 CONTRACTOR'S USE OF PREMISES:

A. Contractor shall provide and coordinate the names and identification of contractor’s labors, sub-contractors’ labors, testing agencies, inspection agencies, material delivery and other labors and suppliers used by the contractor or his sub-contractors to meet all of the MBTA and MBCR security requirements.

B. Contractor shall limit the use of the premises for the performance of the Work and storage of materials and equipment as required by the MBTA and MBCR.

C. Contractor shall assume full responsibility for security of all his and his subcontractors’ materials and equipment stored on the site.

D. If directed by the Engineer, Contractor shall move stored items which interfere with operations of MBTA or MBCR. The Contractor shall not store materials or equipment on site without prior approval of the Engineer.

E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.5 ACCESS TO SITE

A. Limit use of Project site to work in areas indicated and areas providing support to work areas.

B. Driveways, Walkways and Entrances: Keep driveways, parking areas, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

C. Schedule deliveries to minimize use of driveways and entrances by construction operations.

D. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

E. Condition of Buildings: Maintain completed portions of the buildings affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy the buildings and site during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

B. Maintain access to existing walkways and other adjacent occupied or used areas. Do not close or obstruct walkways or other occupied or used areas without written permission from MBTA and approval of authorities having jurisdiction.

C. Notify the MBTA not less than 72 hours in advance of activities that will affect MBTA's or MBCR's operations.

1.7 PROJECT CONDITIONS

A. The Contractor shall conduct the Work at all times in such a manner and in such sequence as will assure the least interference with vehicular and pedestrian traffic, operations of railroads, including MBTA Commuter Rail, CSX freight rail and AMTRAK, and occupant and consumer entrance to and exit from the building and adjacent buildings and properties. The Contractor shall pay close attention to the location of detours and to the provisions for handling pedestrian traffic. The Contractor shall not open up work to the prejudice or detriment of work already started.

B. The Contractor shall conduct his work in such a manner and at such times and with such precautions and safeguards, including but not limited to, debris shields or other protective screens, as the Engineer may require for the purpose of preventing fouling of the track right-of-way and avoiding interference with the safe and continuous operation of MBTA Commuter Rail, CSX freight rail and AMTRAK service or with the business of the Authority and of avoiding interference with or injury to passengers and employees of the Authority or other persons.

C. All workers employed by the Contractor or subcontractors who work within the station and on or adjacent to the track right-of-way, shall be required to attend a safety awareness course conducted by the Massachusetts Bay Commuter Rail (MBCR). The location and time of such training sessions will be

at the sole discretion of the agencies. The intent of these courses is to make the Contractor's personnel aware of the particular hazards related to the railroad operations. The cost of attending training sessions shall be borne by the Contractor and will not be reimbursed.

D. All personnel working on the project will be required to wear personal protective gear as required by the respective agencies.

E. The Contractor is specifically prohibited from conducting any operations next to or over the tracks that have a potential to adversely impact the operation of MBTA/MBCR Commuter Rail, CSX freight rail and AMTRAK railroad operations. The Authority will consider the property, facilities and operations fouled or subject to hazard when the following occurs:

a. When an object or operation is or can be brought nearer than fifteen (15) feet to the centerline of an operating track or has the potential to get within the 15 foot envelope.

b. When an object or excavation is brought nearer than four (4) feet to a signal or communication line.

c. When an object or excavation is brought nearer than ten (10) feet to a power line or cable.

d. When cranes, trucks, power shovels or any other equipment items are working in such a position that failure with or without load could occur.

It shall be the responsibility of the Contractor to inform MBTA Commuter Rail, CSX freight rail and AMTRAK operations personnel in writing thirty (30) working days prior to all times when they intend to perform hazardous work as described above. Submittal must include a site plan, each individual location where work of a different nature is to be performed, the nature of such work, and the number of days, including time schedule, the Contractor intends to remain on the property at each location. Failure of the Contractor to provide the specified advance notice of hazardous work will result in the stoppage of work by the Authority.

F. The Contractor will be allowed to commence daily (Monday through Friday) construction operations on the platforms after the last morning rush hour train has passed and must complete construction operations prior to the first afternoon rush hour train, unless otherwise approved in writing by MBCR operations. The Contractor will be allowed to mobilize and demobilize their operations between the hours of 7:00 AM and 4:00 PM, Monday through Friday. No work will be permitted on Saturdays, Sundays and holidays unless approved in writing by the Engineer and MBCR operations.

G. The Contractor will be permitted to work in limited areas as approved by the Engineer. The Contractor shall erect temporary pedestrian and vehicular barricades as required to prevent pedestrians and vehicles from entering the construction zone and to maintain a safe work area. The Contractor shall furnish and install way-finding signage, subject to approval by the Engineer, to safely direct commuters to train waiting and parking areas. Unless otherwise approved by the Engineer, the Contractor shall maintain egress from the station at all times.

H. The Authority reserves the right to deny the Contractor's access to the track or platform because of operational requirements, adverse weather conditions or emergency conditions.

I. Hi-Rail equipment will not be permitted to perform the work at these stations unless otherwise approved by the Engineer.

J. The Contractor shall make provisions for temporary power, ventilation, air line and disposal of seepage water.

K. Upon direction of the Engineer, the Contractor shall be required to supply partitions, wooden barricades, drums or other suitable means to cordon off the work site; such partitions and barricades shall be maintained graffiti-free for the life of the Contract. The Contractor shall ensure that all walking surfaces in the vicinity of the construction work shall be maintained skid-free and cleared of ice and snow.

L. Public ways shall be maintained clear of spillage from trucks hauling concrete, excavated material, fill, and other construction materials to and from the construction site. Demolition materials, excavation, and other materials hauled to and from the site shall be contained in enclosed vehicles which will prevent spillage onto streets.

M. Any person employed by the Contractor or by any subcontractor who, in the Engineer's judgment, does not perform the work in a proper and skilled manner or is intemperate or disorderly or otherwise unsatisfactory, shall, at the written request of the Engineer, be removed from the site by the Contractor or subcontractor employing such person, and shall not be employed again on site in any portion of the Work without the approval of the Engineer. Should the Contractor fail to take the necessary action to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until such orders are complied with.

N. Railroad flagging services shall be provided by the Authority at no cost to the Contractor. The Contractor shall be responsible for coordinating a schedule of flagging with the Engineer. The Contractor shall be back-charged for flagging services in the event that the flagger is on site and the Contractor does not show up and no construction is performed while the flagger is on site.

O. The Contractor’s full-time on-site Quality Control Manager as described in Article 1.1.c of Section 01400 may be the Contractor’s Project Manager/Site Superintendent.

P. The Contractor’s full-time on-site Safety Supervisor as described in Article 1.4.3.a of Section 01568 may be the Contractor’s Project Manager/Site Superintendent.

Q. The Authority will not provide any security to protect Contractor's equipment and materials or any other appurtenances stored by the Contractor within or outside the station. It will be the Contractor's responsibility to secure and protect his construction equipment and materials.

R. The facility must remain in operation at all times and must always be accessible to MBTA and MBCR employees assigned to work at that facility and especially to the public using the facility.

S. Special care must be taken to avoid any debris of any kind from falling off the face of the buildings. Contractor must conform to all OSHA regulations and MBTA and MBCR Safety regulations.

T. Provide thorough supervision during the roof installation to ensure the quality of workmanship and adherence to FM Approval standards and project specifications.

U. Smoking is not permitted on the roof or within any MBTA and MBCR facilities at any time.

V. At least two 10 1b. ABC portable fire extinguishers shall be available on the roof during installation.

W. The interior of the facility and any equipment therein shall be protected from any falling dirt and debris during the roofing operations, Special care must be taken to avoid any water infiltration through roof and roof penetrations.

1.8 INSURANCE REQUIREMENTS

A. Prior to entry hereunder, LICENSEE and its consultants and contractors shall provide the MBTA and the Railroad Companies with a certificate or certificates of insurance and shall, during the term hereof, renew and replace any expired certificate, evidencing the insurance of the activities permitted hereunder, and LICENSEE's covenant of indemnification hereinabove, with companies that are reasonably acceptable to the MBTA, as stated below, in which LICENSEE and others hereinafter specified are either additional insureds as their interests may appear or named insureds and which provide minimum liability coverage as follows:

1. Commercial General Liability Insurance - Insuring the LICENSEE, the MBTA, the Railroad Companies, the Premises and all activities allowed hereunder as well as LICENSEE's indemnification obligations contained in Section 4 with minimum liability coverage for personal injury, bodily injury and property damage with limits not less than One Million Dollars ($1,000,000.00) per occurrence and Three Million Dollars ($3,000,000.00) in aggregate. Umbrella liability coverage with limits of not less than Five Million Dollars ($5,000,000.00) covering all work performed must also be provided. Such insurance shall be written on an occurrence basis (as opposed to a claims made basis). These policies shall name the MBTA and the Railroad Companies as additional insureds.

2. Worker's Compensation Insurance - Insuring all persons employed by LICENSEE in connection with any work done on or about the Premises with respect to which claims for death or bodily injury could be asserted against the MBTA or the Railroad Companies or the Premises with limits of liability of not less than those required by Massachusetts General Laws Chapter 152, as amended. The policy shall contain a clause waiving the right of subrogation in favor of the MBTA. Each of LICENSEE's subcontractors and consultants shall have similar policies covering their employees.

3. Railroad Protective Liability Insurance - Insuring the MBTA and the Railroad Companies as named insureds with limits of not less than $5,000,000.00 per occurrence and $10,000,000.00 in aggregate combined bodily injury property damage. Massachusetts Bay Commuter Railroad shall be provided with an original policy of Railroad Protective Liability Insurance and the MBTA and the remaining Railroad Companies shall be provided with certificates of insurance. As pertains to the Railroad Protective Liability Policy, the Massachusetts Bay Transportation Authority and the Massachusetts Bay Commuter Railroad are NAMED INSUREDS.

4. Automobile Liability Insurance - Automobile liability insurance with limits of not less than One Million Dollars ($1,000,000.00) covering all owned, non-owned, hired, rented or leased vehicles of LICENSEE and its consultants and contractors that are used in the activities permitted hereunder.

B. The required insurance coverages hereinbefore specified shall be placed with insurance companies licensed by the Massachusetts Division of Insurance to do business in the Commonwealth of Massachusetts and having a Best's rating of B+ or better, shall be taken out before the License is commenced and be kept in full force and effect throughout the term of the License, shall be primary to and non-contributory to any insurance or self-insurance maintained by the MBTA, and shall require that the MBTA be given at least 30 days advance written notice in the event of any cancellation or materially adverse change in coverage. All such required insurance, with the possible exception of Pollution Liability Insurance, shall be written on an occurrence basis form, as opposed to a claim made

basis form. The MBTA shall be named as an additional insured under the Commercial General Liability, Automobile Liability, Umbrella, Pollution Liability, and Builder's Risk Insurance Policies. The Workers' Compensation and Employers' Liability Insurance Policies shall include a waiver of subrogation in favor of the MBTA which precludes these insurers from being able to make any subrogation claims against the MBTA. All such insurance as is required of the LICENSEE shall be provided by or on behalf of all subcontractors to cover their operations performed. The LICENSEE shall be held responsible for any modifications, deviations or omissions in the compliance with these requirements by the subcontractors. At the inception date of the License and throughout the term of the License, the MBTA shall be provided with certificates of insurance evidencing that such insurance policies are in place and provide coverage as required.

C. Additional insureds should be listed as follows:

1. Massachusetts Bay Transportation Authority (MBTA)
   10 Park Plaza, Room 5750
   Boston, Massachusetts 02116, and

2. Massachusetts Bay Commuter Railroad (MBCR)
   32 Cobble Hill Road
   Somerville, Massachusetts 02143

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

Not Used.

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies allowances for all services, personnel, labor, materials, and equipment necessary to perform the work as specified herein. The Contractor shall include in his bid proposal the allowance for each item listed. Except for when the Contractor performs the work, he shall not add any Contractor markups, including overhead and profit, except as noted, to these allowance items. The work is further specified in Section 01010 – SUMMARY OF WORK and in the applicable Construction Specifications sections referenced herein.

1.2 ALLOWANCE ITEMS

A. Section 06100 – CARPENTRY. Include an allowance amount of $50,000 as a contingency to provide for demolition, repairs to existing wood framing, sheathing, rafters, and other structural or non-structural elements due to unforeseen conditions as directed by the Engineer - Item No. 0130.434, REPAIR OF DAMAGES.

B. Section 01733 – HAZARDOUS MATERIALS REMOVAL. Include an allowance amount of $25,000 as a contingency to provide for removal, containment, transporting and disposal of Asbestos-Containing Materials (ACM) or lead paint not previously identified in Appendix A as directed by the Engineer - Item No. 0212.193, ASBESTOS REMOVAL.

1.3 MEASUREMENT

A. Allowances will be made to reimburse the Contractor for work and materials performed and supplied by the Contractor and others as specified herein and as further specified in the applicable Construction Specifications Sections.

1.4 PAYMENT

A. Before permitting work to begin under any allowance, the Contractor shall request an itemized written estimate of cost from the utility companies, private firms, subcontractors, and City and State agencies for the work to be performed. The Contractor shall submit these written estimates to the Engineer for review and approval. For work performed by the Contractor, he shall be reimbursed in accordance with Section 01150 - MEASUREMENT AND PAYMENT, Part 1 “Payment for Extra Work” Article. No payments exceeding the approved amounts will be made by the Authority.

B. Payment for allowances will be based upon receipted invoices and signed receipts, without charges for Contractor overhead and profit (except when the Contractor performs the work), submitted for the actual work performed.

C. The Contractor shall submit receipted copies of itemized invoices for such work to the Authority for partial payments. Payment will be based upon receipted invoices and signed receipts from the utility companies, private firms, subcontractors or the City and/or State agencies to the Contractor, four copies of which shall be submitted to the Authority.

D. The final payment for allowances under this Contract will be withheld until the Contractor has paid each affected utility company, private firm, Railroad, subcontractor, or City and/or State agency for all costs in connection with work specified herein.

E. Each allowance will be adjusted to the actual amount paid by the Contractor for such work done.

1.5 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0130.434	REPAIR OF DAMAGES	ALLOWANCE W/ NO OVERUN
0212.193	ASBESTOS REMOVAL	ALLOWANCE W/ NO OVERUN

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the general requirements for Measurement and Payment.

B. Provisions of this Section are augmented by the measurement and payment provisions for specific classifications of construction, materials, and services as specified in the applicable sections of these Standard Specifications, the Contract Specifications and as listed in the Bid Form for a specific contract.

1.2 MEASUREMENT OF QUANTITIES

A. Quantities of various items of work provided shall be determined, for purposes of payment, by the Engineer; and by the Contractor for purposes of the certification(s) of work provided that are required by the provisions of Article 1.06.

B. Upon the completion of Work and before final payment is made the Engineer will make final measurement to determine quantities of various items of work performed, as the basis for final settlement. Measurements will be made according to United State standard units of measurement.

C. Method of measurement and computations to be used in determination of quantities of material furnished and of work provided under the Contract will be those methods generally recognized as conforming to good engineering practice.

D. Unless otherwise specified, the following shall apply:

1. Longitudinal measurements for area computations will be made horizontally and transverse measurements will be the neat dimensions shown on the Drawings or ordered in writing by the Engineer. Deductions will not be made for individual fixtures having an area of 9 square feet or less.

2. Structures will be measured according to neat lines indicated or as ordered in writing, unless otherwise specified. Concrete and masonry will be measured and accurately computed by dividing the work into simple geometrical figures and adding their volumes.

3. Items which are measured by the linear foot, such as guardrail, underdrains, and the like, will be measured parallel to the base or foundation upon which such structures are placed, unless otherwise indicated or specified.

4. In computing volumes of excavation, embankment or borrow, methods utilizing electronic computation, planimeters or other accepted engineering procedures having general acceptance in the engineering profession will be used. When measurement is based on cross sectional area, average end area method will be used.

5. Allowance will not be made for surfaces laid over a greater area than those indicated, or for any material moved from outside the area of cross section and lines shown on the Drawings except when specifically authorized by the Engineer.

6. The term "gauge" when used in connection with the measurement of plates, will mean the U.S. Standard Gauge, except that when reference is made to the measurements of galvanized or aluminum sheets used in the manufacture of corrugated metal pipe, metal place culverts and arches, metal cribbing and corrugated aluminum pipe, the term "gauge" will mean that specified in AASHTO Designations M36, M167, M196 or M197.

7. When the term "gauge" refers to the measurement of wire, it will mean the wire gauge specified in AASHTO Designation M32.

8. The term "pound" when used in the measurement or payment of any material or work, will mean 16 ounces avoirdupois, based on computed or scale weight.

9. The term "ton" when used in the measurement or payment of any material or work, will mean the short tone consisting of 2,000 pounds avoirdupois. When applicable, materials measured in pounds will be converted to tons.

10. Materials which are specified for measurement by weight shall be weighed on standard scales furnished by and at the expense of the Contractor. Such scales shall be sealed at the expense of the Contractor as often as is necessary to insure their accuracy. A sworn weigher to be compensated by the Contractor shall weigh materials required to be weighed as above provided. Weighing of such materials may be witnessed by the Engineer. If materials are shipped by rail or trucks, the car weights or quarry weights may be accepted but scales shall be used as above, if so directed. Weight slips shall be provided for each shipment of material weighed. Each weight slip shall be signed by the sworn weigher. Weight slips will be countersigned on delivery by the Engineer and no weight slip not so countersigned will be included for payment under the Contract.

11. When requested by the Contractor and approved by the Engineer in writing, material specified to be measured by the cubic yard may be weighed and such weights will be concerted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement to pay quantity is used.

12. Bituminous materials, where specified to be paid for separately, will be measured for payment by the gallon, or by the ton and converted to gallons.

13. Bitumen delivered in tank trucks or tank feeders shall be weighed on scales and the volume computed on the basis of a current tabulation of "Weights per Gallon of Bituminous Materials," as approved by the Authority.

    a. Provisions for weighing bitumen shall conform to the requirements of Article 1.2 D.10 above.

    b. Bitumen delivered in tank cars, when not actually weighed, shall be measured by volume at loading temperature, and this quantity converted to the volume at the applying temperature. Coefficient of expansion or contraction per degree F shall be .00035 for asphalt, .00025 for asphaltic emulsions, .0004 for cutback asphalt and .0003 for tar.

c. In no case shall the total number of gallons of bituminous material for any car be in excess of the United States Interstate Commerce Commission's rating for the car, plus the expansion based on the volumetric change between the loading and the specific application temperature.

d. Only the quantity of bituminous material actually placed in the Work and accepted will be considered in determining the amount due the Contractor.

14. Where specified to be paid for separately, portland cement will be measured by the bag or barrel as indicated. A bag of cement shall contain 94 pounds net and shall be considered equal to 1 cub foot. A barrel of cement shall weigh 376 pounds net.

15. Timber will be measured by the 1,000 feet board measure (M.F.B.M.) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

16. The term "each," when used as an item of payment, such as project markers, right-of-way monuments, and the like, will mean complete payment for the work prescribed for that item.

17. The term "lump sum," when used as an item of payment, will mean complete payment for the work prescribed for that portion of he Contract work under the item, or all work prescribed in the Contract, as the case may be.

18. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

19. The Quantities may be sown on the Contract Drawings for items for which lump sum is the method of measurement. If shown, the quantities are approximate and are shown for estimating purposes only.

20. The term "complete in place," when used in the measurement and payment provisions, means the completion of the contract item, including the furnishing of all materials, equipment, tools, labor and work incidental thereto, unless otherwise specified.

21. Rental of equipment will be measured by hours of actual working time and necessary traveling time of the equipment within limits of the Contract or between the source of supply and contract site (but not exceeding 100 miles) except when special conditions or other agreements make some other method of measurement desirable and is specified. (Also see Article 1.4B of this Section 01150)

22. When standard manufactured items are specified such as fence, wire, plates, rolled shapes, culvert pipe, and the like, and these items are identified by gauge, unit weight, section dimensions, or other measurements, such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

1.3 SCOPE OF PAYMENTS

A. The Authority will pay and the Contractor shall receive and accept the compensation as provided in the Schedule of Prices, in full payment for furnishing all materials, labor, tools and equipment and for performing all work contemplated and embraced under the Contract; also for all loss or damage arising out of the nature of the Work, or from the action of the elements (except as specified in General Conditions Article 5.21), or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the Work (except as set forth in General Conditions Article 2.09) until its final approval by the Authority, and for all risks of every description connected with the prosecution of the Work; also for all expenses incurred by or in consequence of the suspension or discontinuance of the said prosecution of the Work (except as provided in General Conditions Article 6.7), and for any infringement of patent, trademark or copyright, and for completing the Work in an acceptable manner according to the Contract Documents.

B. Payment of any current estimate, or any retained percentage shall in no way constitute an acknowledgment of the acceptance of the Work or in no way or degree prejudice or affect the obligation of the Contractor, at his own cost and expense, to repair, correct, renew or replace any defects and imperfections in the construction of, or in the strength of, or quality of materials used in or about the construction of the Work under Contract and its appurtenances, as well as damages due or attributable to such defects; which defects, imperfections or damages shall have been discovered on or before the expiration of the one year guaranty period specified in General Conditions Article 2.08. The Engineer shall be the sole judge of such defects, imperfections, or damages and the Contractor shall be liable to the Authority for failure to correct the same as provided herein. (Also see General Conditions Article 5.24.)

C. If the "measurement and payment" clause in the Construction Specifications relating to any price in the Bid Form requires that said price cover and be considered compensating for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Specifications.

D. Except as specifically provided otherwise, no separate payment will be made for any work in fulfillment of the requirements of these Division 1, General requirements nor of the respective Specifications relating thereto, and all cost thereof shall be included in the various prices bid or the pay items scheduled in the Bid Form.

1.4 COMPENSATION FOR ALTERED QUANTITIES

A. When the accepted quantities of work vary from the estimated quantities set forth in the Contract, and whether or not there have been any changes in plans, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract prices for the accepted quantities of work done. No allowance or other adjustment except as provided in Subsection 2.5 of Section 00700 shall be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the Contractor and subsequent loss of expected reimbursements therefore or from any other cause except the said payment for the actual quantity done at the original contract unit price.

B. When the accepted quantities of work reach 75% of the quantities in the Bid Form and the Contractor anticipates that known work will require a quantity of units in excess of the units in the bid, the Contractor shall notify the Authority that additional quantities of

work will be required, and submit a proposed cost to complete the work in excess of the bid units. If the Authority is in agreement, an Extra Work Order Authorization Letter (EWOAL) will be issued to the Contractor for a not to exceed amount to cover the anticipated overrun. After 100% of the units in the bid have been expended, the Contractor will proceed on a time and materials basis, or as directed in the EWOAL, until such time as a final lump sum can be negotiated for the extra work scope. Under no circumstance shall the Contractor expend more than 100% of the bid units without an EWOAL. Once agreement is reached for the extra work, a Change Order will be issued in accordance with SECTION 01150 – MEASUREMENT AND PAYMENT - SECTION 1.5 – PAYMENT FOR EXTRA WORK.

C. The Contractor is obligated to bid work in a responsive and responsible manner. Prices proposed for the work must be realistic. During the bid evaluation process, bids that are weighted with unrealistically high values for work at the beginning of the Contract and/or bids that carry unrealistically high or low unit prices may be considered non-responsive or non-responsible.

1.5 PAYMENT FOR EXTRA WORK

A. Payment for work for which there is a unit price provided for in the Contract.

1. Where the Contract contains a unit price for work and the Engineer orders Extra Work for work of the same kind as other work contained in the Contract and it is provided under similar physical conditions, the Contractor shall accept full and final payment at the Contract unit prices for the accepted quantities of Extra Work done.

2. No allowance will be made for any increased expenses or any damages whatsoever.

B. Payment for work or materials for which no price is contained in the Contract.

1. If the Engineer directs, the Contractor shall submit promptly in writing to the Engineer an offer to do the required work on a lump sum or unit price basis, as specified by the Engineer. Unless otherwise directed, the stated price shall be divided so as to show that it is the sum of: (a) estimated cost of direct labor, materials, and the use of equipment, plus 10 percent of this total for overhead; (b) actual cost of Workmen's Compensation and Employer's Liability Insurance, Health, Welfare and Pension Benefits, Social Security deductions, and Employment Security Benefits and such additional fringe benefits which the Contractor is required to pay as a result of Union Labor Agreements and/or is required by authorized governmental agencies; (c) a reasonable percent of the total (a) and (b) shall be negotiated for profit utilizing the procedure outlined under this Article, paragraph B.3; (d) the estimated proportionate cost of surety bonds.

2. Unless an agreed lump sum and /or unit price is obtained from above and is so stated in a Supplemental Agreement or an Extra Work Order the Contractor shall accept as full payment for work or materials for which no price agreement is contained in the Contract an amount equal to the following: (a) the actual cost for direct labor, material (less value of salvage, if any) and use of equipment (see below), plus 10 percent of this total for overhead; (b) actual cost of Workmen's Compensation and Employer's Liability Insurance, Health, Welfare and Pension Benefits, Social Security deductions, and Employment Security Benefits and such additional fringe benefits which the Contractor is required to pay as a result of Union Labor Agreements and/or is required by authorized governmental agencies; (c) a reasonable percent of the total (a) and (b)

shall be negotiated for profit utilizing the procedure outlined under this Article, paragraph B.3; (d) the estimated proportionate cost of surety bonds. The actual cost of use of equipment (except small tools and manual equipment) will be the actual and necessary operating expenses of such equipment power and fuel for the same, and a reasonable rental for the same as determined by the Engineer.

3. A reasonable percent of the total (a) and (b) for Items 1 and 2 above shall be negotiated for profit on each Extra Work Order utilizing the following weighted guidelines:

(a) Breakdown:

Profit Calculation Summary Chart

FACTOR	WEIGHT		RATE	PROFIT
	(W)		FACTOR	VALUE
			(R=.03 to .08)	
1. Degree of Risk				
General Issues of Concern	10	x	=	
Labor Productivity	15	x	=	
Pricing	15	x	=	
Availability of Materials	5	x	=	
2. Relative Difficulty of Work	15	x	=	
3. Size of Job	15	x	=	
4. Period of Performance	15	x	=	
5. Subcontracting	10	x	=	
TOTAL	100			

(b) Based on the Factors for each Work Order, the Weight (W) for each Factor shall have a Rate Factor (R) from .03 to .08 as indicated below. The Profit Value (V) shall be obtained by multiplying the Rate Factor (R) by the Weight (W). The sum of the Profit Value column represents the fair and reasonable profit percentage as determined by the Factors of the particular Extra Work Order.

DEFINITION OF PROFIT RATE FACTORS

1. Degree of Risk:

Where the Work associated with a Extra Work Order involves no risk to the Contractor, or the degree of risk is very small, the Rate Factor should be .03; as the degree of risk increases, the Rate Factor should be increased up to a maximum of .08. The Degree of Risk has been determined to include but not limited to the following major factors:

a) General Issues of Concern
b) Labor Productivity
c) Pricing

d) Availability of Materials

2. Relative Difficulty of the Work involved:

If the modified Work is most difficult and complex the Rate Factor should be .08 and should be proportionately reduced to .03 on the simplest of jobs.

3. Size of job:

If the sum of the modified Work (direct costs) is not in excess of 5% of the base Contract work or $25, 000, the Rate Factor shall be .08. Work greater than 10% of the base Contract Work or $50,000 shall have a Rate Factor of .03. Work estimated between 5% ($25,000) and 10% ($50,000) shall be proportionately rated from .08 to .03.

4. Period of performance:

A change during the early phases of a contract shall have a Rate Factor of .03 and should be proportionately increased to .08 as the period of impact approaches the substantial completion. Additionally, the Rate Factor shall be >03 for a time extension less than 10 days to a defined Milestone and as the potential time extension to a defined Milestones increases the Rate Factor shall also proportionately increase to .08.

5. Subcontracting:

The Rate Factor shall be inversely proportional to the amount of subcontracting. Where 66 percent or more of the Work is to be subcontracted, the Rate Factor shall be .08 and where 90% to 100% of the Work is performed by the Contractor's own forces the Rate Factor shall be .03. If the amount of subcontracting is estimated between 11% and 65% of the Work, the Rate Factor shall be proportionately rated from .08 to .03.

4. The term "direct labor" shall mean the labor actually expended in performing the required work exclusive of all supervisory labor.

5. No allowance will be made for general superintendence and the use of small tools, manual equipment, or buildings.

6. For extra work performed by a subcontractor under this Article, paragraph B.2. above the Contractor shall accept as full payment therefore an amount equal to the following: (a) the subcontractor's cost computed as described above plus (b) an additional 10 percent of such costs. Said subcontractor's cost must be reasonable and approved by the Engineer.

7. The Contractor shall, when requested by the Engineer, furnish itemized statements of the cost of the work ordered and give the Engineer access to accounts, bills, and vouchers relating thereto, and unless the Contractor shall furnish such itemized statements, access to accounts, bills and vouchers, the Contractor shall not be entitled to payment for which such information is sought by the Engineer.

C. Equipment Rates

In the event there arises the need for determination of costs for use of equipment as part of "actual costs" or "cost of performance" or "damages" under General Conditions, Section 00700,

Articles 2.9, 5.19, 6.7; Section 01150, Measurement and Payment, Articles 1.03 and/or 1.05; or under Chapter 30 of the Massachusetts General Laws, such costs for use of equipment shall be established in accordance with the following:

1. "Construction equipment" as used herein means equipment in sound workable condition, either owned or controlled by the Contractor or the subcontractor at any tier, or obtained from a commercial rental source, and furnished for use under the Contract.

2. Allowable hourly ownership and operating costs for Contractor-owned or subcontractor-owned equipment shall be determined as follows:

    a. Actual cost data from the Contractor's accounting and operating records shall be used whenever such data can be determined for hourly ownership and operating costs for each piece of equipment, or groups of similar serial or series equipment. Actual costs shall be limited to booked costs of the annual accounting period or periods during which the equipment was utilized on the Contract, and will not include estimated costs not recorded and identifiable in the Contractor's formal accounting records. The Contractor shall afford Authority auditors full access to all accounting, equipment usage, and other records necessary for development or confirmation of actual hourly cost rates for each piece of equipment, or groups of similar serial or series equipment. The Contractor's refusal to give such full access shall invalidate any request or claim for payment of the equipment costs. When costs cannot be determined from the Contractor’s records, hourly equipment cost rates may be determined under "b." below.

    b. When the Engineer ascertains that it is not practicable to determine actual equipment cost rates or elements thereof from the Contractor's records, hourly equipment cost rates or elements shall be determined by the use of rate schedules or the formula developed from the "Rental Rate Blue Book" (Volume 1) published by Equipment Watch.:

        (1) Hourly rates shall be developed by dividing monthly rates by 176 hours per month (the "weekly," "hourly" and "daily" rates listed in the "Blue Book" will not be used);

        (2) Rates shall in all cases be adjusted by application of Rate Adjustment Tables (machine age adjustment) plus adjustment to eliminate Equipment Overhead plus Regional Adjustment; and

        (3) Rates shall be further reduced by 20 percent to eliminate duplicate and excessive costs, except that the rates shall instead be reduced by 75 percent to determine standby rates.

        The number of hours to be paid for shall be the number of hours that the equipment is actually used on a specific force account activity. The "current revisions" to the Blue Book will be used in establishing rates. The "current revision" applicable to specific force account work will be the "current revision" as of the first day of work performed on that force account work and that rate will apply throughout the period the force account work is being performed. In all cases, the Engineer reserves the right to utilize, in preference

to Blue Book rates, equipment cost rates based upon actual costs per accounting records or hybrid rates as described above.

c. In those cases where a 10 percent additive for overhead is to be superimposed on the equipment costs provided in Section 00700, Article 2.9, and Section 01150, Article 1.5, equipment cost rates determined under (a) and (b) shall exclude any overhead costs such as equipment insurance, licenses or taxes. The 10 percent additive shall compensate the Contractor for all overhead costs, including equipment overhead, general superintendence, small tools, manual equipment, field overhead and central office overhead. Where the 10 percent overhead additive is not applicable, overhead items clearly related to equipment, (equipment insurance, licenses, taxes), shall be included in the equipment rates; provided, however, that such costs shall be identified and eliminated from any other direct or indirect costs or damages payable by the Authority under the Contract. No element of profit shall be allowable in equipment cost rates for Contractor-owned equipment; it being understood that a reasonable percent of profit in accordance with Article 1.5, Paragraph B, Item 3 will be superimposed upon equipment costs when called for by the Contract.

3. Reasonable hourly costs of renting equipment are allowable subject to Contractor production of auditable records supporting actual costs incurred, provided further that:

a. Costs such as fuel, lubricants, and minor or running repairs incident to operating such rented equipment that are not included in the rental rate are allowable.

b. Costs incident to major repair and overhaul of rental equipment are not allowed.

c. Charges for equipment leased or rented from any division, subsidiary organization under common control, or business under common ownership, ordinarily will be reimbursable to the extent that they do not exceed the actual costs of ownership and operating costs determined as in "2.", above. Rental cost of equipment leased or rented from any division, subsidiary, affiliate of the Contractor under common control, or business under common ownership, that has an established practice of renting out the same or similar equipment to unaffiliated parties, shall be allowed at rates higher than actual ownership and operating costs, provided that the Contractor furnishes the Authority adequate documentation, including the rental and usage records for the same or similar equipment items, demonstrating a reasonable likelihood that the equipment would have been rented out if not used on this Contract, and that the rental rates charged are consistent with rates charged to unaffiliated parties and going market rates. Rental costs under a sale and leaseback arrangement will be allowable only up to the amount the Contractor would be allowed if the Contractor retained title.

4. Equipment cost rates determined in "2." and "3." above shall be exclusive of labor cost of equipment operators. Such costs shall be reimbursable subject to Contractor production of auditable payroll and other records sufficient for determination of hours, pay rates, and reimbursable fringe costs as defined in Section 00700, Article 2.9 and above.

5. Except in cases of unit price or lump sum extra work orders approved by the Engineer before the work is done, actual reimbursable hours of equipment usage and operator time must be adequately documented by the Contractor's field and office records maintained during performance of the work in a manner acceptable to the Engineer. Failure of the Contractor to so maintain time records which adequately segregate added equipment hours caused by extra work required by the Engineer, or caused by other Authority actions cited in the Contractor's claim for damages, from other equipment time worked on the Contract, when maintenance of such records would have been feasible, shall constitute a cardinal omission of the Contractor, invalidating any claim for equipment cost reimbursement.

D. Payment for specialized engineering services which may be required in the performance of extra work and which is not otherwise provided for in the Contract shall be for actual costs to be incurred that comply with the standards of the Federal Acquisition Regulations, Part 31, including (a) direct labor based on hours worked on the Contract at the hourly rates paid; (b) overhead costs based on audited financial statements and other data as may be required by the Authority; (c) ten percent of the total of (a) and (b); and (d) other direct expenses related to the Contract.

1.6 OMITTED ITEMS

A. Should any item or items of Contract work be determined unnecessary for the proper completion of the Work, the Authority may, upon written notice to the Contractor, eliminate such item or items from the Contract and allowance will not be made for such items so eliminated in making final payment to the Contractor, except for such actual work as shall be done and materials purchased, including the cost of moving in and out the special equipment necessary for work on the eliminated item or items, prior to notification of the elimination of such item or items. The amount of the credit to the Authority shall be determined in a similar manner as described above for payments for extra work.

1.7 PARTIAL PAYMENTS

A. Monthly, the Engineer will make an estimate in writing of the total amount of the work done to the date of such estimate and the value thereof, including advance payments on materials stores or on hand but not yet incorporated in the Work which may be made as provided in Article 1.7 of this Section. The Authority will retain the following from these payments:

1. Five percent of the approved amount of the payment to secure satisfactory performance of the Contract Work.

2. An amount sufficient to cover claims it has against the Contractor.

3. An amount sufficient to cover all demands for direct payment filed by subcontractors under Chapter 30 Section 39F of the General Laws of the Commonwealth.

4. Five percent of the value of all items to be planted in the ground.

The Authority will pay monthly to the Contractor while carrying on the work the balance not retained as hereinbefore provided. No such estimates or payment shall be required to be made when, in the Engineer's judgment, the work is not proceeding in accordance with the provisions of the Contract, or when in his judgment the total value of the work done since the last estimate amounts to less than $500.00.

B. The Authority may, at its option, after 50 percent of the Work has been completed and (1) if the work is proceeding in accordance with the approved CPM Construction Plan submitted under Section 01300 Article 1.02 and (2) is being performed in accordance with the Specifications and the Contract, not retrain the 5 percent to secure satisfactory performance of the Contract Work as provided in Article 1.7A of this Section 01150 on any subsequent payments. However, if the Authority does not retain these monies, it will reimpose this 5 percent retainage on all subsequent payments should the Contractor fail to maintain progress in accordance with the Contract and approved schedule or fail to execute the Work as required by the Specifications and Contract. Retainages withheld under Articles 1.6A (2) and (3) will remain in effect throughout the Contract Work period as detailed therein. Retainage withheld under Article 1.06A (4) for plantings will be retained until Final Acceptance (Article 1.09).

C. Partial payments will be made on lump sum contracts, and on lump sum items of a contract if the Contractor requests partial payment of such an item, in accordance with a schedule of the quantities and unit prices for the major components of a lump sum contract or of the lump sum items of a contract, to be submitted by the Contractor and approved by the Engineer prior to making partial payments for such contract or for such items. For lump sum contracts, this schedule of major components shall approximate the activities shown on the CPM Construction Plan required by Section 01300 Article 1.2. Each component part shall be considered as including all its concomitance so that the total cost listed for the components is the contract cost for the item. Approval of the schedule by the Engineer shall not be considered as a guarantee to the Contractor that the quantities shown on the schedule are the approximate quantities actually included in the lump sum items. The schedule is only for the purpose of estimating partial payments, and it shall not affect the contract terms in any way.

D. The Contractor shall certify in writing on forms approved by the Authority that the work for which payment is included in the estimate in question, has in fact been done.

E. Whenever the Work is substantially complete, the Authority may, if it considers the amount retained to be in excess of the amount adequate for its protection, at its discretion, release to the Contractor all or a portion of such excess amount and may cause the Contractor to be paid, temporarily or permanently, from time to time, such portion of the reserve as it deems prudent.

F. When the first partial payment estimate is prepared, the Contractor shall submit to the Engineer a cash drawdown forecast indicating the estimated amount of each partial payment by month, projected through completion of the project. The Contractor shall, with each succeeding partial payment estimate, submit updated cash drawdown forecasts to the Engineer. The forecast is for the purpose of estimating cash requirements.

G. Massachusetts Bay Transportation Authority-Statement of Payment to Subcontractors Form is included at the end of this Section 01150. It must be completed and signed by authorized contractor representative and submitted to the Authority with each payment request.

1.8 PAYMENT FOR MATERIALS STORED OR ON HAND

A. When requested in writing by the Contractor, allowances may be made on partial payments for certain materials stored or on hand, but not incorporated in the Work, subject to the following terms and conditions.

B. Upon presentation to the Engineer by the Contractor of copies of paid invoices, advance payments may be made for acceptable reinforcing steel, structural steel, piles, culvert pipe, guard rail, track

rails, precast prestressed concrete members, costly machinery items, and other similar nonperishable materials purchased expressly for the Work and delivered on or in the approved storage places at the site, but which materials are not considered as erected or complete in place under the items of the Contract, and for which partial payment would not otherwise be made until such materials and items were erected or complete in place.

C. The amount to be included in the estimate will be the value of the materials as shown by the certified copies of paid invoices including transportation and handling costs. However, the Engineer reserves the right to limit payment for such materials when such payment is based upon a standard unit of measure. When contract payments are made on the basis of estimated quantities, payment for material stores or on-hand may be limited to an amount not to exceed the value of ninety percent of the estimated contract quantity.

D. Before any advance on materials is made as hereinbefore provided, the Authority will require, as security for the incorporation of the materials in the Work, documents from the Contractor transferring to the Authority the absolute legal title to such materials.

E. However, the transfer of title and the partial payment for such materials shall not in itself constitute acceptance of same nor void the right to reject material subsequently found unsatisfactory as provided in General Conditions Article 4.4, nor in any way relieve the Contractor of his responsibility for satisfactorily furnishing and placing the material in the Work in accordance with the terms of the Contract.

F. In the event any of such material subsequently becomes lost, stolen, impaired, or damaged, the monetary value of the lost, stolen, impaired, or damaged material as may have been paid for in a current estimate will be deducted from the next estimate, and no further payment will be made therefor until such material has been satisfactorily replaced in accordance with Specification requirements.

G. If it is impossible due to lack of area on the site or other valid reason, the Contractor may request in writing permission from the Engineer to store materials off the site and still have the materials paid for as materials on hand and the Engineer may approve payment; however, no advance payment for material stores off the site will be made until written approval of the Engineer has been given. This request will state the reason for the request, location of proposed storage site, and methods that will be employed to insure that material is properly protected and will be used on the particular Contract. The amount to be included in the estimate for materials stores off the site will be limited to 80 percent of the value of the materials as shown by the certified copies of paid invoices including transportation and handling costs.

H. In the case of property not owned or controlled by the Authority, the Contractor shall also lease, or procure a lease, free from encumbrances to the Authority, such lease to be in a form approved by the Authority and to contain provisions for the protection and indemnification by the Contractor of the Authority, its employees and agents, against all claims by reason of such lease or by reason of anything done or permitted in or upon the leased sites. The Contractor shall also take such steps as the Authority may require for the purpose of security and assuring to the Authority the control of such materials, particularly the right to enter upon the property, take possession of such materials and use the same.

1. No advance payment for materials stores or on-hand, but not incorporated in the work, will be made in an estimate when the value therefor amounts to less than $10,000 per contract bid item and represents the value of at least fifty percent of the estimated quantity involved as shown in the contract or as determined by the Engineer.

2. Deductions at rates and in amounts which are equal to the advance payments will be made under the appropriate Contract pay items in estimates as the materials are incorporated in the Work.

1.9 SEMI-FINAL ESTIMATE

A. A semi-final estimate may be made, at the discretion of the Authority, under the following conditions:

1. If, after final inspection has been made, there are any payments or Extra Work items that are in dispute between the Contractor and the Authority, either as to the quantity or value of work provided thereunder, such items or claims may be excluded from the final estimate, and payment for such disputed items may be deferred until such time as agreement has been reached between the Contractor and the Authority or until such claim has been adjudicated. In such case, a semi-final estimate shall be prepared within a period of 65 days after substantial completion of the Contract Work covering the value of Work provided and retained percentage on items of the Contract that are not in dispute and with disputed items or claims excluded but subject to deduction and retention of a sum sufficient to satisfy any and all outstanding claims or liens that have been duly filed by subcontractors and materialmen against the Contractor, or to cover amount of such claims or liens that may have been paid by the Authority directly to others for the Contractor's account (see General Conditions Article 5.17), and subject to deduction and retention from such payment any other amounts to be deducted and retained in accordance with the terms of the Contract. The existence of a dispute between the Contractor and the Authority as to any payment item or items shall not be considered a valid reason for delaying preparation of a semi-final estimate as provided herein.

2. In the event the Contract has been substantially completed and the Contract has been opened to public use by order of the Authority, but final acceptance of the Work is subject to delay because of minor uncompleted items which do not impair the usefulness of the Contract, a semi-final estimate shall also be prepared within a like period of 65 days after the Contract has been substantially completed and placed in public use. Such semi-final estimate shall include an intimate of the value of all Work provided in accordance with the terms of the Contract, including the amount of retained percentage withheld by the Authority from previous periodic payments, but excluding (a) the same deductions and retainage sufficient to cover subcontractors and materialmen's claims and other amounts to be deducted and retained in accordance with the terms of the Contract, as provided by the first paragraph of this Article; (b) an amount equal to the estimated value of the work remaining to be performed and (c) any items or claims for extra Work, or parts thereof, that may be in dispute; and payment for such excluded items or portions thereof, may be deferred until such remaining work has been satisfactorily completed, or in the case of disputed items or claims until such time as agreement has been reached thereon or such claims have been adjudicated.

1.10 FINAL ACCEPTANCE AND FINAL PAYMENT

A. When all of the physical work covered by the Contract has been substantially completed (see General Conditions Article 3.11), the Authority will inform the Contractor in writing the date of such final acceptance upon which date the Contractor's responsibility shall cease except as provided in his bond and as provided in General Conditions Articles 2.8 and 5.24.

B. The Engineer shall, as soon as practicable after the satisfactory completion of the Contract, make a final estimate of the amount of work done thereunder and value of such work. Within 65 days from and after the date the Work has been accepted by the Engineer, the Authority will forward to the Contractor a copy of the final estimate or semi-final estimate, as stipulated in Chapter 30 section 39G of the General Laws of the Commonwealth, which will include an agreement form for the Contractor's acceptance. After such acceptance has been filed with the Engineer, payments of the entire sum will be made, so found to be due thereunder after deducting therefrom all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract. All prior partial estimates and payments will be subject to correction in the final estimate and payment. If within six months from the date the final estimate is forwarded to the Contractor, the Contractor has not filed a valid (as determined by the Engineer) written reason(s) for not accepting final estimate, final estimate will be considered acceptable to the Contractor and payment of final estimate made.

C. Acceptance by the Contractor of the final payment shall operate as and will be a release to the Authority and every member, agent, and employee thereof, from all claim and liability to the Contractor for anything done or furnished for, or relating to, the Work, or for any act or neglect of the Authority or of any person relating to or affecting the Work, except the claim against the Authority for the remainder if any there be, of the amounts kept or retained to satisfy liens or claims pending against the Contractor.

SECTION 01300

SUBMITTALS

1.1 DESCRIPTION

This Section specifies the general requirements and procedures for preparing and transmitting data to the Engineer for his information, acceptance or approval. Detailed requirements for submittals are specified in applicable Sections of these Standard Specifications and in the Construction Specifications.

1.2 SUBMITTALS (SHOP DRAWINGS, WORKING DRAWINGS AND MISCELLANEOUS)

A. Definitions

1. Shop Drawings: Original drawings, submitted to the Engineer by the Contractor pursuant to the Work, including, but not limited to: working drawings, diagrams, illustrations, schedules, performance charts, brochures, erection plans, falsework plans, framework plans, bending diagrams for reinforcing steel, or other supplementary plans or similar data which are prepared by the Contractor or a Subcontractor, manufacturer, supplier or distributor, and which the Contractor is required to submit for review and approval by the Engineer.
2. Working Drawings: Contractor prepared plans for temporary structures and facilities. Working Drawings for elements of work which may affect safety of persons or property included but are not limited to Contractor's plans for temporary structures such as decking, temporary bulkheads, support of utilities, and for such other work as may be required for construction but which do not become an integral part of completed project.
3. Miscellaneous Submittals: Those submittals directly related to the work (non-administrative) including quality assurance program, resume of QA Managers, warranties, guarantees, maintenance agreements, maintenance of traffic plan, project photographs, survey data and reports, physical work records, quality testing and certifying reports, record and as-built drawings and data, operating and maintenance manuals, security and protection lists (including keying) and other similar information and materials not defined as shop drawings, working drawings, product data, samples mockups or sample panels.

B. Within 15 calendar days of receipt of Notice to Proceed, submit to Engineer, Schedule of all submittals required by the contract. Submit schedules for submission of shop drawings, working drawings, mock-ups, sample panels, product literature and miscellaneous submittals in that order of priority which reflects sequence of construction requirements, project schedule logistics, and include anticipated review time that may be required by Contractor and Engineer for these submissions. If complexity of submittal requires more time for review, show approximate extended number of days required. Submittal schedules shall contain the following information as a minimum:

1. Submittal number, including revisions.
2. Specification section and paragraph reference.
3. Submittal title and description
4. Date needed to support construction schedule.

5. Date sent to Engineer.
6. Date returned from Engineer
7. Comments. Included within this section will be references to any new RFIs issued as a result, reasons for delay and any other relevant information.

C. General Procedures

Transmit submittals sufficiently in advance of construction requirements to permit a maximum of 30 calendar days for checking and appropriate action by Engineer.

Submit all work related submittals as defined in this Section and as required by Contract Documents on a Transmittal Form: Prepare draft of required transmittal form and submit it to Engineer for acceptance. At a minimum, furnish: transmittal forms sequentially numbered and show contract number, project name, date; names of subcontractors, suppliers, manufacturers, and required specification references; category and type of submittal, purpose, description, distribution record (for both transmittals and submittals) and signature of transmitter.

1. Examine and check submission for accuracy, completeness, and compliance with Contract before delivery to Engineer.

   Stamp and sign each submission with following statement: "Having checked this submission, we certify that it conforms to the requirements of the Contract in all respects, except as otherwise indicated."

   By reviewing and approving each submittal, Contractor represents that he has determined and verified materials, field measurements and field construction criteria related thereto, and has checked and coordinated information contained within such submittals with requirements of Work and Contract.

   Submit one construction material or one drawing per submittal review.

2. Maintain at site of work a complete up-to-date, organized file of all past and current submittals including an index and locating system, which identifies the status of each submission.
   a. Assign sequential numbers to each submittal.
   b. Assign new submittal numbers to all re-submissions and cross-reference to previous submittals.
   c. Certify shop drawings, working drawings and calculations as submitted by a professional engineer registered in the Commonwealth of Massachusetts when required by individual Specification Sections. Convey, or be accompanied by, information sufficient to completely explain the structures, machines, or systems described and their intended manner of use. When professional certification is required by Contract requirements, Engineer is entitled to rely upon accuracy and completeness of such calculations and certifications

3. Engineer's Review and Action
   a. The Engineer will review and approve or take other appropriate action upon Contractor's submittals only for the limited purpose of reviewing for conformance with information given and design concept expressed in Contract requirements. The Engineer's action will be taken as to cause no delay in Work or in activities of Contractor. Review of such submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and

quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain responsibility of Contractor as required by Contract. Engineer's review will not constitute approval of safety precautions or, unless specifically stated by Engineer, of any construction means, methods, techniques, sequences or procedures. Engineer's review of a specific item does not indicate approval of entire assembly of which the item is a component.

b. Time required for review of submittals and resubmittals by Engineer will be a maximum of 30 calendar days, except as otherwise specified.

c. All Contractors' submittals will be stamped with one of following dispositions:

1) NO EXCEPTIONS TAKEN: Work may proceed, provided it complies with Contract. Approval of shop drawings and samples will be general, but approval is not construed:

- As relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or
- As approving departures from details furnished by Engineer.

2) EXCEPTION AS NOTED: Work may proceed, provided it complies with Contract and changes shall be made by Contractor. Resubmission not required. Exception, as noted, will be general. The above dispositions will be general, but approval or exceptions noted shall not be construed as:

- Permitting any departure from Contract requirements;
- Relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or
- As approving departures from details furnished by Engineer.

3) REVISE AND RESUBMIT: Work recognized as not being able to proceed. Revise submittal in accordance with notations thereon and resubmit without delay.

d. Handle re-submissions in the same manner as first submittals. On re-submissions, direct specific attention in writing to revisions other than the corrections on previous submissions. Make any correction required by Engineer.

e. Failure of any material to pass specified tests is sufficient cause for refusal to consider, under this Contract, further samples of same brand or make of that material. Engineer reserves right to disapprove any material or equipment previously proven unsatisfactory in service.

f. Samples of various materials on site, stored or in place may be taken by Engineer for testing. Samples failing to meet Contract requirements will automatically void approval of items tested. Replace such materials or equipment to meet Contract requirements. When tests are required, make only one test of each sample. Samples that do not meet specified requirements will be rejected. Additional testing of samples will be made by Engineer at Contractor's expense.

D. Requirements for shop drawings.

1. Shop drawings shall include stress sheets, fabrication details, bending schedules for reinforcing steel, location and details of construction joints in concrete, catalog cuts of equipment or fixtures, wiring or piping diagrams, data sheets and performance curves for

electrical, mechanical, or other equipment and any other supplementary data required by the Engineer.

2. Detail drawings for cribs, cofferdams, falsework, shoring, decking, form work, and for other temporary work and methods of construction the Contractor proposes to use, will be required to be furnished. Such drawings shall be subject to review, but details of design will be left to the Contractor who shall be responsible for the safety and successful construction of the Work. Drawings, the original design for which is the responsibility of the Contractor, shall bear the seal of a Professional Engineer registered in the Commonwealth.
3. Shop drawings shall show design, dimensions, connections, and other details necessary to insure that the Contract Documents are accurately interpreted. Shop drawings shall show proper connections with adjoining work in detail. Where adjoining work requires shop drawings, such drawing must be submitted for approval at the same time so that connections can be accurately checked.
4. Shop drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work and amplify design details of mechanical and electrical equipment in the physical spaces in any structure and incorporate minor changes of design or construction details to suit actual conditions. Where separate sections or trades are involved, shop drawings shall be coordinated and where required by the Engineer shall be submitted in composite form (coordination drawings) clearly designating which trade will perform which work; the words "work by others" will not be accepted.
5. All requests for approval of materials and equipment and submissions of drawings shall indicate the corresponding number of the section and paragraph of the Specifications and reference to the Contract Drawing sheet numbers under which each of the above are required, and the Construction Performance Monitoring (CPM) activity number.
6. All shop drawings shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Engineer for approval and shall bear the Contractor's stamp of approval certifying that they have been so checked. Shop drawings submitted without the stamp of approval and certification, or which are incomplete, contain numerous errors, have not been checked, or have been checked only superficially will be returned unchecked by the Authority for resubmission by the Contractor. The Contractor shall certify: “This shop drawing has been thoroughly checked and complies with the Contract Documents and field measurements and the item fits with adjoining work except as noted.”
7. In checking shop drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the shop drawings with the requirements of all other Sections, adjoining materials or trades whose work is related thereto, as required for the proper and complete installation of the work.
8. Nothing in the above shall be construed to hold the Contractor liable for the design of any of the permanent structures.

E. When submitting shop drawings or working drawings for approval or review by the Engineer, the following procedures shall apply:

1. Submit to the Engineer with such promptness as to cause no delay in his work, six copies checked and approved by him, of all shop drawings and detail drawings required for the work.
2. The Engineer will make a prompt decision on approval of such Drawings no later than 30 days after submittal; but if such decision requires extended investigation and study, the Engineer will, within 30 days after the receipt of the submission, give the party making the submission written notice of the reason why the decisions cannot be made

within the 30 day period and the date by which the decisions will be made.

3. Markings of approval, or of corrections required, will be made on the transparencies by the Engineer and record copies made by the Engineer for his own use will be at the Authority's expense.
4. If corrections are required by the Engineer, make such corrections and resubmit the drawings, again as six prints, to the Engineer for approval. If corrections are still required, the same procedure shall be carried out until the drawings are acceptable.
5. All items shown on shop drawings shall be clearly identified with their location in the Contract, or by the sheet or detail number in which they appear, in order to facilitate checking by the Authority.

F. Contract prices shall include the cost of furnishing all shop and detail drawings as specified.

1.3 QUALITY CONTROL

A. SAMPLES AND TESTS

1. Inspection and sampling of materials will be carried out, ordinarily at the source or at the site of the Contract Work in accordance with established policies and procedures of the Authority, but the Authority will not assume any obligation for the inspection and sampling of materials at the source. Responsibility for incorporating satisfactory material in the Work rests entirely with the Contractor.
2. Furnish to the Engineer samples specified in the various specification sections. Prepay shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved in writing by the Engineer.
3. Unless otherwise indicated, submit not less than two identical samples of each type required. Label each sample indicating:
   a. Name of project and contract number;
   b. Name of contractor and subcontractor;
   c. Material or equipment represented;
   d. Source;
   e. Name of producer and brand (if any);
   f. Specification Section, article, and paragraph; and
   g. Location in project.

4. Mail, under separate cover, a letter submitting each shipment of samples. Enclose a copy of the submittal letter with the shipment and a copy to the Engineer. Approval of a sample shall be only for the characteristics and use named in the submittal and approval, and will not be construed to change or modify any Contract requirement. Before submitting samples, the Contractor shall assure himself that the materials or equipment will be available in the quantities required in the Contract, as no change nor substitution will be permitted after a sample has been approved unless approved by the Engineer in writing.
5. Approved samples not damaged in testing may be incorporated in the finished work if marked for identification and approved by the Engineer. Materials incorporated in the Work shall match the approved samples.
6. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider, under the Contract, any further samples of the same brand, make, or source of that material. The Engineer reserves the right to disapprove any material, which has previously proven unsatisfactory in service.
7. Samples of various materials or equipment delivered on the site or in place may be taken

by the Engineer for testing. Failure of samples to meet Contract requirements will automatically void previous approvals of the item tested.

8. As soon as possible and a minimum of 35 days in advance of the time when placing of bituminous or Portland cement concrete is expected to begin, deliver to the Authority Laboratory samples and available analysis of concrete ingredients. Quantities of materials, aggregate sizes, cement, admixtures, and bitumens as may be required for the performance of necessary tests and trial mixes will be determined by the Authority's Materials Testing Engineer.

1.4 REQUESTS FOR INFORMATION

A. Upon discovery of the need for interpretation of the Contract Documents, the Contractor shall prepare and submit a Request for Information (RFI) on the form specified at the end of this Section. RFIs shall not be used to request approval of submittals, request approval of design changes or substitutions, nonconforming conditions, or requests for changes to Contract schedule and/or Quantities.

1. RFIs shall be issued by the Contractor to the Engineer. RFIs submitted by entities other than the Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the work.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project Name
2. Contract Number
3. Date
4. Name of Contractor
5. RFI Number, numbered sequentially
6. Specification Section number and title and related paragraphs, as appropriate
7. Drawing number and detail references, as appropriate
8. Field dimensions and conditions, as appropriate
9. Contractor’s suggested solution(s). If Contractor’s solution(s) impact the Contract Completion Date or Quantities, Contractor shall state the impact in the RFI.
10. Contractor’s signature
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe item needing interpretation.

C. RFI Log: Prepare, maintain and submit a log of RFIs organized by the RFI number containing the following information:

1. Project Name
2. Project Contract Number
3. Name of Contractor
4. RFI number and Revision Indicator
5. RFI Description
6. Date RFI was submitted
7. Date Response Required
8. Date Response Received
9. Date Closed

D. Engineer’s Action: Engineer will review each RFI, determine action required and return to the

Contractor within 5 days.

1.5 GENERAL

No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of Work to which they pertain.

END OF SECTION

MBTA Request For Information RFI No.

CONTRACTOR: **CONTRACT NO.**

AFFECTED DOCUMENT (S): **SPEC:** _____

DWG (S): _____ **OTHER** _____

DESCRIPTION:

JUSTIFICATION:

SIGNATURE:	**DATE: / /**

RESPONSE:

DESIGNER:	**DATE: / /**
MBTA PROJECT MGR:	**DATE: / /**

SECTION 01400

QUALITY ASSURANCE

GENERAL

1.1 DESCRIPTION

A. This Section specifies the general requirements for quality assurance and quality control including source of supply and quality of materials, acceptance testing by the Engineer, control testing by the Contractor, off-site inspection, inspection and use of local materials, inspection of proportioning plants and coordination of finishes.

B. Quality Assurance Program: The Contractor is responsible for controlling the quality of Work including work of its Subcontractors and suppliers and for assuring that the specified quality is achieved. The Contractor, Subcontractors and suppliers shall establish, maintain and implement a written Quality Assurance Program meeting the requirements of U. S. Department of Transportation Quality Assurance and Quality Control Guidelines (FTA-MA-06-0189-92-1). The Program shall be tailored to the scope and complexity of the Work and shall include implementing procedures and inspection forms equal to those included at the end of this Section. Subcontractors or suppliers may use the Contractor Quality Assurance Program in lieu of developing their own.

C. The overall administration of the Quality Program shall be vested in a responsible section of the Contractor's organization. This section shall contain a QC Organization headed by an on-site QC Manager who has clear access to top-level management and to Subcontractors' officers responsible for the execution of the Subcontractor's QC Program. The QC Manager's sole duty is to manage and administer the QC Program unless otherwise authorized in writing by the Engineer. Such authorization can be withdrawn at any time. The QC Manager shall have at least five (5) years experience in quality control inspection on construction projects.

D. The QC Organization shall be staffed by technically competent personnel with freedom to make decisions without pressure or bias and shall have sufficient authority to ensure that quality requirements are consistently maintained.

1.2 SUBMITTALS

A. The Contractor shall submit within three weeks of the Notice to Proceed the Quality Assurance Program to be used on the project by the Contractor and Subcontractors. The resume of the Contractor’s Quality Control Manager shall be included with the submittal. Changes to the Quality Assurance Program shall be submitted for approval prior to implementing the changes.

B. The Contractor shall submit the name, address, and qualifications, together with the scope of proposed services, of proposed inspection or testing firms to the Engineer for approval at least 30 days prior to the scheduled commencement of any work involving such inspection or testing.

C. Test Reports - Within five days after completion of testing performed by or for the Contractor, submit test results to the Engineer. The Contractor shall identify the test reports to be submitted as required in Section 01300. Test reports shall be identified with the information specified for samples in Section 01300 and additionally, the name and address of the organization performing the test, the date of the tests and a signature of an authorized representative attesting to the validity of the test results.

1.3 DELIVERY, STORAGE, AND HANDLING (Not Applicable)

1.4 QUALITY ASSURANCE

A. Source of Supply and Quality

1. If the Engineer so desires, materials will be approved at the source of supply before delivery.
2. Unless otherwise stipulated, the Contractor shall furnish all materials required for the Work specified in the Contract, and said materials shall meet the requirements of the Specifications for the kind of Work involving their use.
3. Unless otherwise provided, only new and first quality materials conforming to the requirements of the Specifications and approved by the Engineer shall be used in the work, except for material used by the Contractor for his convenience and which is not to be permanently incorporated in the work..
4. After testing, if the sources of supply that have been approved do not furnish a uniform product or if the product from such sources proves unacceptable at any time, the Contractor shall, at no additional expense to the Authority, take any and all steps necessary to furnish acceptable materials.
5. Materials such as crushed stone, gravel borrow, or ordinary borrow, shall be sampled at the source and, if satisfactory, given preliminary approval for use. The Contractor shall furnish such facilities as the Engineer may require for collecting and forwarding samples to the Authority Laboratory. Samples shall be furnished without charge and with any shipping charges prepaid. However, preliminary approval by the Engineer does not relieve the Contractor of the responsibility for placing satisfactory material in the Work as determined by subsequent samples taken at the source or on the Contractor site, prior to the material being incorporated into the Work and if the Contract site samples test satisfactorily the material will be considered to meet the Contract requirements as to quality. If such sampling and testing reveal that the material is unsatisfactory it shall be removed from the Work or blended in with such other materials so that an acceptable material will be produced. Removal and blending of such material shall be done by the Contractor without additional compensation.

B. Rights of Access

The Engineer may make visits at the proportioning plant or source of supply to audit or inspect the production of material, or the manufacture of products. These visits, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer or manufacturer. The Contractor shall assure that "Rights of Access" clauses are contained in the purchase document with the producers of materials or manufacturers of products allowing the Engineer, or an authorized representative, to have free entry at all times to such parts of the off-site plant concerned with the manufacture or production of the materials. Adequate work facilities at the off-site plant, shall be furnished free of charge to the Authority for its use during audits or inspections. The Engineer assumes no obligation to inspect materials at the source of supply. The responsibility of incorporating satisfactory materials in the Work rests entirely with the Contractor, notwithstanding any prior inspections or tests.

C. Acceptance Testing

1. Acceptance testing is the testing of materials and workmanship by the Engineer for acceptance of the completed Work. The Engineer will perform acceptance testing of materials and workmanship in accordance with the Contract Documents and reserves the right to perform additional testing at any time to determine conformance with the Contract requirements.
2. Acceptance testing by the Engineer is not to be considered a replacement for control testing conducted by the Contractor or a manufacturer producing materials for the Contract. Acceptance testing will be at the expense of the Authority.

D. Hold and Notification Points

The Contractor will be required to notify the Engineer when certain activities will be performed. These notifications and time requirements will be detailed in the various sections of the Specification. There will be two types of notifications as follows:

Hold Point - A point in a function or process in which the Engineer performs a planned inspection and beyond which work may not proceed without prior approval from the Engineer.

Notification Point - A point in a function or process in which the Engineer may perform an inspection. The Engineer must be notified at this point and work may proceed.

Failure to provide sufficient notice to the Engineer or violating a "Hold Point" may result in the subsequent rejection of the work. Any correction of the work will be at the expense of the Contractor.

E. Control Inspection and Testing

1. Control inspection and testing are the testing or inspection of materials prior to their delivery from a manufacturer, or during construction. Examples of such testing are soils tests before and after compaction, concrete tests during placement, except for concrete strength tests that the Engineer will perform, and other tests and inspections specified in the various sections of the Specifications to ensure compliance with Contract requirements. The Contractor shall assume full responsibility for control inspection and testing and give sufficient notice to the Engineer to permit the witnessing of the inspections or tests. Control inspection and testing shall be at the expense of the Contractor and may be performed by independent firms.

   Notification Point - The QC Manager shall make periodic site inspections of the work areas with the construction supervisors to assure that there are no conditions that would affect the quality of the installation or product. Deficient areas shall be identified, causes identified and deficient conditions corrected. Inspections shall be documented on the “General Inspection Form” contained at the end of this Section. The Contractor shall notify the Engineer in advance of the periodic inspections to allow participation by the Authority.

PART 2 – PRODUCTS (Reserved)

PART 3 – EXECUTION (Reserved)

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

MATERIAL RECEIVING INSPECTION REPORT

CONTRACT NO.: CONTRACTOR:

DATE: REPORT NO.:

MATERIAL RECEIVED:

DESCRIPTION:

QUANTITY:

SUBMITTAL NO.:

ACTIVITY NO.:

MANUFACTURER/SUPPLIER

RECEIVING INSPECTION REQUIREMENTS

REQUIREMENTS	REQ□D	REQ□D	SAT	UNSAT	REQUIREMENTS	SAT	UNSAT	N/A
MATERIAL CERTIFICATION					PHYSICAL CONDITION			
CERTIFICATE OF COMPLIANCE					PACKAGING			
SPECIAL TEST REPORTS					CLEANLINESS			
MANUALS					IDENTIFICATION/MARKINGS			
OWNER RELEASE FORM								

STORAGE AND MAINTENANCE REQUIREMENTS:

MATERIAL COMPLIES WITH CONTRACTURAL REQUIREMENTS: □ YES □ NO

COMMENTS:

CONTRACTOR REPRESENTATIVE DATE:

MBTA REPRESENTATIVE DATE:

NO.

MBTA RESOLUTION REPORT

☐ DESIGN CHANGE		☐ NONCONFORMANCE	
CONTRACTOR:		CONTRACT NO.	
DOCUMENT AFFECTED: ☐ SPEC:		☐ DWG:	☐ OTHER:
DESCRIPTION:			
ORIGINATOR:	DATE:	RES. ENG:	DATE:
DISPOSITION: ☐ DESIGN CHANGE ☐ NONCONFORMANCE ☐ ACCEPT AS IS ☐ REWORK ☐ REPAIR			
PREVENTIVE ACTION:			
DESIGNER:	DATE:	RES. ENG:	DATE:
PROJ. MGR:	DATE:	QA MGR:	DATE:
CORRECTIVE/PREVENTIVE ACTION COMPLETE:			
CONTRACTOR:	DATE:	MBTA INSP:	DATE:
RES. ENG:	DATE:	OTHER:	DATE:

GENERAL CONSTRUCTION INSPECTION REPORT

Contract No: _____
Contract Title: _____
Inspection Date: _____
Plan No(s): _____
Specification Section(s): _____

Inspection Description (State The Work Inspected)
Results Of Inspection Including List of Deficiencies Noted, or State "No Deficiencies"

Contractor

Representative:_____Date:_____
Signature

QC Manager:

_____Date:_____
Signature

END OF SECTION

SECTION 01500

CONSTRUCTION TEMPORARY FACILITIES AND TEMPORARY CONTROLS

1.1 DESCRIPTION

A. This Section specifies the general requirements for furnishing, installing, operating and removing construction temporary facilities and temporary controls during construction.

1.2 TEMPORARY FACILITIES AND SERVICES DURING CONSTRUCTION

A. During the progress of the Work, provide all temporary facilities and services not limited to, the following:

1. Water Supply

   a. Make all arrangements for obtaining temporary water connections, and pay all costs thereby incurred. Furnish, install and pay for all piping and equipment required to provide water for the execution of the Work.

   b. Have location, material, and installation for all temporary piping lines and connections approved by the Engineer. Water for construction purposes may be distributed by means of connections to the permanent system, if available when required, at the expense of the Contractor. Make connections for temporary water to comply with all applicable codes for buildings under construction and fire safety regulations. Remove temporary connections and restore the permanent system as approved by the Engineer.

   c. Pay all costs of water until final acceptance of the Work.

   d. Provide drinking water with suitable cups for all personnel and workmen on the job.

   e. Remove the temporary water service at the completion of the Work.

2. Light and Power

   a. Provide and maintain, including power or fuel, sufficient lights for the safety of construction forces and to ensure the proper construction, inspection and prosecution of the Work, in addition to any lights necessary to protect the Work or the traveling public.

   b. Furnish and install all temporary wiring, extension cords, sockets, and all lamps, both initial and replacement, used for temporary power and lighting systems.

   c. Remove temporary power and lighting systems at completion of the

Work.

d. When permanent electrical power and lighting systems are in operating condition, said systems or portions thereof may be used, in lieu of the temporary service, for construction purposes, provided that the Contractor, (1) assumes full responsibility for the entire power and lighting systems, and (2) pays all costs for operation and restoration of the systems including re-lamping just prior to occupancy by the Authority.

3. Fire Protection

a. Take all necessary precautions to prevent fires at the Work. Provide and maintain adequate facilities for extinguishing fires, taking special precautions in the storage and use of solvents, paints, adhesives, and other flammable materials. No on-site burning or storage of rubbish will be allowed.

4. Weather Protection and Heating During Construction

a. Provide temporary, weather-tight enclosures and heat to permit construction work to be carried on during the months of November through March, if required. These requirements are not to be construed as requiring enclosures or heat for operations that are economically infeasible to protect in the judgment of the Engineer. Included in this category, without limitations, are such items as Site Work, Excavation, Pile Driving, Steel Erection, Erection of Certain Exterior Wall Panels, Roofing, and similar operations.

b. "Weather protection" means the temporary protection of that Work adversely affected by moisture, wind and cold, by covering, enclosing, heating or a combination thereof. Provide adequate protected working areas during the months of November through March as determined by the Engineer and consistent with the approved construction schedule to permit the continuous progress of Work necessary to maintain an orderly and efficient sequence of construction operations. Furnish and install weather protection material and be responsible for costs, including heating required to maintain a minimum temperature of 40 deg F at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials or the applicable general conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.

c. As necessary and within 30 days prior to its expected need, submit to the Engineer in writing, for approval, three copies of proposed methods for weather protection and heating during the construction of those items requiring such protection.

d. Installation and operation of weather protection and heating devices shall comply with safety regulations, including provisions for adequate

ventilation and fire protection devices. Heating devices which may cause damage to finish surfaces shall not be used.

e. Furnish and install one accurate Fahrenheit thermometer at each work area as designated by the Engineer. Provide one additional accurate Fahrenheit thermometer for every 2,000 square feet of floor space where the work areas exceed 2,000 square feet.

f. Assume all risks of damage by the elements to the work under the Contract.

g. Protect work carried on, or materials used in the work or stored during extreme weather, against freezing, drying, wetting, snow or other harmful conditions, and heat, cover, or protect as required by good practice or as directed by the Engineer.

h. Heating during construction shall mean providing protection from cold and moisture by covering, enclosing and heating materials and work under construction and providing suitable working conditions in all areas for all trades employed on the work. Provide all heating during construction and pay costs, including fuel, incurred. Supply and maintain means of properly heating the facility until it is accepted.

i. For facilities and areas not presently being heated from existing sources, and as a result of construction, provide heating and ventilation in enclosed areas within the contract limit lines from the time of enclosure until the acceptance of the Project. The temperature shall:

1) not be less than specified in any Section of the Specification.

2) not be less than that recommended by the manufacturers of the materials incorporated in the Project, whether specified in the pertinent Section or not.

3) be made available sufficiently in advance of any predetermined operation requiring advance heating before operations commence.

4) not be less than required for the protection of all installed work as determined by the Specifications or determined by the Engineer within the range of not less than 55 deg F nor more than 75 deg F.

5) The ventilation shall be adequate for:

a) the areas (volumes involved).

b) the personnel employed therein.

c) the operations planned, under execution or executed.

d) the ensuring of no adverse toxic conditions.

6) Heat and ventilation within buildings shall be, at all times, uniform and constant and shall have such controls as to ensure this requirement, regardless of variances in external temperatures.

j. The permanent heating system may be utilized for temporary heat if specifically authorized by the Engineer.

k. Salamanders shall be allowed for unenclosed form of work and structural concreting operations only with the approval of the Engineer.

l. Unit heaters or other methods of heating shall meet with the approval of the Engineer. Install unit heaters and other heating equipment and operate in such a way that finished work will not be damaged. Any surface damaged by the use of unit heaters or other heating methods selected by the Contractor shall be repaired or refinished to the satisfaction of the Engineer at no cost to the Authority.

m. Provide operating labor for continuous direct attendance, including frequent inspection of the system, emergency repairs, and keeping of temperature records. Continuous direct attendance shall include Saturdays, Sundays, and holidays, throughout the progress of the Work, unless otherwise permitted by the Engineer and so certified in writing.

1.3 SANITARY PROVISIONS

A. Provide and maintain in a neat and sanitary condition, properly secluded, such accommodations for employees as may be necessary to conform to the Commonwealth of Massachusetts Sanitary Codes and all local by-laws and ordinances. Necessary conveniences, properly secluded, shall be provided and maintained for the use of the Engineer, satisfactory to the Engineer and sanitary authorities. No public nuisance will be tolerated.

1.4 MEASUREMENT AND PAYMENTS

A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01545

PROTECTION OF WORK AND PROPERTY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the general requirements for the temporary protection of work and property during the Contract period.

1.2 TEMPORARY PROTECTION

A. Protect the following:

1. Sills, jambs and heads of openings through which materials are handled;
2. All finished surfaces, such as walls, doors, floors, ceilings, treads, and platforms, against damage, mortar droppings, oil, grease, paint, or other material which will stain or mat the finished surface;
3. Roof surfaces where any activity must take place on finished roofing in order to carry out the Contract.

B. After work is properly completed, be responsible for protecting work and for repairing, replacing, and cleaning of damaged work, so that all work is in perfect condition at the time of acceptance of the facility.

C. The Contractor shall protect all tracks within and adjacent to the work zone to prevent damage to the rails, ties, switches, signals, etc., and to prevent fouling of the track ballast. All means of temporary protection shall be approved by the MBTA and MBCR.

D. Remove all temporary protection and coverings at the completion of the Work.

1.3 STAGING

A. The Contractor may utilize a temporary staging area if designated by the Engineer. Any staging area must be set up so as to allow emergency access to the track right-of-way and station building at all times. Keys must be provided to the MBTA and MBCR for any locked access gates. Staging areas shall be fenced off with a chain link fence approved by the Engineer. The Contractor is responsible for the security of any equipment and materials left in the staging area. The Authority assumes no liability for any equipment or materials left in the staging area.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01550

HOT WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies "Hot Work" fire control procedures for contractors and their personnel, including cutters, welders and operators of heating equipment. Hot work is any work that utilizes or produces an ignition source.

1.2 SUBMITTALS

A. Perform "Hot Work" operations as follows:

1. Ensure the safe handling of "Hot Work" equipment and the safe use of the particular "Hot Work" process.
2. Determine the combustible materials and hazardous areas present or likely to be present in the work locations.
3. Protect combustibles from ignition by the following:
   a. Have work moved to a location free from dangerous combustibles.
   b. If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustible properly shielded against ignition.
   c. See that "Hot Work" is so scheduled that any operation which might expose combustibles to ignition is not started during the "Hot Work".
4. Give notice to the project office of the need to perform "Hot Work" operations and secure authorization from the Engineer.
5. Ensure that the cutter or welder secures his or her supervisor's approval that conditions are safe before going ahead with the work.
6. Ensure that fire protection and extinguishing equipment are properly located at the site.
7. Where fire watchers are required, see that they are available at the site.
8. Shall not use the signal rail system of a single rail track circuit as a negative return.
9. Procure all required permits as per Document 00700 - GENERAL CONDITIONS, Articles 5.1 and 5.2.

B. Ensure the worker handles the "Hot Work" equipment safely and uses it so as not to endanger lives or property and:

1. has the approval of his or her supervisor and the MBTA project office before starting any "Hot Work";
2. does not perform any "Hot Work" where conditions are not safe;
3. continues to perform "Hot Work" only so long as conditions are unchanged from those under which approval was granted.

1.3 FIRE PREVENTION PRECAUTIONS

A. Permit "Hot Work" only in areas that are or have been made fire-safe. Within the confines of a building or other enclosed structure, perform cutting and welding operations preferably in a specific area designed or approved for such work, such as a maintenance shop or a detached outside location. Ensure that such areas are of noncombustible or fire resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. When work cannot be moved practicably, as in most construction work, make the area fire-safe by removing combustibles or protecting combustibles from ignition sources.

B. Do not permit "Hot Work" in the following situations:

1. In areas not authorized by the project office;
2. In sprinklered buildings while such protection is impaired;
3. In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts;
4. In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulphur, baled paper or cotton.

C. Before "Hot Work" is permitted, the Engineer will give notification authorizing the "Hot Work", and designate precautions to be followed. He will have designated MBTA personnel inspect the work area for fire safety, as indicated herein, and which personnel will complete a "Hot Work" checklist. The Engineer will also assure himself of the following:

1. The "Hot Work" equipment to be used is in satisfactory operating condition and in good repair.
2. Where there are combustible materials such as paper clippings, wood shavings or textile fibers on the floor, sweep the floor clean for a radius of 35 feet. Keep combustible floors wet, covered with damp sand, or protected by fire resistant shields. Where floors have been wet down, protect personnel operating arc welding or cutting equipment from possible shock.
3. Where practicable, relocate combustibles at least 35 feet from the work site. Where relocation is impracticable, protect combustibles with flame proofed covers or otherwise shield with metal or fire resistant guards or curtains. Secure edges of covers at the floor so they are tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.
4. Tightly cover wall or floor openings or cracks within 35 feet of the site to prevent the passage of sparks to adjacent areas.
5. Suitably protect or shut down ducts and conveyor systems that might carry sparks to distant combustibles.
6. Where "Hot Work" is done near walls, partitions, ceilings or roofs, or combustible construction, provide fire resistant shields or guards to prevent ignition. If welding is to be done on a metal wall, partition, ceiling or roof, take precautions to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, provide a fire watch on the opposite side of the work. Do not attempt welding on a metal partition, wall, ceiling or roof having a combustible covering, nor on walls or partitions of combustible sandwich type panel construction.

7. Do not undertake to perform "Hot Work" on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs if the work is close enough to cause ignition by conduction.
8. Provide sufficient quantities of portable fire extinguishers, appropriate for the type of possible fire, at the work area. Where hose lines are available, connect them so they are ready for service.
9. Suitably protect nearby personnel against heat, sparks, slag, etc.

D. Require the services of Fire Watchers whenever "Hot Work" is performed in locations where other than a minor fire might develop, or where the following conditions exists:

1. Appreciable combustible material in the building construction or contents is closer than 35 feet to the point of operation.
2. Appreciable combustibles are more than 35 feet away, but are easily ignited by sparks.
3. Wall or floor openings within a 35 foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
4. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs, and are likely to be ignited by conduction or radiation.

E. Fire Watcher's responsibilities include:

1. Have fire extinguishing equipment readily available and be trained in its use.
2. Be familiar with facilities for sounding an alarm in the event of fire.
3. Watch for fires in exposed areas, and try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm.
4. Maintain a fire watch for at least one half hour after completion of "Hot Work" operations to detect and extinguish possible smoldering fires.

F. Where a Fire Watch is not required, make a Final Check Up one half hour after the completion of "Hot Work" operations to detect and extinguish possible smoldering fires.

G. Have "hot tapping" operations or other cutting or welding on a flammable gas or liquid transmission or distribution utility pipeline performed only by a crew qualified to make hot taps.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for work required under this Section. Costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

1.1 DESCRIPTION

This Section specifies the general requirements for furnishing. installing and operating temporary controls during construction.

1.2 DEBRIS AND CLEAN UP

A. Debris shall:

1. not be permitted to accumulate: the Work shall at all times be kept satisfactorily clean. Remove debris and rubbish as required by the Engineer.
2. not be disposed of on-site. Under no circumstances shall open fires or incinerators be used for disposal of rubbish or debris.

B. Disposal of debris:

1. Do not throw rubbish. debris, and waste material from windows. platforms, or other parts of the facility. Wet down rubbish, dirt. and other dust-producing materials from time to time.
2. Immediately after unpacking, remove and dispose of all packing materials, case lumber, excelsior, wrapping, or other rubbish from the site.

C. Cleanup:

1. Be responsible for all breakage of glass from the time the glazier has completed his work until the Contract is accepted by the Authority. Replace all broken glass and deliver the entire facility with all glazing in perfect condition, intact and clean. Broken glass shall be replaced in kind: the replacement of special glass shall conform to the original specification and the integrity of special sash shall be retained as specified.
2. Prior to final inspection, the entire exterior and interior of the facility within the Contract limit lines shall be cleared of all rubbish and thoroughly cleaned by the Contractor. including, but not restricted to, the following:
    a. all construction facilities, debris, and rubbish shall be removed from the site.
    b. all finished surfaces within the facility shall be swept, dusted, washed, and polished. This includes cleaning of the work of all finished trades where needed, whether or not cleaning for such trades is included in their respective specifications.
    c. pipe and duct spaces, chases, and crawl spaces shall be thoroughly clean.
    d. all equipment shall be in an undamaged, bright, clean, polished condition.
    e. all glass shall be washed and polished, both sides.

D. The Contractor shall have full responsibility for cleaning up during and immediately upon completion of his work, shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work, leaving the site clean, free of debris and in proper condition.

E. Equipment or material shall not be left within any of the aforementioned areas after acceptance of the Contract without the written permission of the Engineer. Do not abandon any material at or near the site regardless of whether or not it has any value.

1.3 LAWS TO BE OBSERVED

A. Air Pollution Control

1. Comply with the provisions of Section 142B of Chapter 111 of the General Laws pertaining to air pollution within the Metropolitan Air Pollution Control District. The burning of trees, brush, and other combustible materials will not be permitted. Provide satisfactory methods of disposal without additional compensation.
2. On all Federal Aid Projects, submit evidence, to the Engineer, that the governing criteria issued by agencies of the U.S. government pertaining to prevention and control of air pollution can be met.

B. Prevention of Water Pollution

1. Attention is directed to Section 42 of the Massachusetts Clean Waters Act (Chapter 21 of the General Laws as amended).

2. On all Federal Aid Projects, submit evidence to the Engineer that the governing criteria issued by agencies of the U.S. government pertaining to prevention and control of water pollution can be met.

3. Further, during the performance of all work under the Contract, take sufficient precautions in the conduct of operations necessary to avoid contaminating water in adjacent streams or pond areas. All earthwork, grading, moving of equipment, water control in foundation areas, and other operations likely to create silting, shall be planned and conducted so as to avoid or minimize pollution in adjacent streams or pond areas. Water used for any purpose which has become contaminated with oil, bitumen, salt, or other pollutants shall be discharged so as to avoid affecting nearby waters. Under no circumstances shall pollutants be discharged directly into any adjacent stream or pond areas.

4. When water is used from natural sources for any operations, intake methods shall be such as to avoid contaminating the source of supply and maintaining adequate downstream flow when the source is a stream.

5. Attention is directed to Chapter 220. Acts of 1955, relative to inland waters.

D. Energy Policy and Conservation Act

1. Comply with mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC Section 6321 et. seq.).

E. Environmental Violations

1. Comply with the Massachusetts Department of Environmental Protection Regulations for Releases of Oil and Hazardous Materials and all other requirements of the Environmental Protection Agency regulations of the Clean

Air Act and Clean Water Act and any other provisions of law, or amendments thereto including the laws or regulations of local municipalities.

2. All diesel construction equipment used in this contract shall have emission control device installed, such as oxidation catalysts or particulate filters on the exhaust system side of the diesel combustion engine equipment.

1.4 PUBLIC SAFETY AND CONVENIENCE

A. At all times until final acceptance of the Work by the Engineer, the Contractor shall protect the Work and shall take all precautions for preventing injuries to persons or damage to property on or about the site.

B. The Contractor shall comply with all applicable laws, ordinances, rules, and regulations regarding the safety of persons or property or with regard to protecting them from damage, injury, or loss and shall not load or permit any part of the Work to be placed so as to endanger the safety of the Work.

C. The decision for routing traffic through or around the Work and provisions for the control of same will be made by the Engineer. Whenever it is deemed advisable, special detours will be provided for vehicular yard traffic. Highways and streets shall be closed to travel only as directed by the Engineer.

D. Schedule the temporary or permanent closing of highways and city and town ways to travel only after consultation with the Police Chief and Fire Chief of the municipalities concerned. The temporary closing of highways and city and town ways shall be kept to a minimum.

E. When the work in any way affects the operation, management, maintenance, business or traffic on the railroad, carry on such work in a manner satisfactory to the said railroad: but all orders, directions, or instructions to the Contractor relative to Work under the Contract will be issued only by the Engineer. All possible vigilance in order to effectively guard against all accidents or damages on the railroad due to the work, and at all times during the progress of the Work manage and execute the same so as to cause the least possible interference with the operation, management, business or traffic of the railroad

.

1.5 NOISE CONTROL

A. Use every effort and every means possible to minimize noises caused by construction operations, which the Engineer may consider as objectionable. Provide working machinery and equipment designed to operate with the least possible noise, and when gearing is used, such gearing shall be of a type designed to reduce noise to a minimum. Equip compressors with silencers on intake lines. Equip gas or oil operated equipment with silencers or mufflers on intake and exhaust lines. Wherever practicable, electricity shall be used for power to reduce noise. Dumping bins, hoppers, and trucks used for disposal of excavated materials shall be lined with wood or other sound-deadening material if required. Where required by agencies having jurisdiction, certain noise-producing work may have to be performed during specified periods only.

1.6 DUST CONTROL

A. Dust control shall be the responsibility of the Contractor, and furnishing and applying calcium chloride or other dust control material shall be at the Contractor's expense unless specified otherwise in the Contract Specifications.

B. Notify the Engineer, in writing, what measures will be implemented to provide adequate dust control measures. If the actual dust control measures used on the work are inadequate. when directed by the Engineer, immediately provide additional dust control to rectify the situation at no additional expense to the Authority.

1.7 SITE SECURITY AND ACCESS

A. The Contractor shall prepare and submit to the Engineer for approval, a site specific security plan for the all phases of the Work. This plan shall be detailed to address all site security issues of the Work including all subcontractor efforts. The plan shall be maintained and updated as required throughout the Contract duration. The Contractor, Subcontractor, Vendors and Suppliers are required to comply with the approved site security plan at all times. The Contractor is required to provide identification badges for all employees including subcontractors. The badges must include personal photograph, name and employer and must be visible when worn at all times.

END OF SECTION

SECTION 01568

CONSTRUCTION SAFETY

PART 1 GENERAL

1.1 DESCRIPTION

A. This Section specifies requirements to establish a practical, sound, and effective program for the prevention of accidents, and to assign specific responsibilities to Contractors for program compliance.

B. This basic safety program has been designed to assist all site Contractors and their supervisors to recognize, evaluate and control hazardous activities and conditions within their respective areas of contract responsibility.

C. The attached MBTA "Construction Safety Manual," including Safety policy/Procedure (Contractor Safety Violation Program) forms a part of the Contract Specifications and is hereby included on the following pages of this Section 01568.

1.2 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of work to which they pertain.

CONSTRUCTION SAFETY MANUAL

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
BOSTON, MASSACHUSETTS

Prepared by:

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
SAFETY DEPARTMENT

Date Issued: October 26, 1995

Revision: 1.0

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DEFINITIONS

TERM	ABBREVIATION	DEFINITION
MBTA Project Manager	PM	Authorized representative of the MBTA responsible for specific contracts administered by the Resident Engineers.
MBTA	CM	The Authority is responsible for construction management
Contract		The written agreement executed by the Authority and the Contractor, setting forth the obligations of the Parties thereunder.
Contractor		The individual, firm, partnership, corporation, or combination thereof, private, municipal or public, including joint ventures, which, as an independent contractor, has entered into a Contract with the Authority, as Party or Parties of the Second Part, and who is referred to throughout the Contract Documents by singular number.
Subcontractor		The individual, firm, partnership, corporation, vendor, supplier, or combination therefore to whom the Contract, with written approval of the Authority, sublets any part of the Contract.
General Engineering Consultant	GEC	Specific for each contract.
Project		That specific portion of MBTA Transit System indicated in the Contract Documents.
Engineer		The General Manager of the Authority or designee Acting within the scope of the particular duties entrusted to this person.
Resident Engineer	RE	MBTA's field representative responsible for the completion of specific construction contracts.
Contractor Project Manager/Superintendent	CPM/CPS	Contractor's senior management official responsible for the Project beginning with preconstruction activities and extending to final completion of the work.
Safety Director	SD	MBTA's Director of Safety
Contractor Safety Supervisor	CSS	Representative of the Contractor whose sole responsibility is safety and loss prevention.

TERM	ABBREVIATION	DEFINITION
Experience		Individual who possesses at least five years of heavy construction experience, three of which include full-tie on-site safety responsibility. Must be knowledgeable through education and training in occupational safety and health laws and regulations (construction and general industry). It is preferred that the individual possess the CSP designation.
MBTA Safety Manager	PSM	MBTA appointed representative responsible for safety implementation.
Foreman	F	Contractor's Craft Supervisor.

1.0 ADMINISTRATION AND ORGANIZATION

1.1 PURPOSE AND SCOPE

To establish a practical, sound and effective program for the prevention of accidents, and to assign specific responsibilities to Contractors for program compliance.

This basic safety program has been designed to assist all site Contractors and their supervisors to recognize, evaluate and control hazardous activities and conditions within their respective areas of contract responsibility.

The minimum accident prevention activity expected from each Contractor is indicated in each of the following program sections; fewer than these minimums will be considered substandard.

1.2 PROGRAM OBJECTIVES

The objective of this policy is to establish the concept that people and property are our most important assets.

To achieve this goal, all Project safety and loss control efforts shall be directed towards a single goal, the elimination of personal injuries and damage to property, and to minimize the effects of accidents on both the individuals and on the project. Beyond satisfying the obvious humanitarian and moral obligations, specific objectives of the program are:

a. Increased efficiency and attendant cost reductions.

b. Compliance with all statutory requirements.

c. Maintenance of favorable labor and community relations.

d. Improvements of relationship with regulatory agencies.

e. Avoidance of penalties.

1.3 PROGRAM EFFECTIVENESS

The effectiveness of the MBTA Construction Safety Program will depend upon the active participation and personal cooperation of all supervisors and employees, and positive coordination of their efforts toward carrying out the following responsibilities:

1.3.1 Establishing and maintenance of a positive environment and attitude by all levels of management.

1.3.2 Proper planning of all work to minimize personal injury, property damages and loss of production efforts.

1.3.3 Provide constant and consistent safety.

1.3.4 Establish and maintain a system for early detection and correction of unsafe practices and conditions.

1.3.5 Provide adequate protection of adjacent public and private properties to provide for the safety of the public.

1.3.6 Establish and implement safety education programs designed to stimulate and maintain the interest and active participation of all personnel involved with the Project.

a. Safety meetings and safety communications.

b. Investigations of accidents and safety incidents to determine cause, and the taking of necessary corrective actions.

c. Use of proper work procedures, personnel protection equipment and mechanical guards.

d. Safety instruction to individual employees and group safety training program.

e. Maintenance of records of accidents and losses and development of accident/loss experience summaries.

1.4 ORGANIZATION AND ADMINISTRATION

1.4.1 Project Safety Organization

See Exhibit 1-1, Project Safety Organization Chart.

1.4.2 General

This document establishes minimum standards of performance for the implementation and conduct of Safety Operations during the course of a Project.

Each contractor shall take all reasonable precautions in the performance of the work under his contract to protect the safety and health of its employees and members of the public and shall comply with all applicable MBTA, Local, State and Federal safety and health regulations and requirements (including reporting requirements).

The MBTA shall notify the Contractor of any non-compliance and of the corrective action required. This notice, when delivered the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the non-compliance and corrective action required after receiving the notice, the contractor shall immediately take corrective action. If the contractor fails or refuses to take corrective action promptly, the MBTA may, without prejudice to other legal or contractual rights, issue an order stopping all or part of the work; and may subject contractor to safety violation assessments as deemed appropriate by the MBTA thereafter, resumption may be issued at the discretion of the MBTA.

The Contractor shall maintain an accurate record of exposure data on all accidents and incidents occurring under this contract and report this data in a manner prescribed by the MBTA.

The Contractor shall be responsible for all its lower-tier sub-contractor's and vendor's compliance.

Contractor management shall make a commitment for accident prevention and fire prevention. Safety shall take precedence over schedule and production. Enforcement action is mandatory.

1.4.3 Safety Responsibilities

a. **Contractor**

To assist Contractors in fulfilling their responsibility, a Construction Safety Inspection Check List (Exhibit 5.1) has been included in this manual for their use. Contractors are reminded that this list is not all-inclusive and must be considered only a minimum. Contractors should add to it for their particular type of work and work site conditions.

The key to an effective safety program is a proactive Contractor who is expected to take the initiative in accident prevention. Contractors, managers and supervisors will be held accountable for the Safety performance demonstrated by the employees under his/her supervision. The Contractor's responsibilities for safety cannot be delegated to Subcontractors, suppliers of other individuals. Each Contractor is required to designate a full-time; on-site Safety Supervisor who is charged with sole responsibility of on-site safety management under the direction of the Contractor's Project Manager/Superintendent. It is expected that potential safety hazards found to exist on the job will be promptly corrected through informal communications between the Contractor between the Contractor and the MBTA. Notwithstanding these informal procedures, it should be clearly understood that formal communications regarding accident prevention and safety enforcement shall be maintained between the Contractor and the MBTA. Such formal communications are necessary to provide follow-up action on the part of the Contractor and to prevent misunderstandings.

The Contractor is responsible for compliance with the accident prevention and safety requirements contained in this manual and its contract with the MBTA. To achieve this goal, the Contractor shall:

1. Within five (5) days after receipt of notification of contract award, submit to the MBTA a letter signed by the senior operating official of the Contractors organization setting forth the following:

    a. A statement of its company's safety policy based upon compliance with the MBTA Construction Safety Program.

    b. A detailed site specific safety plan which reflects the Contractor's intentions for full and complete compliance with the MBTA Construction Safety Program and the provisions of its contract with the MBTA.

    c. A statement which will reflect its awareness and knowledge of all local, state and federal health and safety codes applicable to its contract with the MBTA.

2. Submit a resume of the qualifications and work experience of the designated Safety Supervisor proposed for assignment to the Project as specified by the Safety and First Aid requirements Section of the Contract. The resume shall be reviewed by the MBTA Safety Department. Contractor's designated Safety Supervisor may be required to appear for a personal interview before designated representatives of the MBTA Project staff and the MBTA Safety Department.

3. Establish and maintain an orientation program for new employees which shall include:

   a. For each individual the hazards present in their work assignment and in the general area in which he will be working.

   b. Personal protective equipment required.

   c. Instruction in the proper procedure for reporting unsafe job conditions which he/she may encounter.

   d. All workers employed by the Contractor who are to work within the Authority's track area, right-of-way or adjacent to the power traction system, shall be required to attend an up to four (4) hour safety awareness course at the Authority's Safety Training location. The location and time of such school will be at the sole discretion of the Authority. The intent of this course is to make the Contractor's personnel aware of the particular hazards related to the Authority's operations.

      At the completion of the Safety Awareness Training, attendees will be issued a serialized sticker for the hard hat and a serialized certification card. The employee must display the hard hat sticker on the left side of their hard hat and carry the card certification on their person at all times when working on the Authority projects. (See Exhibit 1-2)

   e. All personnel working in the immediate vicinity of, or within the right-of-way are required to wear orange safety vests similar to standard Authority equipment. In addition, all Contractors personnel or groups of personnel, working within the right-of-way or within eight (8) feet of track will require the presence of an Authority flagperson on duty at all times.

4. Furnish to the MBTA a copy of all citations and/or warnings of safety violations received from any state or federal jurisdiction agency by its organization or by any of its sub-tier Contractor organizations.

b. <u>Contractor's Project Manager/Superintendent</u>

As the direct representative of the Contractor at the site the Project Manager/ Superintendent shall:

1. See that the Contractor's responsibilities set forth in the safety provisions are fully complied with.

2. Supervise the designated Safety Supervisor in the discharge of its duties and responsibilities.

3. Plan and execute all work in compliance with the stated objectives of the MBTA Construction Safety Program.

4. Assure cooperation with the MBTA Safety Project Manager.

5. Take immediate action to correct unsafe or unhealthful work practices or conditions as necessary.

6. Review and implement administrative actions required to maintain complete and accurate safety records as specified by the MBTA Construction Safety Program recordkeeping requirements.

7. Attend safety meetings as directed by the MBTA Safety Project Manager.

8. Assure that appropriate first aid plans and facilities are established and implemented as stated and outlined in contract.

c. Contractor's Safety Supervisor

1. Make daily safety inspections of the job site(s) and public area contiguous and adjacent thereto and take necessary and timely corrective action(s) to eliminate unsafe acts and/or conditions. Record observations as directed using Construction Safety Survey Report Form Exhibit 8-1 in conjunction with Job Site Daily Safety Checklist.

2. Construction Safety Audit Checklist (Exhibit 5-1) will be completed weekly by Contractor's Safety Supervisor.

3. Review Foreman accident and investigation reports, as required, to assure timely submission, and to initiate corrective action(s) to prevent recurrence.

4. Provide Foremen with material suitable for use in conducting weekly "tool box" safety meetings.

5. Review safety meeting reports submitted by Foremen to ensure adequacy of training as well as subject matter.

6. Assist Foreman in accident investigations and preparation of required reports.

7. Establish and implement a safety training program for Supervisors and employees as applicable to their specific job.

8. Encourage establishment of incentive programs designed to recognize individual employee safety efforts and contributions towards improved safety.

9. Attend safety meetings held by the MBTA.

10. Maintain copies of all required Contractor safety reports.

d. Foremen

Foremen are in first level of supervision. These are the key individuals in an effective safety program. Their initiative and efforts toward accident prevention on

their daily assignments largely determines whether or not a required high degree of safety exists on the job.

A Foreman's responsibility includes:

1. Inspection of its assigned job area to assure that unsafe acts or conditions are identified and corrected.

2. Ensures that safety requirements are adhered to and enforced.

3. Provides and requires the use of proper personal protective equipment and suitable tools for the job.

4. Sets a good example for his/her crew in the matter of safety.

5. Sees that his/her assigned crew is properly instructed in safe work practices when they first arrive on the job and every day thereafter.

6. Investigates all accidents under his/her direct control to determine facts necessary for corrective action.

7. Promptly completes accident reports as required.

8. Conducts weekly "toolbox" safety meetings with personnel to:

    a. Discuss type of work to be or being accomplished and potential risks and/or unsafe conditions to be aware of.

    b. Discusses unsafe work practices and conditions noted.

    c. Reviews accident experience with the crew and discuss corrective action(s).

    d. Encourages personnel to make safety suggestions and to pass these onto the Safety Supervisor for evaluation and possible implementation.

    e. Ensures that prompt first aid is administered.

e. <u>MBTA</u>

The MBTA is responsible for:

1. Inspection, surveillance, and monitoring the safety practices of the Contractor.

2. Requiring timely application of safety and accident prevention procedures to all job site activities and to all persons on the Project including Subcontractor, Visitors, Suppliers and other authorized personnel.

3. Documenting unsafe work conditions wherever observed and reports these conditions per internal MBTA guidelines and issuing citations when warranted, for willful safety violations.

4. Notifying Contractors, in writing, of persistent noncompliance with Project safety requirements.

5. Notifying Contractors or individuals who continually and deliberately violate safety regulations and where appropriate, initiate action to the Contractor or individual from the Project.

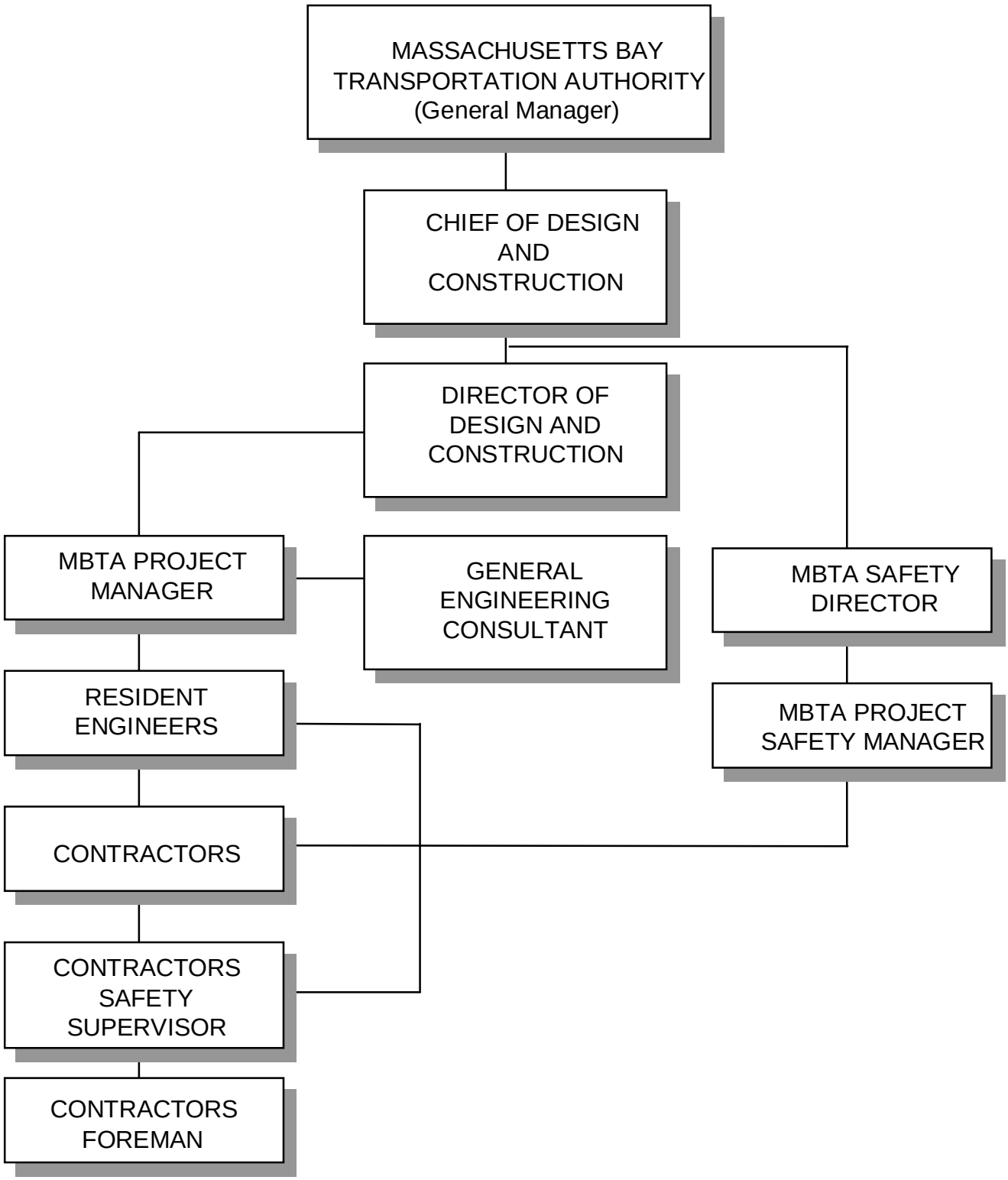
6. In the event of imminent danger requiring immediate corrective action(s). The MBTA, through its designated representative(s), is authorized to order a work stoppage until such time as the condition is corrected.

7. Arranging for or conducting safety training for both contractor and MBTA personnel.

f. Resident Engineer

The MBTA Resident Engineer provides on-site leadership to assigned inspection staff to determine that the construction work is accomplished safely and in accordance with contract plans and specifications.

CONSTRUCTION PROJECT SAFETY ORGANIZATION CHART



2.0 GENERAL SAFETY REQUIREMENTS

2.1 SUBMITTAL OF SAFETY PROGRAM AND QUALIFICATIONS

The contractor shall, within five (5) days after receipt of the award of a contract, submit for approval to the MBTA, a detailed operational Safety and Health Plan. Along with the Plan, the contractor shall submit the name and qualifications of the designated management official assigned responsibility for implementation and administration of the program. The contractor's safety supervisor shall attend MBTA Safety meetings as required. Also, the contractor shall submit it's past three (3) years industrial injury/illness experience for review. Submittal of this experience may be in or obtained from OSHA Form 200. Note: Each employer is subject to record keeping requirements of OSHA 1970, thus must maintain logs and experience modification of all recordable occupational injuries and illnesses.

2.2 REQUIREMENTS

2.2.1 Emergency Action Plan

The Contractor shall establish in its safety plan procedures to handle emergencies created by the following:

a. Injuries to employees.

b. Injuries to the general public on or adjacent to the work site.

c. Property damages with particular emphasis on utilities, pedestrian and vehicular routes.

d. Fire

e. Natural disasters such as earthquakes.

f. Public demonstrations such as mobs, riots, etc.

g. Bombs or other destructive threats.

h. Hazardous material, exposures or other potential hazards that may occur at work site.

i. Severe weather, particularly lightening storms and high winds. Emergency action plans shall be compatible with local police and fire procedures. Emergency procedures shall ensure that Contractor's most senior supervisor present take charge and directs the handling of the emergency.

Emergency procedures shall be reviewed frequently to ensure that Contractor personnel are familiar with the proper actions to take, and that emergency telephone numbers are current. All emergency procedures shall be reviewed and approved by, and coordinated with the MBTA Safety Department Emergency procedures and actions required shall be discussed regularly with the Contractor's supervisory personnel and at "tool box" safety meetings.

2.2.2 First Aid Facilities

In formulating the Emergency Action Plan, the Contractor shall provide for the establishment and staffing of appropriate first aid facilities for the treatment of on the job injuries.

Off-site medical treatment of employee injuries shall be performed at medical facilities named in the Contractor's Safety Submittal.

2.2.3 Serious Accidents

Serious accidents shall be reported immediately to the MBTA Resident Engineer. Contractors shall issue standing orders to all supervisors directly in charge of operations that the scene of the accident shall not be disturbed, except for rescue or other emergency measures, until otherwise directed. Contractor's forces either witnessing or party to the accident shall be detained at the site to provide detailed accounting of facts.

2.2.4 Posting of Emergency Telephone Numbers

To ensure that emergency actions are promptly taken, Contractors shall post emergency telephone numbers in a conspicuous place(s) (all telephone locations). See Exhibit 2-2.

2.2.5 Emergency Plan Implementation

Should an emergency occur, the Contractor shall:

a. Immediately secure the area and implement the emergency action plan.

b. Notify the MBTA Resident Engineer.

c. Provide information regarding the emergency to authorized MBTA representatives only. Questions from the press and media should be referred to the Public Relations/Communications Department of the MBTA.

2.3 Protection of the Public

2.3.1 Protective Measures

All necessary precautions to prevent injury to the public or damage to property of others shall be taken. The public is defined as all persons not employed by or under contract or subcontract to the MBTA. Installation of temporary barriers and/or fencing designated to protect the public shall be reviewed and approved by the MBTA. Precautions shall include but not be limited to the following:

a. Work shall not be performed in any area occupied by the public unless specifically permitted by the contract or in writing by the MBTA

b. When necessary to maintain public use of work areas involving sidewalks, entrances to buildings, lobbies, corridors, aisles, stairways, vehicular roadways, etc., the Contractor shall protect the public in accordance with the applicable OSHA Construction Safety Standards 1926.

c. Sidewalks, entrances to buildings, lobbies, aisles, doors or exits shall be kept clear of obstructions to permit safe ingress and egress of the public at all times.

d. Appropriate warnings, signs and instructional safety signs shall be conspicuously posted where necessary. In addition, a policeman/flagperson shall control the moving of motorized equipment in areas where the public might be endangered.

e. Sidewalks, sheds, canopies, catch platforms and appropriate fences shall be provided when necessary to maintain public pedestrian traffic adjacent to the erection, demolition or structural alteration of outside walls on any structure. The protection required shall be in accordance with all applicable laws and regulations.

f. Whenever practicable, a temporary fence shall be provided around the perimeter of above ground operations adjacent to public areas except where a sidewalk shed or fence is provided by the Contractor as required by subparagraph e., above. Perimeter fences shall be at least six (6) feet high. They may be constructed of wood or metal or wood frame and sheathing, wire mesh, a combination of both, or as otherwise provided in contract documents. When the fence is adjacent to a sidewalk near a street intersection, at least the upper section of fence shall be open wire mesh from a point not over four (4) feet above the sidewalk and extending at least twenty-five (25) feet in both directions from the corner of the fence.

g. Guard rails shall be provided on both sides of vehicular and pedestrian bridges, ramps, runways and platforms. Pedestrian walkways elevated above adjoining surfaces, or walkways within six (6) feet of the top of excavated slopes or vertical banks, shall be protected with guardrails, except where sidewalk sheds or fences are provided as required by subparagraph e., above. Guardrails shall be constructed in accordance with MBTA requirements.

h. Barricades shall be provided where sidewalk shed, fences or guardrails as referenced above are not required between work areas and pedestrian walkways, roadways or occupied buildings. When a barricade is removed temporarily for the purpose of work, a policeman/flagperson shall be placed at all openings.

i. Temporary sidewalks shall be provided when a permanent sidewalk is obstructed by the Contractor's operations. Guardrails shall be provided on both sides of temporary sidewalks.

j. Warning signs and lights shall be maintained from dusk to sunrise along guardrails, barricades, temporary sidewalks and at every obstruction to the public. They shall be placed at both ends of such protection or obstructions and not over twenty (20) feet apart alongside of such protection or obstruction.

k. Fuel-burning type lanterns, torches, flares or other open flame devices are prohibited within twenty (20) feet of open utility manholes until certified safe for entry.

2.4 Group Tours and Site Visitors

2.4.1 Conduct of Tours

It is particularly important that a high degree of protection be afforded all persons on authorized tours of construction worksites. The following instruction shall be complied with, as applicable, by the Contractor and those responsible for arranging such tours. Except for technical inspection tours, made by MBTA staff members and their sponsored guests, the following procedures shall be followed:

a. Group tours must be cleared through the MBTA, allowing maximum advance notice and in compliance with MBTA Policy and Procedures.

b. MBTA will coordinate the tour arrangements and ensure notification to the Contractors Project Manager.

c. MBTA will coordinate the following with the individual or organization requesting the tour:

1. Number of Visitors - Tour groups in non-hazardous areas will be limited to no more than 10 person per tour guide.

2. Clothing - Visitors will be required to wear pants or slacks, shirt/blouse, and suitable work shoes.

3. Children - Children under 12 not permitted on tours. Children ages 12 to 15 must be accompanied by an adult.

4. Protective Equipment - Hard hats, raincoats, eye protection, earplugs, and other protective devices will be required as necessary.

5. Release and Hold Harmless Agreement - Each visitor shall be required to sign the agreement prior to the commencement of the tour. MBTA staff members and guides shall familiarize their group(s) with the hazards to be encountered on the tour prior to entering the worksite.

2.5 Substance Abuse/Prevention/Testing Program

2.5.1 The Contractor shall establish a substance abuse policy and testing program that includes the following elements:

- Deterrence
- Treatment and Rehabilitation
- Detection
- Enforcement

The MBTA reserves the right to approve the proposed substance abuse program prior to commencing the contract.

2.6 Criteria for Substance Abuse Policy and Testing Programs for Construction Contractors

Each contractor will have in place a written policy on substance abuse that emphasizes the goal of maintaining a drug and alcohol free workplace. This policy should contain minimally the following elements:

2.6.1 Deterrence

Use of drugs and alcohol while on or near MBTA property is strictly forbidden. Each employee should receive a copy of the policy on substance abuse and appraised of the requirement that he/she is expected to be drug/alcohol free when reporting for work and at all times while on or near MBTA property or while acting in any capacity as an agent of the contractor.

2.6.2 Treatment and Rehabilitation

Information regarding treatment and rehabilitation programs must be made available to employees. This can be accomplished by providing information regarding such program that are available through health insurance benefits, union health and welfare funds, Employee Assistance Programs, or community organizations. Employees are responsible for any costs related to rehabilitation or treatment that are not covered by health insurance or union health or welfare funds. Employees should be encouraged to seek help for drug and/or alcohol problems before their job performance is affected.

2.6.3 Detection

Each contractor, in order to promote and maintain a drug and alcohol free environment, will utilize a program of drug and/or alcohol screening which will be mandatory under the following conditions:

a. Pre-Employment

Prior to assignment, all contracted employees will be required to submit a drug and/or alcohol test as a condition of employment. Prior to the test, the employee must sign a release authorizing the procedure.

A urine test will screen for the presence of marijuana, cocaine, opiates, phencyclidine (PCP), amphetamines, barbiturates, benzodiazepenes, methadone, methaqualone, and propoxyphene. A blood test will screen for alcohol.

b. Probable Cause

An employee who reports to work in an unfit condition or is found to be unfit while on duty and/or who exhibits behavior which provides one (1) supervisor with probable cause that the employee is unfit for duty will be required to submit to a drug and alcohol screen. The employee will be given a urine test for marijuana, cocaine, opiates, phencyclidine (PCP), amphetamines, barbiturates, benzodiazepenes, methadone, ethoaqualone and propoxyphene. A blood test will screen for alcohol.

c. Post Accident/Incident

Whenever any of the following occurs, the employee(s) involved will be required to submit to a drug and alcohol screen.

- Any MBTA-related event on/or involving MBTA property or personnel that results in a fatality.
- Any MBTA-related personal injury to an employee, or member of the public, which requires or should reasonably require medical attention.
- Any MBTA-related event causing significant or unusual property damage, as determined by an MBTA management official.
- Any MBTA event which appears to involve violation of Authority rules which poses a safety threat to employees or members of the public. The employee(s) in these

situations must be tested unless at the time of the accident/incident the employee's performance can be completely discounted as a contributing factor to the accident/incident. The screen should be completed immediately, but absent unusual circumstances, not more than eight (8)hours after the accident/incident in question.

In the event of hospitalization and unless medical precluded, a drug/alcohol will be ordered at the treatment facility if treatment is expected to exceed eight (8) hours.

This drug and alcohol screen will be identical to that utilized in Probable Cause.

d. Return to Work

Whenever an employee returns to work under the conditions listed below, the employee will be required to submit to a drug/alcohol screen before returning to work.

This drug and/or alcohol screen shall be required when:

The employee has previously failed a post accident/incident, probable cause, return to work or random screen.

The employee is returning from a drug and/or alcohol rehabilitation program known to or arranged by the contractor or made known to the contractor.

The employee is returning to work for any reason from an absence longer than thirty (30) calendar days. This drug and alcohol screen will be identical to that utilized in Probable Cause.

e. Random

All employees will be submitted to drug screening on an unannounced and random basis. A scientifically valid method of selection must be utilized to ensure that each employee has an equal chance of being selected.

A urine test will be used to screen for the presence of marijuana, cocaine, opiates, phencyclidine (PCP) and amphetamines.

2.6.4 Enforcement

Enforcement of the policy and testing program is essential if deterrence, treatment, and detection are to be successful. Accordingly, the use, sole or possession of illegal drugs, and use of intoxicants resulting in unfitness for duty as well as the use or possession of intoxicants on any construction site is prohibited and will result in the employee's permanent removal from the project.

a. Consequences of Positive Test Result

1. Pre-Employment

A positive drug or alcohol test result in this category will render the individual not qualified for employment on an MBTA project. The individual can reapply for employment after one (1) calendar year. However, the applicant must provide documentation that he/she has

received rehabilitation/treatment for substance abuse in order to be considered for employment after the one year period.

2. Post Accident/Incident

Any employee involved in an accident/incident who tests positive for drugs and/or alcohol will be discharged, regardless of the ultimate preventability determination or the extent of any damage or personal injury.

3. Probable Cause

Any employee who tests positive for drugs and/or alcohol pursuant to a probable cause screen will be discharged. The probable cause determination will be made by one Authority supervisor/manager.

4. Return to Work

Any employee who tests positive for drugs and/or alcohol pursuant to a return to work screen shall be suspended for forty (40) working days. During this period, he/she will be required to obtain an evaluation by a substance abuse professional (SAP). The substance abuse professional shall be an individual who is a licensed physician (medical doctor or doctor of osteopathy), or a licensed or certified psychologist, social worker, employee assistance professional or additional counselor (certified by the National Association of Alcoholism and Drug Abuse Counselors Certification Commission), with knowledge of an clinical experience in the diagnosis and treatment of drug and alcohol related disorders. The employee will be required to submit to any and all treatment recommendations made by the SAP. The cost of any recommendations made by the SAP. The cost of any recommended treatment or counseling as well as the initial evaluation by the SAP will be at the employee's own expense unless covered by health insurance or union health and welfare funds.

The employee will not return to work without documentation from the SAP that he/she has completed all treatment recommendations. In addition, the employee will be required to submit to and pass a return to work drug and alcohol screen. A second positive screen in this category will result in discharge.

5. Random

Any employee who fails a random drug screen will be subject to the disciplinary actions as outlined above under return to work.

6. Refusal to Take Test

Any employee who refuses to submit to any drug and/or alcohol test, either by word or action, will be discharged. This will include any employee who fails to provide a urine sample within a reasonable time period. However, employees who have difficulty providing a sample will be given liquids and an ample opportunity to produce a sample. This time period should not exceed two (2) hours from the time at which the employee arrived at the clinic or hospital unless there are extenuating medical circumstances.

Employees who notify their supervisor that they are ill when they have been informed or are anticipating they will be informed they are required to take a drug and/or alcohol test will be given prompt medical attention, which will also include a drug and/or alcohol test.

7. Test Tampering and/or Non-Compliance with Testing Procedures

In situations where it has been determined that an employee has tampered with his/her urine sample or an employee refuses or fails after reasonable opportunity to complete any step in the drug testing process, he/she will be discharged.

EMERGENCY

AMBULANCE_____

FIRE-RESCUE_____

HOSPITAL_____

POLICE_____

MBTA RESIDENT ENGINEER_____

ALTERNATE_____

(POSTING IS REQUIRED BY OSHA 1926.)

(EXHIBIT 2-2)

SAFETY STANDARDS

American Concrete Institute
American National Red Cross
American National Standards Institute
American Petroleum Institute
American Society of Mechanical Engineers
American Society for Testing Materials
American Welding Society
Associated General Contractors of America
Buildings Officials Conference of America
Department of Transportation
Federal Transportation Administration
E.I. DuPont de Nemours & Company
Federal Fire Council
Federal Safety Council
Industrial Hygiene Foundation of America, Inc.
Institute of Makers of Explosives
Interstate Commerce Commission
Massachusetts Division of Labor and Industries
National Bureau of Standards
National Fire Protection Association
National Safety Council
Occupational Safety and Health Act, U.S. Department of Labor
Underwriters Laboratories, Inc.
United States of American Standards Institute
Nuclear Regulatory Commission
U.S. Army, Corp. of Engineers
U.S. Department of Interior, Bureau of Mines
U.S. Government, General Services Administration
U.S. Urban Mass Transportation Administration

3.0 INSTRUCTION AND TRAINING

3.1 Basic Elements

The following areas of instruction and safety communication will promote satisfaction of the statuary as well as the Project requirements:

- Indoctrinations
- Right-of-Way Safety Awareness Assignments
- Meetings
- Personal Contact
- Specific Instruction
- Promotional Material
- Bulletin Board

3.2 Procedures

The MBTA Safety personnel are available to assist Contractor's in carrying out their accident prevention instruction and training responsibilities.

3.2.1 Indoctrination

Newly employed, promoted and/or transferred personnel shall be fully instructed in the safety practices required by their new assignments. Initial instructions for new project personnel will include discussion of the project's basic safety regulations.

3.2.2 Right-of-Way Safety Awareness

Newly employed, promoted and/or transferred personnel shall be fully instructed in the right-of-way safety practices required by their new assignments. Personnel will not be allowed on the job site unless they have attended the Right-of-Way Safety Awareness training session. They must display the Hard Hat sticker, and carry a certification card.

3.2.3 Work Assignments

All work assignments, regardless of level, should include specific instruction on safety, especially in instances where experience or the nature of the assignment indicates the possibility of personal injury or property damage.

3.2.4 Meetings

Holding properly conducted safety meetings of reasonable length is an effective means of communicating with employees. To be effective, the material presented must be specific as well as practical.

a. Operational or Progress Meetings

Whether these meetings are held at a Project or Contractor level, accident prevention shall be an agenda item and the record of these meetings should reflect the specific items discussed.

b. Crew Training Meeting

Each Foreman shall hold a weekly safety training meeting in its work area with its entire crew. These meetings often called "tool box" or "tail gate" meetings are ideally held on Monday morning and should usually last five to ten minutes. Subject matter should cover specific safety procedures pertinent to the crew's on-going activity. Following these meetings, "Report of Safety Meeting" Form (Exhibit 3-1) shall be completed. The Contractor's designated Safety Supervisor shall periodically attend and participate in these meetings.

3.2.5 Personal Contact

All levels of supervision shall make a specific effort to call to the attention of individuals under their direction, pertinent safety items relative to work. This personalized "on the spot" instruction is an extremely valuable training technique, as well as continuing indication of management's awareness and concern for safety.

3.2.6 Specific Instruction

OSHA's Construction Safety Standards require that varying degrees of training and instruction be afforded Project personnel engaged in specific areas of performance. Among the requirements listed are:

a. Unsafe Conditions (All Employees)

b. Use of Poison or Caustics (Exposed Employees)

c. Use of Flammable Liquids, Etc. (Employees Using)

d. Use of Respiratory Protection (As Required)

e. Gas Welding and Cutting (Employees Performing)

f. Arc Welding (Employees Performing)

g. Toxic Substance (Employees Using)

h. Hazardous Material Communication Program (All Employees)

3.2.7 Promotional Material

Posters and signs are useful means for wide dissemination of instruction and training. The value of both have been repeatedly demonstrated.

Basic safety signs are normally permanent while posters are temporary and should be changed frequently to maintain relevance with the changing job site environment.

3.2.8 **Bulletin Board**

The Contractor shall provide a bulletin board at the work site(s) in an area accessible to all employees. The Bulletin Board shall be utilized for the required OSHA and other MBTA distributed information, safety information and posters.

MBTA CONSTRUCTION SAFETY

"WEEKLY TOOLBOX SAFETY MEETING"

DATE:_____

MBTA CONTRACT NO._____

PROJECT:_____

CONTRACTOR:_____

CRAFT:_____

NO. ATTENDING:_____

TOPIC(S) DISCUSSED:

SUGGESTIONS FOR IMPROVEMENTS:

_____

FOREMAN'S SIGNATURE

_____

SAFETY REPRESENTATIVE

(EXHIBIT 3-1 (B)

ATTENDANCE ROSTER DATE:_____

	NAME (PRINTED)	SIGNATURE	CRAFT
1.			
2.			
3.			
4.			
5.			
6.			
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25.			

4.0 WORK PRACTICES CONTROL

4.1 Procedures

The techniques to be applied by the Contractor in the control of employee unsafe acts are identical to those that are utilized in the achievement of production quality and quantity control.

4.1.1 Supervisory Controls

a. Contractor - Each Contractor shall be responsible for continuous surveillance of its operations, so that he is aware of the probable sources of potential injury or loss due to unsafe acts or procedures.

b. Contractor Supervisor - The practical safety experience of project supervision must be utilized in directing the actions of those under their direction.

4.1.2 Project Controls

Frequent monitoring surveillance and audit of the performance of Contractors and its supervision will be made by MBTA Inspectors, Resident Engineers, the Project Safety Manager and/or its designated representative(s). In all instances, Contractors will be notified in writing of any serious unsafe practices observed. Failure to notify the Contractor shall not relieve the Contractor of its obligation to identify and correct unsafe practices. The Contractor's Safety Supervisor, the MBTA Project Safety Manager and other designated safety personnel shall utilize Exhibit 8-1, "Construction Safety Survey", to record unsafe practices and/or conditions. Instructions for completing Exhibit 8-1 are contained in Section 8.0.

4.1.3 Working On Or Near Third Rail

When working on or near the third rail, when the power is off, the contractor must have a third rail high-voltage warner device (Julian A. McDermott Corp. Mod RR4WL-WSAD-LI or MOD RRail-WSAD-LI-DP). This device will warn work crews if the third rail becomes energized at any time during work activity involving the right-of-way.

5.0 PHYSICAL CONDITIONS CONTROL

5.1 Procedures

5.1.1 Planning

It is an accepted principle of accident prevention that effective control of physical conditions must begin with planning. Many more serious accidents result from poor planning (or worse, lack of planning) than from any other cause. Planning, for the safety of personnel and for equipment being used, must begin with design and continue through Project completion. Contractors shall plan the safety procedures to be followed for each phase of construction. Planning meetings must include the involved Contractor, its responsible members of the MBTA's staff, and any other responsible party who may contribute to the safety of the operation.

Personnel chosen to perform any such planned operation shall be thoroughly instructed in all aspects of the procedure, including emergency actions to be taken in the event of a mishap.

5.1.2 Responsibility

The Contractor is ultimately responsible for effective performance under this section through its Superintendent or Foremen. This is because the Superintendent or Foreman has direct control of the work being performed. As such, he has the last opportunity to observe and correct any unsafe acts and/or conditions that may exist.

5.1.3 Inspections

There are a number of physical equipment inspections required by OSHA. One example is crane inspection: A "competent person" must be responsible for the regular inspection of cranes, including all wire rope. A written record of these inspections must be maintained on the site.

a. Contractor's Safety Supervisor

The Contractor shall ensure that its Safety Supervisor regularly inspects each of the work areas (including storage, office and shop facilities) to ensure compliance with MBTA and OSHA requirements. "Construction Inspection Check List", (Exhibit 5-1) is to be used on a weekly basis.

b. Crane Inspection Record

(Exhibit 5-2) and Wire Rope Inspection Record (Exhibit 5-3) are to be completed by the MBTA competent person prior to use on the job site.

c. Crane and Wire Rope Inspections

Shall be performed by the Contractor per OSHA requirements.

d. OSHA Compliance Officers

Contractors may expect periodic safety inspections from OSHA Compliance Officers. Contractors shall promptly notify the Resident Engineer whenever an OSHA Compliance Officer arrives on the Project.

e. Inspectors, Resident Engineers, Construction Project Manager, Safety Director, Project Safety Manager

Contractors may expect continuous surveillance, monitoring, and audit of the safety practices and procedures by the MBTA staff above. Full cooperation of the Contractor shall be given to correct in a timely manner any safety discrepancies noted verbally or in writing by the MBTA staff above. Surveillance, monitoring, and audits shall not relieve the Contractor of any of its safety obligations.

5.1.4 Information Exchange

The free flow and exchange of any information that may contribute to safe operations between the Contractor's Safety Supervisor and the MBTA staff is strongly encouraged.

5.1.5 Equipment and Facilities

Contractor operating equipment and facilities shall be used, inspected, and maintained as directed in this manual and as dictated by the applicable federal and state safety and health regulations. In the event of conflict the more stringent requirement will take precedence.

5.1.6 Notification of Hazards

Contractors shall notify the Resident Engineer/Project Safety Manager, in writing, of the existence of any hazardous conditions, property or equipment at the work site which are not under the Contractor's control. However, it is the Contractor's responsibility to take all necessary precautions against injury to persons or damage to property from such hazardous conditions until corrected by the responsible party.

5.1.7 Work Authorizations

The following work authorizations will be issued by the MBTA:

a. Excavation

b. Hotwork

c. Confined Space Entry

d. Crane-Suspended personnel platforms

Construction Safety Inspection Check List

Contractor: _____ Contract No._____
Jobsite Location: _____
Person in Charge: _____
Date:_____ Time:_____
Person(s) making inspection:
_____
_____
_____

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
(1)	PROGRAM ADMINISTRATION:			
	(a) Posting OSHA and other jobsite warning posters.			
	(b) Do you have safety meetings?			
	(c) Do you have job safety training, including first-aid training?			
	(d) Are there medical service and first-aid equipment, stretchers, and emergency vehicles available?			
	(e) Are jobsite injury records being kept?			
	(f) Are emergency telephone numbers, such as police department, fire department, doctor, hospital, and ambulance posted?			
(2)	HOUSEKEEPING AND SANITATION:			
	(a) General neatness of working areas.			
	(b) Regular disposal of waste and trash.			
	(c) Passageways and walkways clear?			
	(d) Adequate lighting.			
	(e) Projecting nails removed.			
	(f) Oil and grease removed.			
	(g) Waste containers provided and used.			
	(h) Sanitary facilities adequate and clean.			
	(i) Drinking water tested and approved.			
	(j) Adequate supply of water.			
	(k) Disposal drinking cups.			
	(b) Fire extinguishers identified, checked, lighted.			
	(c) Phone number of fire department posted.			
	(d) Hydrants clear, access to public thoroughfare open.			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	(e) Good housekeeping.			
	(f) "No smoking" posted and enforced where needed.			
	(g) Fire brigades.			
(4)	ELECTRICAL INSTALLATIONS:			
	(a) Adequate wiring, well insulated.			
	(b) Fuses provided.			
	(c) Fire hazards checked.			
	(d) Electrical dangers posted.			
	(e) Proper fire extinguishers provided.			
	(f) Are terminal boxes equipped with required covers? Are covers used?			
(5)	HAND TOOLS:			
	(a) Proper tool being used for each job.			
	(b) Neat storage, safe carrying.			
	(c) Inspection and maintenance.			
	(d) Damaged tools repaired or replaced promptly. Are employee's tools inspected and repaired?			
(6)	POWER TOOLS:			
	(a) Good housekeeping where tools are used.			
	(b) Tools and cords in good conditions.			
	(c) Proper grounding.			
	(d) Proper instruction in use.			
	(e) All mechanical safeguards in use.			
	(f) Tools neatly stored when not in use.			
	(g) Right tool being used for the job at hand.			
	(h) Wiring properly installed.			
(7)	POWER-ACTUATED TOOLS:			
	(a) Local laws and ordinances complied with.			
	(b) All operators qualified.			
	(c) Tools and charges protected from unauthorized use.			
	(d) Competent instruction and supervision.			
	(e) Tools checked and in good working order.			
	(f) Tools not used in any, but recommended			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	materials.			
	(g) Safety goggles of face shields.			
	(h) Flying hazard checked by backing up, removal of personnel, or use of captive stud tool.			
(8)	LADDERS:			
	(a) Ladders inspected and in good condition?			
	(b) Properly secured to prevent slipping, sliding, or falling?			
	(c) Do siderails extend 36" above top of landing?			
	(d) Rungs or cleats not over 12" on center.			
	(e) Stepladders fully open when in use.			
	(f) Metal ladders not used around electrical hazards.			
	(g) Proper maintenance and storage.			
	(h) Are ladders painted?			
	(i) Are safety shoes in use?			
(9)	SCAFFOLDING:			
	(a) Is erection properly supervised?			
	(b) Will all structural members meet the safety factor?			
	(c) Are all connections secure?			
	(d) Is scaffold tied into structure?			
	(e) Are working areas free of debris, snow, ice, grease?			
	(f) Are foot sills and mud sills provided?			
	(g) Are workers protected from falling objects?			
	(h) Is scaffold equipment in good working order?			
	(i) Are guard rails, intermediate rails, and toeboards in place?			
	(j) Are ropes and cables in good condition?			
(10)	HOISTS, CRANES AND DERRICKS:			
	(a) Inspect cables and sheaves.			
	(b) Check slings and chains, hooks, and eves.			
	(c) Equipment firmly supported.			
	(d) Outriggers used if needed.			
	(e) Power lines inactivated, removed, or at safe distance.			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	(f) Proper loading for capacity at lifting radius.			
	(g) All equipment properly lubricated and maintained.			
	(h) Signalmen where needed.			
	(i) Signals understood and observed.			
	(j) Are inspection and maintenance logs maintained?			
(11)	HEAVY EQUIPMENT			
	(a) Regular inspection and maintenance.			
	(b) Lubrication and repair of moving parts.			
	(c) Lights, brakes, warning signals operative.			
	(d) Wheels chocked when necessary.			
	(e) Haul roads well maintained and laid out properly.			
	(f) Protection when equipment is not in use.			
	(g) Are shut-off devices on hose lines in case of hose failure?			
	(h) Are noise arresters in use?			
(12)	MOTOR VEHICLES:			
	(a) Regular inspection and maintenance.			
	(b) Qualified operators.			
	(c) Local and state vehicles laws and regulations observed.			
	(d) Brakes, lights, warning devices operatives.			
	(e) Weight limits and load sizes controlled.			
	(f) Personnel carried in a safe manner - seated.			
	(g) Is all glass in good condition?			
	(h) Are back-up signals provided?			
	(i) Are fire extinguishers installed where required?			
(13)	GARAGES AND REPAIR SHOPS:			
	(a) Fire hazards.			
	(b) Dispensing of fuels and lubricants.			
	(c) Good housekeeping.			
	(d) Lighting.			
	(e) Carbon monoxide dangers.			
	(f) Are all fuels and lubricants in proper containers?			

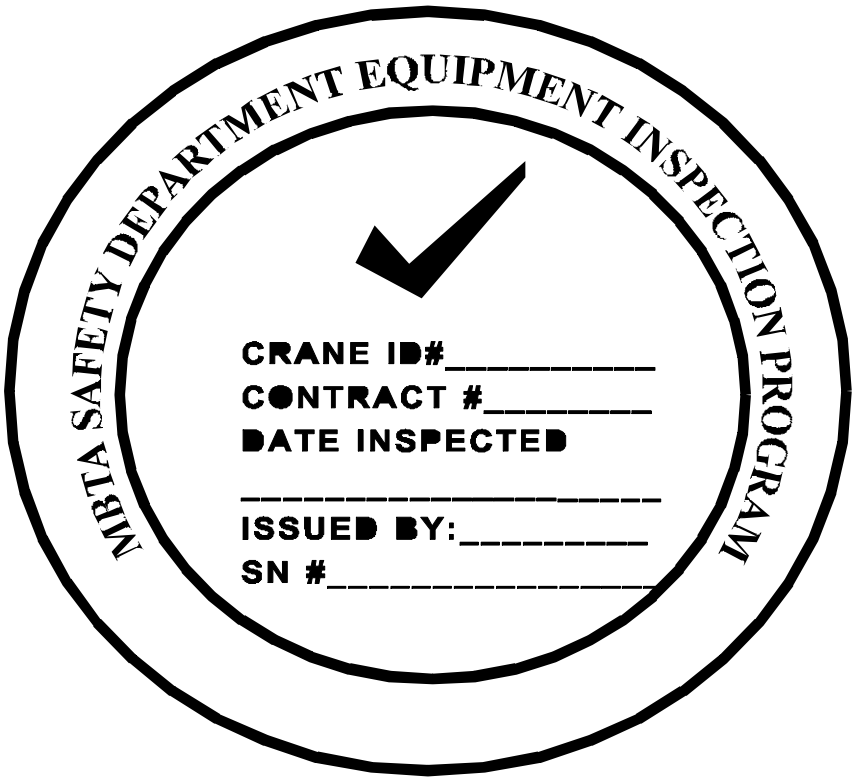
		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	(g) Proper ventilation.			
	(h) Proper grounding and bonding.			
(14)	BARRICADES:			
	(a) Flood openings planked over or barricaded.			
	(b) Roadways and sidewalks effectively protected.			
	(c) Adequate lighting provided.			
	(d) Traffic controlled.			
(15)	HANDLING AND STORAGE OF MATERIALS:			
	(a) Are materials properly stored or stacked?			
	(b) Are passageways clear?			
	(c) Stacks on firm footings, not too high.			
	(d) Proper number of men for each operation.			
	(e) Are men lifting loads correctly?			
	(f) Are materials protected from weather conditions?			
	(g) Protection against falling into hoppers and bins.			
	(h) Is dust protection observed?			
	(i) Extinguishers and other fire protection.			
	(j) Is traffic controlled in the storage area?			
(16)	EXCAVATION AND SHORING:			
	(a) Are adjacent structures properly shored?			
	(b) Is shoring and sheathing used for soil and depth?			
	(c) Are roads and sidewalks supported and protected?			
	(d) Is material stored too close to excavations?			
	(e) Is excavation barricaded and lighting provided?			
	(f) Is equipment a safe distance from edge of excavation?			
	(g) Are ladders provided where needed?			
	(h) Are equipment ramps adequate?			
	(i) Is job supervision adequate?			
(17)	DEMOLITION:			
	(a) Are operations planned ahead?			
	(b) Is there shoring of adjacent structures?			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	(c) Are material chutes used?			
	(d) Is there sidewalk and other public protection?			
	(e) Clear operating space for trucks and other vehicles.			
	(f) Adequate access ladders or stairs.			
(18)	FILE DRIVING:			
	(a) Are there proper storage procedures?			
	(b) Is unloading only by properly instructed workmen?			
	(c) Are steamlines, slings, etc., in operating condition?			
	(d) Are piled riving rigs properly supported?			
	(e) Are ladders on frames?			
	(f) Are cofferdams maintained and inspected?			
	(g) Is adequate pumping available?			
	(h) Is man protection adequate?			
(19)	EXPLOSIVES:			
	(a) Qualified operators and supervision.			
	(b) Proper transport vehicles.			
	(c) Local laws and regulations observed.			
	(d) Storage magazines constructed per regulations or as recommended.			
	(e) Experienced personnel handling explosives at all times.			
	(f) Cases opened properly.			
	(g) “No smoking” posted and observed where appropriate.			
	(h) Detonators tested before each shot.			
	(i) All personnel familiar with signals and signals properly used at all times.			
	(j) Inspection after each shot.			
	(k) Proper protection and accounting for all explosives at all times.			
	(l) Proper disposition of wrappings, waste, and scrap.			
	(m) Advise residents nearby of blasting cap damage, and inspect potential damage points.			
	(n) Check radio frequency hazards.			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
(20)	FLAMMABLE GASES AND LIQUIDS:			
	(a) All containers clearly identified.			
	(b) Proper storage practices observed.			
	(c) Fire hazards checked.			
	(d) Proper storage temperatures and protection.			
	(e) Proper types and number of extinguishers nearby.			
	(f) Carts for moving cylinders.			
(21)	WELDING AND CUTTING:			
	(a) Are operators qualified?			
	(b) Screens and shields.			
	(c) Goggles, gloves, and clothing.			
	(d) Equipment in operating condition.			
	(e) Electrical equipment grounded.			
	(f) Power cables protected and in good repair.			
	(g) Fire extinguishers of proper type nearby.			
	(h) Inspection for fire hazards.			
	(i) Flammable materials protection.			
	(j) Gas cylinders chained upright.			
	(k) Gas lines protected and in good condition.			
	(l) Are cylinders caps in use?			
(22)	STEEL ERECTION:			
	(a) Safety nets or planked floors.			
	(b) Hard hats, safety shoes, gloves.			
	(c) Taglines for tools.			
	(d) Fire hazards at rivet forge and welding operations.			
	(e) Floor opening covered and barricaded.			
	(f) Ladders, stairs, or other access provided.			
	(g) Hoisting apparatus checked.			
	(h) Safe man position.			
(23)	CONCRETE CONSTRUCTION:			
	(a) Forms properly installed and braced.			
	(b) Adequate shoring, plumed, and cross braced.			

		Column: A=Adequate: B=Inadequate		
		A	B	Remarks
	(c) Shoring remains in place until strength is attained.			
	(d) Proper curing period and procedures.			
	(e) Check heating devices.			
	(f) Mixing and transport equipment supported and traffic planned and routed.			
	(g) Adequate runways.			
	(h) Protection from cement dust and concrete contact.			
	(i) Nails and stripped form material removed from area.			
(24)	MASONRY:			
	(a) Proper scaffolding.			
	(b) Masonry saws properly equipped, dust protection provided.			
	(c) Safe hoisting equipment.			
(25)	HIGHWAY CONSTRUCTION:			
	(a) Laws and ordinances observed.			
	(b) Competent flagmen properly dressed, instructed, posted.			
	(c) Adequate warning signs and markers.			
	(d) Equipment not blocking right-of-way.			
	(e) Traffic control through construction site.			
(26)	PERSONAL PROTECTION EQUIPMENT:			
	(a) Eye protection.			
	(b) Face shields.			
	(c) Respirators and masks.			
	(d) Helmets and hoods.			
	(e) Head protection.			
	(f) Gloves, aprons, and sleeves, rubber or plastic, designed to afford protection from alkalis and acids, electricians' rubber gloves with protectors.			

Exhibit 5-2



CRANE SAFETY INSPECTION REPORT

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

CRANE SAFETY INSPECTION REPORT

CONTRACTOR		SUB CONTRACTOR		JOB. NO.	CFSR #
ADDRESS		TELEPHONE	LOCATION	INSPECTION DATE	INSPECTION STICKER #
MANUFACTURER	CAPACITY	SER. #	MODEL #	UNIT #	TIME

OPERATOR'S INFORMATION NAME_____ LICENSE #_____ EXPIRATION DATE_____	ITEM #	SAT.	UNSAT.	N/A	DEFICIENCIES
RECORDS/SIGNS					
Current Annual Inspection Report					
Preventive Maintenance Records					
Operator's Manual/Instructions					
Marked Operator Controls					
Load Charts					
Caution or Informational Signs					
Hand Signal Chart					
High Voltage Warning Signs					
Counterweight Warning Signs					
SAFETY EQUIPMENT					
Handrails, Steps, Non-Skid Surfaces, Mirrors					
Heater/Defroster					
Windshield Wipers/Blades					
Fire Extinguisher					
Warning Devices: Back-up Alarm, Horn					
Anti-two Block System/Device					
ELECTRICAL CONTROL AND ENGINE SYSTEMS					
Electrical System					
Air Pressure System					
Hydraulic System					
Controls and Instructions: Levers, ???, Switches, Buttons and Knobs					
Holding and Locking Systems					

Indicators: Level Boom Angle/Length					
Load ?? Drum Rotation Swing/Boom Warning					
Engine Operation: Upperworks/Carrier					
Clutch and Brake Systems: Pads					
Safety and Machinery Guards					
Muffler/Exhaust System					
HYDRAULIC					
Radiator					
Boom Extension Hoses and Reel					
Hoses and Fittings					
Hoist Cylinders: Foot Pins and Seals					
Boom Sections/Base/Intermediate/Tip					
Rollers/Wear Pads					
Point Sheaves/Bearings					
Cable Keepers On All Sheaves					
Jib/Extensions					
LATTICE BOOM/JIB					
Gantry Bridle or Equalizer Systems					
Foot Connections/Pins					
Automatic Boom/Hoist Kickout					
Boom Stops					
Chords					
Lacings					
Welds					
Pins/Keepers/Lugs					
Rollers					
Cable Keepers On All Sheaves					
Sheaves/Bearings					
Jib: Connections, Hinge Pins					
LUBE SYSTEMS GAUGES					

Automatic/Manual Lubrication						
Fluid Levels						
Gauge/Gauge Ports						
DRUMWIRE ROPE HOOK/BLOCK ASSEMBLERS						
Glazing						
Superstructure: Frame, Cracks and Welds						
Steering System						
Lights: Head, Tail, and Brake						
Signal Indicators/Markers/Flashers						
Fuel Tank/Cap						
Tires: Condition/Pressure						
Wheel Lugs/Cylinders						
Cranes/Chains?? Sprockets, Hobbers and Pins						
Outriggers: Boxes, Beams, Cylinders						
Pads, Pins and Keepers						
Mounts, Bolts, Nuts, Rivets, and Brackets						
Muffler/Exhaust System						
Counterweight Hooks and Bolts						
Housekeeping/Toolbox or Storage Area						
Drums	Wedge Sockets					
Anchoring of Rope	Hends On Ball/Swivel					
Ropes Spooling on Drums	Blocks: Sheaves, Sheave					
Boom Hoist	Bearings Guard Plates					
Pendants	Swivel, Pins, and Keepers					
Main Hoist	Hook: Tram/Throad					
Auxiliary Hoist	Hook NOT					
Whip or Jib Hoist	Safety Latch					
Rope End Fittings						

All unsatisfactory wire rope shall be replaced as per original manufacturer's recommendations.
NOTE: As of this date _____ the unit described above has been found to be in the above condition. It is understood that this inspection does not provide?? The necessary to perform frequent and periodic inspections in conjunction with a regular maintenance program in accordance with manufacturer's specifications and/or Federal, State and local guidelines, as applicable. This inspection does not constitute a warranty or guaranty of the performance on above equipment.

EXHIBIT 5-3

MBTA

WIRE ROPE INSPECTION REPORT

CRANE NO._____ MILEAGE _____ HOURS_____ DATE INSPECTED_____

WIRE ROPE	(A) Number Broken Wires Per:	(B) Diameter reduction (wear or core damage)	(C) Kinked, Crushed, Cut, Loss of Lay, Etc.?	(D) Lubed, Corrosion, (internal or external), Heat damage?	(E) Terminal, Tackle, Blocks, Hooks, Etc.?
TYPE SIZE	(1) (2) Lay? Strand?	(1) (2) Ind. Wire Tot. Rope?			
Main Hoist (Td. Line)					
Boom Hoist (Top Lift)					
Jib Hoist (Whip Line)					
Pendants (Main)					
Pendants (150 Foot Boom)					
Jib Guys (Upper)					
Jib Guys (Lower)					

Replacement of hoisting rope shall be done in compliance with the replacement criteria by manufacturers recommendations.

INSPECTED AT LOCATION:_____ INSPECTED BY_____

COMMENTS:

6.0 SAFE PRACTICE STANDARDS

6.1 PROCEDURES

6.1.1 Housekeeping

A basic concept in any effective accident prevention program is "good housekeeping." No one item has a great impact on the overall success of a safety program for a construction project. The importance of good housekeeping is such that it must be planned from the beginning of the job and carefully supervised through the final cleanup.

a. During the course of construction, work areas, passageways and stairs, in an around buildings and structures, shall be kept clear of debris. Construction materials shall be stored in an orderly manner. Storage areas and walkways on the site shall be maintained free of depressions, obstructions and debris.

b. The essential elements of good housekeeping include:

1. Orderly placement of materials, tools, equipment, cords, and electric lines.

2. Placing receptacles at appropriate locations for the disposal of rubbish and debris.

3. Prompt removal and disposal of trash and waste materials.

4. Locating air and water lines, welding and burning leads, to eliminate tripping hazards.

6.1.2 Equipment Standards

Adherence to the standards listed below will aid the Contractor in the prevention of personal injury and property damage accidents.

a. Motor Vehicles

1. Each operator is responsible for the safe operation of its vehicle Drivers should make a daily inspection of the following: steering, brakes, mirrors, lights, horn, seat belts, backup alarm, tires and windshield wipers. Noted defects must be reported for prompt repair.

2. Preventative maintenance shall be regularly scheduled for all vehicles to assure their safe operating condition. All vehicles must be in compliance with federal and state requirements.

3. Trucks shall never be loaded beyond their rated capacities, or in a manner that will obscure the driver's vision. To prevent shifting or loss of material, all loads shall be securely fastened.

4. Motor vehicles shall be fueled only at established locations and by approved methods. When a vehicle is being fueled, smoking or open flames will not be permitted. Gasoline-powered equipment shall not be refueled while engine is running or hot. Gasoline will only be dispersed from approved

acceptable safety containers. Grounding straps shall be utilized during transfer of flammable liquids.

b. Material Handling Equipment (Cranes)

1. The Contractor shall notify the Resident Engineer 48 hours prior to bringing in any hoisting equipment on the Authority's property.

2. Operators are responsible for the exercise of caution necessary for the safe operation of their equipment. Operators shall immediately report unsafe conditions, including defects in the machine, to their supervisor.

3. Operators shall not permit anyone to ride the hook or load.

4. When the operator leaves its machine or repairs are being made, it is his/her responsibility to set the brakes, secure the boom, take the machine out of gear and turn off the engine.

5. When making a lift, the operator will take operational signals only from the person authorized to give them. An emergency stop signal, given by anyone, will be acted upon by the operator.

6. It is the joint responsibility of the operator and the riggers to see that all hitches are secure and that all loose material is removed before the loads are lifted.

7. Safety hooks, or properly "moused" hooks, shall be used on all operations where loads are being handled. Suspended loads shall be controlled by tag lines.

8. Booms shall be equipped with a boom angle indicator and approved boom stops. Boom heads, load blocks and hooks shall be painted with a high visibility paint.

9. Where necessary to increase stability, cranes, except crawler cranes and boom type excavators, shall be equipped with outriggers of a design and strength suitable for the work being performed. Outrigger shall be used in accordance with the manufacturers instructions.

10. Hooks, wire rope, bearings, gears, friction clutches, chain drivers and other parts subject to wear must be inspected at regular intervals and repaired or replaced as required. Records of such inspections shall be maintained by the contractor.

11. A thorough annual inspection of each crane or hoisting device shall be made by a competent person. Written records of such inspections be maintained by the contractor.

6.1.3 Electrical

a. All electrical work, installation and wire capacities shall be in accordance with the pertinent provisions of the National Electrical Code (NFPA 70-1984), unless

otherwise provided by applicable regulations. (GFS or GFI's are required on all circuits)

b. All switches shall be enclosed and grounded. Panel boards shall have provisions for closing and locking the main switch and fuse box compartment.

c. Cables passing through work areas shall be covered or elevated to protect them from damage and to eliminate tripping hazards to employees.

d. Extension cords used with portable electric tools and appliances shall be heavy duty and of the three wire grounding type, and shall conform to the type and configuration required by the applicable OSHA Construction Safety Standards Part 1C.

e. Suitable means shall be provided for identifying all electrical equipment and circuits, especially when two or more voltages are used on the same job. All circuits shall be marked for the voltage and the area of service they provide.

6.1.4 "Lock-Out" "Tag-Out" Clearance Procedure

The following procedure is intended to provide a controlled method for rendering inactive electrical equipment or operating systems (including mechanical or piped) when equipment is down for any reasons, such as repair, removal or replacement of equipment and installation of new equipment.

This procedure includes the three basic phases of work on any system:

a. Shutting down equipment

b. Repairing or installing equipment

c. Start-up equipment

It is likely that some situations will not include all three phases as such; however, regardless of the operation and the phase or phases involved, the "lock-out" "tag-out" clearance procedure must be observed to ensure that safety of the operation.

It is pointed out that even though this procedure generally provides for locking and tagging of equipment, the danger tag along is to be considered a lock-out device and any equipment bearing such a tag shall not be operated under any circumstances.

Prior to starting any major operation which would involve locking and tagging procedures, a meeting should be set up involving the Contractor's Safety Supervisor and the Cognizant MBTA Representative. Specific procedures should be adopted and reviewed by all concerned with the operation prior to commencement of work

a. Shutdown of Equipment or System

1. The Foreman shall cause equipment to be shut down in a manner consistent with good operating practice.

2. The main disconnect shall be opened in addition to any remote control switches. On electrical work, it is advisable as a further precaution that the electrician shall remove all of the supply fuses. On piped

hydraulic/pneumatic systems, the main valves shall be closed, pressures relieved and blocked before initiating repair or maintenance.

3. After assuring himself that the equipment has been properly shut down in accordance with prescribed procedures, the craft supervisor shall positively determine that the equipment or system has been locked and tagged as follows:

   - Tags shall be affixed in a clear view (signed and dated).
   - Padlocks, to which only the craft supervisor shall have access keys, shall be placed on the equipment in such a manner as to render operation of the equipment impossible.
   - If a shutdown is ordered by the MBTA, custody of keys will be by the MBTA only.

b. Repair or Installation

1. Each individual craftsman assigned to the repair or installation shall attach to the equipment or system a separate standard danger tag. The tag shall be dated and signed. Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area in order to be effective.

2. The craft supervisor responsible for the work must assure that the equipment has been deactivated and properly tagged before permitting its personnel to perform any work.

c. Starting Up Equipment or System

1. As soon as the work is completed, the tags shall be removed only by the individuals installing them.

2. In the event the shift ends before the work is completed, the status of the work is to be reported in detail to the oncoming shift Superintendent/Manager/Supervisor and the names on the tags jointed hanged.

3. Upon completion of the work, the supervisor will make certain all worker's tags have been moved and that everyone is clear of the equipment or system. Return the equipment to normal operating conditions.

d. General

1. In an emergency, the Contractor's Project Manager/Superintendent shall have the authority to remove the tags and locks only after positively determining whether or not the equipment or system is safe for operation and that all personnel are in the clear.

2. Personnel deviating from these instructions or unauthorized persons removing danger tags shall be subject to immediate dismissal.

6.1.5 Tools

All hand tools, power tools and similar equipment, whether furnished by the Contractor or the employee, shall be maintained in a safe condition. Supervisors and craft employees shall be responsible for the inspection and repair of tools under their control. The use of many tools requires the use of a variety of personal protective equipment. See OSHA for specific requirements.

a. Hand Tools

1. Insulated or non-conducting tools should be used when working near energized electrical circuits.

2. Tool handles should be tightly fitted. Wooden handles should be carefully checked; tightened with wedges, if necessary, and replace split or splintered handles.

3. All impact tools, such as chisels, punches and wedges shall be regularly dressed to eliminate "mushrooming."

b. Power Tools

The majority of power tools accidents are caused by improper handling or poor maintenance. The following applies to all types of power tools.

1. Only authorized personnel should be permitted to operate or repair power tools.

2. Maintenance of power tools should be systematic. All worn or damaged tools should be promptly repairs or replaced. All tools should be cleaned, tested and inspected regularly.

3. Power tools shall not be used if safety equipment, such as shields, tools rests, hoods and guards have been removed or otherwise rendered inoperative.

4. Employees using tools under conditions that expose them to the hazards of flying objects or harmful dusts shall be provided with the requires personal protective equipment.

5. All electrically powered tools shall be properly grounded.

6. Gasoline powered tools shall not be used in unventilated areas. Gasoline shall be dispensed only in U.L. approved safety cans. No gasoline powered tools shall be used in the tunnel areas during revenue hours, and they must be removed prior to beginning revenue service (storage of flammable material is prohibited).

7. Portable grinders should be provided with hood type guards with side enclosures that cover the spindle and at least 50% of the wheel. All wheels should be inspected regularly for signs of fractures.

8. Bench grinders shall be equipped with deflector shields and side cover guards. Tools rests shall have a maximum clearance of 1/8 inch from the wheel.

9. Hoses supplying pneumatic tools shall have coupling secured to prevent accidental disconnection.

10. Air supply lines should be protected from damage, inspected regularly and maintained in good condition.

11. Air sources supplying hoses exceeding 1/2 inch ID shall be protected by excess flow valves to prevent "whipping" in the event of hose separation or failure.

12. The pressure of compressed air used for cleaning purposes must be reduced to 30 psi or less (does not apply for cleaning for forms, etc.).

13. The use of compressed air for cleaning purposes is encouraged, so as to reduce the employee exposure to potential airborne contaminants.

c. Powder-Actuated Tools

1. Only employees who have furnished evidence of having been trained in its use shall be allowed to operate a powder-actuated tool. Eye protection shall be worn by all personnel using the tool.

2. Tools shall not be loaded until just prior to use. Loaded tools shall not be left unattended.

3. Tools shall not be used in an explosive or flammable atmosphere. Cartridges (powder source) shall be kept separated from all other material.

4. Powder actuated tools used on this project shall meet all applicable requirements of ANSI A10.3-1970.

6.1.6 Welding and Cutting

a. Welding

1. A suitable, approved fire extinguisher shall be available for instant use in locations where welding is done. Screens, shields or other safeguards should be provided for the protection of personnel or materials below or otherwise exposed to sparks, slag, falling objects or the direct rays of the arc.

2. The welder shall wear approved eye, head protection, gloves and respirators if required. Persons assisting the welder shall wear protective glasses and respirator if required.

3. Electric welding equipment, including cable, shall meet the requirements of the National Electric Code. Welding practices shall comply with all applicable regulations.

b. Burning or Cutting

1. When gas cylinders are stored, moved or transported, the valve protection cap shall be in place.

2. When cylinders are hoisted, they shall be secured and upright in an approved cage or basket.

3. All cylinders shall be stored, transported and used in an upright position. If the cylinder is not equipped with a valve wheel a key shall be kept on the valve stem while in use. Gas cylinders must be stored 20 feet from propane.

4. An approved fire extinguisher shall be readily available in the event of fire.

5. Appropriate personal protective equipment, such as burning glasses, shields and/or gloves must be used.

6.1.7 Ladders

a. Manufactured Ladders

Manufactured ladders on the project shall comply with the regulations of ANSI A14.1-1990, Safety Code for Portable Wood Ladders or ANSI A14.2-1990, Safety Code for Portable Metal Ladders are required by OSHA.

1. Ladders with broken or missing rungs, broken or split side rails, or otherwise damaged, shall not be used.

2. All portable ladders shall be equipped with non-skid safety feet and shall be placed on a stable base. The access areas at the top and bottom of ladders shall be kept clear.

3. The side rails shall extend 36 inches above the landing. When this is not practical, grab rails shall be installed. All ladders in use shall be tied, blocked or otherwise secured to prevent accidental displacement.

b. Job Made Ladders

1. Job made ladders shall be fabricated in compliance with OSHA 1926 Subpart X.

2. The general rules applying to the use of manufactured ladders also apply to the use of job made ladders.

6.1.8 Scaffolding

a. 1. Scaffolds should be designed, built and inspected by competent persons. To avoid the use of makeshift platforms and scaffolding, each job should be carefully planned to assure that scaffolding is used where required and that such scaffolding conforms to its length and be made of at least 2 inch by 4 inch stock or its equivalent.

2. Guard rails shall be installed on all open sides and ends of platforms more than six feet (6') above the ground or floor and shall be approximately forty two inches (42") high. Guard rails shall be made of lumber not less than two inches (2") by four inches (4") material.

3. The midrail shall be halfway between the top rail and the floor, runway, platform or ramp. The ends of the rail shall not overhang the terminal posts except when it does not constitute a projected hazard. The midrail shall be made of at least 1 inch by 6 inch stock or its equivalent.

4. The toeboard, 4 inch minimum height, shall be securely fastened in place.

5. Wooden Railing Posts (verticals) shall be made of at least 2 inch by 4 inch stock or its equivalent, and be spaced so as not to exceed 8 feet on center.

b. Other types, sizes and arrangements of railing construction are acceptable, provided they meet the following requirements:

1. A smooth surfaced top rail approximately 42 inches above the floor.

2. A strength to withstand the minimum of 200 lbs. applied within two inches (2") of the top edge in any downward or outward direction at any point along the top edge

3. For specific material requirements, refer to current OSHA Standards 1926 Subpart L.

c. Stair Railings

A stair railing shall be constructed similar to a standard railing, but the vertical height shall be not more than 34 inches nor fewer than 30 inches from the top rail to the surface of the tread in line with the face of the riser at the forward edge of the riser. All hand rails shall be provided with a clearance of approximately three inches (3") between the hand rail and any other surface or object.

d. Covered Floor Opening

Floor opening covers shall be capable of supporting the maximum intended load and so installed as to prevent accidental displacement. Covers on larger floor openings shall be distinctively marked.

e. Stairways

During construction, stairs shall be provided on all structures that are two or more floors or more than 20 feet in height.

1. Stairway placement should follow as soon as practical.

2. All parts of stairways shall be free of hazardous projections. Debris and other loose material shall not be allowed to accumulate on stairways.

3. Permanent steel stairways having hollow pan type treads and landings that are to be used prior to concrete placement shall have the pans filled with solid material to the level of the nosing.

4. Temporary stairs shall have a landing not fewer than 30 inches wide, in the direction of travel, for every 12 feet of vertical rise. Wooden treads for temporary service shall be full width.

5. Riser height and tread width shall be uniform throughout any flight of stairs.

6.1.9 Concrete and Concrete Forms

All equipment and materials used in concrete construction and masonry work shall meet the applicable requirements as prescribed in ANSI A10.9-1970 "Safety Requirements for Concrete Construction and Masonry Work."

a. Employees working more than 6 feet above any adjacent working surface, placing reinforcing steel in walls, piers, columns, etc. shall be provided with fall protection such as a safety harness or equivalent device

b. Employees shall not be permitted to work above vertically protruding reinforcing steel unless such steel has been protected to eliminate the implement hazard.

c. The riding of concrete buckets for any purpose shall be prohibited.

6.1.10 Floor and Wall Openings

To control conditions where there is danger of employees of materials falling through floor, roof or wall openings, such openings shall be protected by standard railings and toeboards or covered over as follows:

a. A standard railing shall consist of a top rail, intermediate (midrail) rail, toeboard and posts.

1. The top rail shall be approximately 42 inches from the upper surface of the rail to the floor, platform or ramp level. The top rail shall be smooth surfaced throughout.

6.1.11 Steel Erection

a. Permanent floors shall be installed as soon as practical following the erection of structural members. At no time shall there be more than four floors or 48 feet of unfinished bolting or welding above the foundation or uppermost secured floor.

b. Temporary Flooring

1. The erection floor shall be solidly planked over its entire surface except for access openings. Planking shall be not fewer than 2 inches thick, full size undressed, and shall be laid tight and secured against movement.

2. On structures not adaptable to temporary floors, safety nets shall be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet.

3. A safety railing shall be installed, approximately 42 inches high, around the periphery of all temporary planked floors during structural steel erection.

c. General Requirements

1. Bundles of sheets or small material shall be so secured as to prevent their falling.

2. When setting structural steel, each piece shall be secured with not fewer than two bolts at each connection and drawn up wrench tight before the load is released.

3. 100% full protection is a mandatory project requirement. Avoid walking on the top flange of beams. Beams must be "cooned", using the lower flange. When engaged in work from a fixed position, a safety harness shall be used.

4. When loads are being hoisted, avoid walking under the lift or permitting an employee to be exposed to the swing of the lift.

5. A tag line shall be used to control all loads.

6. For the protection of other crafts on the project, signs shall be posted in the erection area, "Danger Men Working Overhead."

6.1.12 Excavations, Trenching and Shoring

a. The determination of the angle of repose and design of the supporting system shall be based on careful consideration of the following: depth of the cut; anticipated changes in the soil due to air, sun and water; and ground movement caused by vehicle vibration of blasting, and earth pressures.

b. Trenches 5 feet and over in depth shall be shored or walls cut back to protect employees from cave-ins.

c. Ladders or other means of egress shall be provided in each excavation. No more than 25 feet of lateral travel shall be required to reach any such ladder.

d. Soil piles must be kept back 2 feet from excavation.

e. Contractor must ensure that at a minimum for any excavation or open trench on MBTA property, a snow fence must be installed and maintained by the contractor at all times. Caution tape on any open excavation is not a sufficient barrier.

6.1.13 Personal Protection Equipment

This section establishes the minimum requirements of personal protective equipment to be used. Only equipment complying with OSHA Safety Standards shall be used. All

Contractors shall be responsible for the compliance by their employees. The Contractor's Safety Coordinator shall make regular field inspections to audit compliance.

a. Head Protection

Hard hats shall be mandatory. Hard Hats shall meet the requirements of ANSI Z89.1 or ANSI Z89.2, as appropriate, as specified by OSHA 1926 Subpart E.

b. Eye Protection

When working on or visiting the project, all employees or visitors shall wear eye protection. Eye and face protection shall meet the requirements of ANSI Z87.1 as specified by OSHA 1926 Subpart E.

c. Respiratory Protection

Respiratory protection devices approved by the National Institute of Occupational Safety and Health (NIOSH) shall be supplied by the Contractor and worn by all employees when exposed to hazardous concentrations of toxic or noxious dust, fumes or mists as required by OSHA regulations.

d. Hearing Protection

Approved hearing protection shall be made available by Contractors, and such protection shall be worn by all employees exposed to sound levels in excess of OSHA's Permissible Exposure Limits (PEI).

e. Safety Harnesses

Safety harnesses meeting OSHA safety standards shall be made available by the contractor and shall be worn by all employees exposed to falls from and unprotected height of six feet or more. Safety harness lanyards shall be a minimum of 1/2 inch nylon or equivalent with a maximum length to provide for a fall of no greater than six feet.

f. Safety Shoes

While the Contractor may not be responsible for furnishing safety shoes to its employees, the Contractor is required to assure that its employees wear suitable work shoes on the project. No tennis, canvas shoes of any kind will be permitted.

g. Other Personal Protective Equipment

Other such required equipment to be used under unusual circumstances, such as high temperature work, handling corrosive liquids, etc., not specifically covered in this section shall be reviewed with the Safety Director.

h. Maintenance

Personal protective equipment which has been altered in any manner so as to reduce its effectiveness shall be repossessed, repaired or destroyed. Personal protective equipment which has been worn or used previously shall not be reissued to another employee until the article has been cleaned and sterilized.

6.1.14 Blasting

The "Blaster's Handbook" by E.I. DuPont is an excellent guide in the use, storage and handling of explosives. Only qualified personnel shall transport, handle or use explosives. For specific blasting requirements, refer to OSHA 1926 Subpart U.

6.1.15 Fire Prevention

Fire prevention is of special importance during construction. There are considerably more hazards present during construction that will be present in the completed facility. Constant attention to the fundamentals of fire prevention is vital. The Contractor's Safety Representative shall make fire hazard inspections of the entire project on a regular basis. Immediate correction of substandard conditions is mandatory.

a. Provide sufficient quantities of portable fire extinguishers appropriate for the type of possible fire, at the work area. Where hose lines are available, connect them so they are ready for service.

b. Particular care shall be taken when welding and cutting in locations where combustibles are exposed. When such welding or cutting is done, the surrounding area must be protected with fire retardant blankets, and an adequate number of approved fire extinguishers must be immediately available.

c. The operation and maintenance of temporary heating equipment shall create no fire hazards. The use of solid fuel salamanders shall be prohibited. Clothing must not be dried by placing on or near heaters.

d. All flammable and combustible materials shall be stored, piled and handled with due regard to their fire characteristics. Flammable liquids must be stored in an approved manner, and dispensed only in acceptable safety containers. Welding gases shall be stored and segregated by type of gas. Lumber should be stacked in small piles that are interspersed with wide aisles. Lumber storage should be as far as possible from any structure.

e. Temporary shacks or similar structures shall be constructed of fire resistant materials.

f. Rubbish and debris shall not be allowed to accumulate.

6.2 HOT WORK REQUIREMENTS

6.2.1 Description

This section specifies "Hot Work" fire control procedures for Contractors and their personnel, including cutters, welders and operators of heating equipment. Hot Work is any work that utilizes or produces an ignition source.

6.2.2 Submittals

a. Perform "Hot Work" operations as follows:

1. Ensure the safe handling of "Hot Work" equipment and the safe use of the particular "Hot Work" process.

2. Determine the combustible materials and hazardous areas present or likely to be present in the work locations.

3. Protect combustibles from ignition by the following.

   a. Have work moved to a location free from dangerous combustibles.

   b. If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustible properly shielded against ignition.

4. Give notice to the Project Office of the need to perform "Hot Work" operations and secure authorization from the Resident Engineer and the local fire department as applicable.

5. Ensure that the cutter or welder secures his or her supervisor's approval that conditions are safe before going ahead with the work.

6. Ensure that fire protection and extinguishing equipment are properly located at the site.

7. Where fire watchers are required, see that they are available at the site.

8. Procure all required permits.

b. Ensure the worker handles the "Hot Work" equipment safely and uses it so as not to endanger lives or property and:

1. Has the approval of his or her supervisor and the MBTA Project Office starting any "Hot Work";

2. Does not perform any "Hot Work" where conditions are not safe;

3. Continues to perform "Hot Work" only so long as conditions are unchanged from those under which approval was granted.

6.2.3 Fire Prevention Precautions

Permit "Hot Work" only in areas that are or have been made firesafe. Within the confines of a building or other enclosed structure, perform cutting and welding operations preferably in a specific area designed or approved for such work, such as a maintenance shop or a detached outside location. Ensure that such areas are of non-combustible or fire-resistant construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. When work cannot be moved practicably, as in most construction work, make the area firesafe by removing combustibles or protecting combustibles from ignition sources.

a. Do not permit "Hot Work" in the following situations:

1. In areas not authorized by the MBTA;

2. In sprinklered buildings while such protection is impaired;

3. In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts;

4. In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulphur, baled paper or cotton.

b. Before "Hot Work" is permitted, the Resident Engineer will give notification authorizing the "Hot Work" and designate precautions to be followed. He will have designated MBTA personnel to inspect the work area for fire safety, as indicated herein, and which personnel will complete a "Hot Work" check off list. The Resident Engineer will also assure himself of the following:

1. The "Hot Work" equipment to be used is in satisfactory operating condition and in good repair.

2. Where there are combustible materials such as paper clippings, wood shavings or textile fibers on the floor, sweep the floor clean for a radius of 35 feet. Keep combustible floors wet, covered with damp sand, or protected by fire-resistant shields. Where floors have been wet down, protect personnel operating arc welding or cutting equipment from possible shock.

3. Where practicable, relocate combustibles at least 35 feet from the work site. Where relocation is impracticable, protect combustibles with flame-proofed covers or otherwise shield with metal or fire-resistant guards or curtains. Secure edges of covers at the floor so they are tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.

4. Tightly cover wall or floor openings or cracks within 35 feet of the site to prevent the passage of sparks to adjacent areas.

5. Suitably protect or shut down ducts and conveyor systems that might carry sparks to distant combustibles.

6. Where "Hot Work" is down near walls, partition, ceiling or roofs or combustible construction, provide fire-resistant shields or guards to prevent ignition. If welding is to be done on a metal wall, partition, ceiling or roof, take precautions to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, provide a fire watch on the opposite side of the work. Do not attempt welding on a metal partition, wall, ceiling or roof having a combustible covering, nor on walls or partitions of combustible sandwich-type panel construction.

7. Do not undertake to perform "Hot Work" on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs if the work is close enough to cause ignition by conduction.

8. Provide sufficient quantities of portable fire extinguishers, appropriate for the type of possible fire, at the work area. Where hose lines are available, connect them so they are ready for service.

9. Suitably protect nearby personnel against heat, sparks, slag, etc.

c. Require the services of Fire Watcher whenever "Hot Work" is performed in locations where other than minor fire might develop, or where the following conditions exist:

1. Appreciable combustible material in the building construction or contents is closer than 35 feet to the point of operation.

2. Appreciable combustibles are more than 35 feet away, but are easily ignited by sparks.

3. Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.

4. Combustible materials are adjacent to the opposite end of metal partitions, walls, ceilings or roofs, and are likely to be ignited by conduction or radiation.

Fire Watcher's responsibilities include:

1. Have fire extinguishing equipment readily available and be trained in its use.

2. Be familiar with facilities for sounding an alarm in the event of a fire.

3. Watch for fires in exposed areas, and try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm.

4. Maintain a fire watch for at least one-half hour after completion of "Hot Work" operations to detect and extinguish possible smoldering fires.

d. Where a Fire Watch is not required, make a Final Check-Up one-half hour after the completion of "Hot Work" operations to detect and extinguish possible smoldering fires.

e. Have "hot tapping" operations or other cutting or welding on a flammable gas or liquid transmission or distribution utility performed only by a crew qualified to make hot taps.

6.3 CONFINED SPACE ENTRY PROCEDURE (CSEP)

6.3.1 Purpose

This confined space entry procedure (CSEP) has been designed with the objective of preventing serious physical injury or death caused by employees attempting to perform work in confined space areas without proper testing and evaluation being performed. Contractors

shall ensure that their employees and supervisors are trained in this procedure and that it is used where appropriate.

6.3.2 Confined Space Identification

A key element is CSEP is to identify areas that are considered confined spaces. A confined space is any area that:

a. has limited openings for entry and exit;

b. which may contain or produce toxic air contaminants;

c. has a high concentration of an inert gas;

d. is not intended for continuous occupancy; and

e. may have an oxygen deficient atmosphere (less than 19.5%)

Examples include, but are not limited to, storage tanks, process vessels, pits, vats, vaults, sewers, tunnels, manholes, cells, ducts, and rooms with less than proper size openings for easy access with no mechanical ventilation.

6.4 Responsibilities

Confined space areas must be evaluated prior to employee entry by supervision and/or qualified safety personnel. Once the evaluation is complete, supervision will draft its plan for ensuring that the elements of the CSEP are met.

6.4.1 Implementation and Pre-Entry Requirements

Personnel shall not enter the confined space area until the following are accomplished:

a. Lines which may convey flammable, injurious, or incapacitating substances into the space shall be disconnected, blinded or blocked off by other positive means to prevent the development of dangerous air contamination and/or oxygen deficiency within the space.

The disconnection or blind shall be so located or completed in such a manner that inadvertent reconnection of the line or removal of the blind are effectively prevented. (See lockout tagout procedures).

b. The confined space shall be emptied, flushed or otherwise purged of flammable, injurious or incapacitating substances.

c. Qualified Contractor personnel shall test the atmosphere with an approved calibrated device to determine whether dangerous contaminants and/or oxygen deficiency exists. Written records of such testing results shall be made and posted adjacent to the identified confined space. The date, time, and the name of the testing official shall also be recorded. Contractor personnel who may either be supervision of safety personnel shall perform these tests on an "as needed" basis. Records of these tests must remain a permanent record of construction site operations.

d. Where interconnected spaces are blinded off as a unit, each space shall be tested, results recorded, and the most hazardous conditions found shall govern the operation.

e. If dangerous air contamination and/or oxygen deficiency does not exist within the space, as demonstrated by the tests, entry into and work within the space may proceed subject to the following provisions:

1. Frequent testing shall be conducted to ensure that a dangerous air contamination and/or oxygen deficiency does not develop during the performance of any operation.

2. If this does occur during the operation, the requirements covered in "Confined Space Operations" shall apply.

3. Where the existence of either dangerous air contamination and/or oxygen deficiency is demonstrated by tests, existing ventilation shall be augmented by appropriate means (usually additional ventilation).

4. When additional ventilation has removed the dangerous air contamination and/or oxygen deficiency as demonstrated by additional tests (and recorded), entry into and work within the space may proceed.

f. No source of ignition shall be introduced until the implementation of appropriate provisions has ensured that dangerous air contamination due to flammable and/or explosive substances does not exist.

g. Whenever oxygen-consuming equipment such as salamanders, plumbers, torches, or furnaces and the like are to be used, measures shall be taken to ensure adequate combustion air and exhaust gas venting.

h. To the extent feasible, provision shall be made to permit ready entry and exit.

i. Where it is not feasible to provide ready exit from spaces equipped with automatic fire suppression systems employing harmful design concentrations of toxic or oxygen-displacing gases, or total foam flooding, such systems shall be deactivated. Where it is not practical or safe to deactivate such systems, the provisional of "Confined Space Operations" related to the use of self-contained breathing equipment shall apply during entry into work within such spaces.

Contractors Must Remember:

Surveillance of the surrounding areas must be considered to avoid drifting vapors from tanks, piping and swears which might adversely affect the atmosphere of the confined space, and Respirators are of no use in an oxygen-deficient atmosphere. Either an air-line respirator or self-contained breathing equipment is effective for use in an oxygen-deficient atmosphere.

6.4.2 Requirements, Confined Space Operations

Contractor personnel shall not be allowed to enter a confined space with an oxygen deficient of potentially toxic/explosive atmosphere, except for emergency or rescue personnel as directed by the Contractor's Safety Representative.

6.4.3 Entry Into and Work Within Confined Spaces

a. Tanks, vessels, or other confined spaces with side and top openings shall be entered from side openings when practicable.

Note: Side openings are those within 3 and 1/2 feet of the bottom.

b. Approved respiratory protective equipment shall be provided and worn when needed; this equipment may include self-contained breathing equipment.

c. An approved safety harness with attached line shall always be used. The free end of the line shall be at secured outside the entry opening. The line shall be at least 1/2 inch diameter and 2,000 pounds test.

d. At least one employee shall stand by on the outside of the confined space, ready to give assistance in case of emergency. At least one additional employee who may have other duties shall be within sight of call of the standby employee(s).

1. The standby employee shall have appropriate, approved respiratory equipment which may include an independent source of breathing air, and adequate communications.

2. The standby employee shall be equipped with an emergency light source.

3. A standby employee(s), protected as prescribed, may enter a confined space. In case of emergency, the employee must alert an additional employee of the pending emergency, and the standby employee's intention to enter the confined space.

e. When entry must be made through a top opening, the following requirements shall apply:

1. The safety belt shall be of the harness type that suspends a person in an upright position.

2. A hoisting device or other effective means shall be provided for lifting employees out of the space.

f. Work which involves the use of a flame, arc, sparks, or other sources of ignition is prohibited within a confined space (or any adjacent space having common walls, floor or ceiling with the confined space) which contains, or is likely to develop, dangerous air contamination due to flammable and/or explosive substances, i.e., repair of gas tanks, etc.

g. Whenever gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark or other source of ignition shall be permitted unless the oxygen concentration is maintained at less than 20% of the lower explosive limit (LEL). Contractor and Subcontractor's supervision must be aware of operations of this description.

1. Atmosphere testing shall be conducted by a competent subcontract person with sufficient frequency to ensure conformance with this paragraph.

2. A written record of the results of such testing shall be made and a copy posted adjacent to the confined space.

h. Only approved lighting and electrical equipment (12 volt, explosion-proof) shall be used in confined spaces subject to dangerous air contamination by flammable and/or explosive substances.

i. Employees working in confined spaces which had contained substances corrosive to the skin or substances which can be absorbed through the skin shall be provided with, and shall be required to wear, appropriate personal protective clothing.

j. An effective means of communication between standby employees and employees in a confined space shall be provided and used whenever the provisions of confined space operations require the use of respiratory protective equipment or whenever employees inside a confined space are out of sight of the standby employee(s). All affected employees shall be trained by the Contractor in the use of such communications system. The system shall be tested before each use to confirm its effective operation.

7.0 HAZARDOUS SUBSTANCES/COMMUNICATIONS

7.1 Purpose and Scope

The purpose of this section is to establish a procedure for the identification and notification of hazardous substances as provided under the OSHA CFR 1926 Safety and Health Regulations for Construction.

7.2 General Requirements

7.2.1 Any Contractor who uses substances on the hazardous substances list to which workers might be exposed under either normal work conditions or reasonable foreseeable emergency conditions resulting from work place operations must provide those workers with the required hazardous substance information.

7.2.2 Contractors must provide their employees, upon request, information based on the Material Safety Data Sheet (MSDS) and a copy of the MSDS. (Note: MSDS must be readily available at the job site).

7.2.3 Contractors are required to train employees to work safely with hazardous substances to include informing them what an MSDS is and where they are located.

7.2.4 Contractors are required to adhere to current minimum MBTA contract work practice requirements for the removal, containment, recovery and disposal of lead based paint, and associated waste.

7.3 Reporting of Hazardous Substances

Each Contractor working on MBTA projects is required to provide the MBTA with a list of hazardous substances and copies of the MSDS that they will be using in their work site operations. Contractors are required to provide a copy of their training program to the Safety Director for review.

8.0 OCCUPATIONAL SAFETY AND HEALTH ACT 1926 SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

8.1 OSHA

Employees must comply with current OSHA Safety Standards that apply to their type of business. All employers must meet reporting requirements and employers with eleven (11) or more employees must meet recordkeeping requirements specified in booklet "Recordkeeping Requirements Under Occupational Safety and Health Act."

8.2 Familiarization with OSHA Safety Standards

Each Contractor must be familiar with Occupational Safety and Health Act (OSHA) as it pertains to its work responsibility.

8.3 Reporting of Fatal/Serious Accidents to OSHA

All fatality cases and/or serious accidents and illness shall be reported to OSHA immediately by phone to an Occupational Safety and Health Area Office. Employers must report immediately all blasting accidents.

8.4 OSHA Poster

Part of the OSHA requirements is that each employer must post in a prominent location the "Safety and Health Protection on the Job" poster. The poster briefly states the intent and coverage of the Act. Failure to post this document is a citable offense under the Act.

EXHIBIT 8-1

CONSTRUCTION SAFETY SURVEY FORM

1. This form is required for recording any unsafe condition and/or action noted by the Contractor's Safety Supervisor, and the MBTA Safety Manager.

2. This form is primarily intended for preparation and use by the Contractor's Safety Supervisor, who is appointed to perform safety audit services in accordance with the requirements of the MBTA Construction Safety Program. Unsafe conditions and/or actions should be corrected immediately and duly reported on this form.

3. Completed copies indicating action taken and date completed shall be submitted to the MBTA Safety Project Manager.

4. This form shall also be used by the MBTA Project Safety Manager to record any unsafe action and/or condition noted. The MBTA Project Safety Manager will make known his recommendations to the Contractor's Safety Supervisor and/or Project Manager/Superintendent for immediate corrective action.

5. This form shall be used by the representatives performing safety audit services on all projects. They shall prepare this form, noting all unsafe acts and/or conditions observed during field audits. These reports shall be distributed as noted on Exhibit 8-1.

Exhibit (8.1)

CONSTRUCTION SAFETY SURVEY

Report No.:_____
Contract No.:_____
Contractor No.:_____

FILE NO.	DESCRIPTION	SAFETY REGULATION REFERENCE	ACTION AND/OR DATE COMPLETED

SURVEY MADE BY (PRINT): _____ Signature _____ Title _____ Date	_____ Signature of contractor's Project Manager/Superintendent Date:_____ _____ Signature of MBTA Resident Engineer Date:_____	DISTRIBUTION 9 Project Mgr./Superintendent 9 Resident Engineer 9 Project Safety Manager 9 Project Risk Mgmt. Consultant 9 MBTA Chief of Design and Construction

EXHIBIT 8-2

REPORT OF ACCIDENT OR DAMAGE TO EQUIPMENT OR PROPERTY

1. This form shall be prepared covering every accident to equipment or property.

2. The form shall be prepared from information as a result of investigation or direct reports by the person or persons involved or responsible.

3. Reports shall be completed promptly.

4. All accidents involving damage to property, including raw materials or equipment, installed equipment, motor vehicles and heavy construction equipment are reportable.

5. Investigation of alleged damage to private property:

   a. Buildings that may be affected by construction shall have been inspected by outside consultant (selected by the Risk Management Consultant and the MBTA).

   b. If, in the course of construction work, property damage occurs which is allegedly due to construction operations, this reporting procedure is to be followed.

   c. If, however, a property owner reports damage to its property, of which it's compliant is the first intimation, and alleges that it is due to construction, he will probably request prompt inspection.

   d. In complying with an owner's request for report of damage allegedly due to construction work, particular care is required to see and record only the facts and to avoid expressing opinion. The owner's opinion shall be recorded as "remarks by owner".

"**EXHIBIT 8-3**

REPORT OF ACCIDENT OR DAMAGE
TO EQUIPMENT OR PROPERTY

CONTRACTOR_____ DATE_____

SUBCONTRACTOR _____ MBTA CONTRACT NO._____
SECTION DESIGNER_____
LOCATION OF ACCIDENT)_____
EQUIPMENT INVOLVED (DESC. & SERIAL NOS.) (OWNER) _____
_____

WERE THERE PERSONAL INJURIES YES_____ NO _____
DAMAGES $_____

WITNESS TO ACCIDENT
_____
_____ WERE THEIR STATEMENT (S) OBTAINED
FROM WITNESS(ES) YES ___ NO ___
_____
_____ ARE STATEMENTS ATTACHED
YES ___ NO ___

REMARKS
_____
_____

TIME OF ACCIDENT ___A.M. ___ P.M. DATE_____

WEATHER CONDITIONS _____ TEMPERATURE _____

ROADWAY OR SURFACE_____ WET____ DRY____ ICY____ OTHER _____

IF OTHER, EXPLAIN_____

IF MORE SPACE IS REQUIRED, USE BACK OF THIS SHEET FOR ADDITIONAL INFORMATION AND SKETCHES
SIGNED_____

TITLE_____

EXHIBIT 8-4

SUPERVISOR'S REPORT OF ACCIDENT/UNUSUAL OCCURRENCE

1. This form shall be submitted by the Contractor to the MBTA Resident Engineer for each job-related accident involving any of the following:

   a. Any injury to an employee of the Contractor or any Subcontractor.

   b. Any injury to persons not directly connected with the project (including any alleged injuries reported by a member of the general public).

   Submittal shall be made as soon as possible, but in no case later than twenty-four (24) hours after the accident. Pertinent facts which are not available within the above time shall be submitted as soon as available in a supplemental report.

SAFETY DEPARTMENT
CONSTRUCTION PROJECT ACCIDENT/INCIDENT
FIRST REPORT

Project Number_____

Contract Description_____

	Name of Injured:
	Employer:
	Job Title:
Location:	Type of Accident:
Type:	Type of Injury:
Name:	Witness(es):
Person(s) Injured:	

DESCRIPTION OF ACCIDENT/INCIDENT: *(Attach additional sheets if necessary)*

PREVENTION RECOMMENDATIONS:

PREPARER'S NAME:	PREPARER'S TITLE:
PREPARER'S SIGNATURE:	PREPARER'S PHONE:

COPY TO SAFETY DEPT. FAX #(617) 222-5127 *and* CONSTRUCTION DEPT. FAX #(617) 723-1969

Forward copies of additional reports to:

MBTA Safety Department
10 Park Plaza
Room #8350
Boston, MA 02116
Attn: Mgr. Of Industrial, Construction, Safety & Design

MBTA Design & Construction Department
10 Park Plaza
Room #6720
Boston, MA 02116
Attn: Chief of Design and Construction

EXHIBIT 8-4

SUPERVISOR'S REPORT OF ACCIDENT/UNUSUAL OCCURRENCE

1. Contract Number	2. Date of Accident - Time (AM or PM)
3. Project Section	4. Location of Accident
5. Reporting Organization	6. Contractor or Subcontractor Involved
7. Injury 8. Damage* ___Reportable ___Lost Time ___Fatal	___Fire ___Property ___Equipment
9. Injured person and address	10. Occupation of Injured __Male __Age__Female Employer Address
11. Nature of Injury	12. Date stopped work 13. Date Returned
14. First aid by	15. Ambulance
16. Hospital	17. Attending Physician
18. Witnesses or persons responding, including addresses	
19. Fire Department	20. Police Department
21. Equipment and/or materials involved	
22. Primary cause of accident	
23. Secondary cause	
24. Contributing factors	
25. Supervisor's corrective action	Supervisor's signature
26. Project Supt.'s corrective action	Project Supt.'s signature
27. Date this report *Attach a list of damaged property and/or equipment excluding motor vehicles. Indicate Owner's names and addresses.	
28. MBTA safety regulations involved Part_____Chapter_____ Par. _____	
29. OSHA regulations involved Part_____ Chapter _____ Par. _____	
30. Photographs attached_____	
31. Sketch showing location of nearby structures, materials, equipment, etc., with approximate scale of distances.	
32. Narrative description of events previous, during and immediately after the accident.	

EXHIBIT 8-5

MONTHLY ACCIDENT EXPERIENCE SUMMARY

1. This form shall be submitted monthly by the Contractor to reflect the cumulative accident experience of the Contractor and each Subcontractor.

2. This report must be submitted no later than three (3) days after end of the month being reported.

3. These report forms and their completion do not, in any way, relieve the Contractor from completing OSHA Form 200 or Employers Report of Occupational Injury or Illness.

MBTA Contract No.
CONTRACTOR/SUBCONTRACTOR Name:
MONTH YEAR
REPORTING PERIOD: THROUGH

MONTHLY
ACCIDENT EXPERIENCE SUMMARY

	THIS MONTH	YEAR TO DATE	PROJECT TO DATE
Hours Worked First Aid Cases			
A. OSHA Recordable Cases B. Lost Time Cases (List each under comments) C. Days Lost			
A. OSHA Recordable Incidence Rate *No. Of Recordables x 200,000* *Hours Worked* B. Lost Time Incident Rate *No. Of Incidents Resulting in Lost Time x 200,000* *Hours Worked* C. Lost Time Severity Rate *Total Days Lost x 200,000* *Hours Worked*			
AVERAGE MONTHLY EMPLOYEES			DAYS LOST
COMMENTS: TOTAL DAYS LOST			
Prepared By Date	PM/Superintendent		Date

OSHA RECORDKEEPING REQUIREMENTS

The following forms are required by OSHA for recordkeeping. The forms and the instructions for completing the forms are in the OSHA booklet entitled "Recordkeeping Requirements under the Occupational Safety and Health Act."

a. OSHA Form 200, Log Summary of Occupational Injuries and Illness; and

b. Employer's Report of Occupational Injury or Illness, CDLSR Form 5020 (Rev. 3); or

c. OSHA Form 101, Supplementary Record of Occupational Injuries and Illness.

Each Contractor shall be responsible for its own records. A copy of these reports shall be made available to the MBTA and to the Risk Management consultant on request.

9.0 ACCIDENT INVESTIGATION, REPORTING AND RECORDKEEPING

9.1 First Aid

All accidents/incidents which result in on-site first aid treatment shall be investigated by the Contractor's Safety Supervisor, and submit a report of accident (Exhibit 8-3) to the MBTA within twenty four (24) hours of the occurrence.

9.2 OSHA Recordable

Accidents and incidents resulting in medical treatment by a licensed physician shall be thoroughly investigated by the Contractor's Safety Supervisor and reports of Accident (Exhibit 8-3) and Workers Compensation Report completed within twenty four (24) hours.

All reports must be submitted to the MBTA. The accident investigation should generate appropriate recommendations for corrective actions to prevent recurrence of similar accidents.

9.2.1 Analysis and Corrective Action

Corrective actions can only be taken when specific factors of an accident/unusual occurrence have been accurately developed and the resulting recommendations have been disseminated to the responsible persons.

In the event of a serious accident, prompt oral reporting of the preliminary details is mandatory. See 9.4 under this section for required telephone reports.

In preparing written reports of an accident/unusual occurrence, statements and comments should be confined to objective finding of facts and determining the root cause. The Contractor's accident/unusual occurrence report, project records, progress, reports, and daily time reports may become important evidential material in any ensuing legal action. Accordingly, for the date on which a potential third party accident has occurred, it is important to be specific and accurate in describing work being performed, crew of equipment being utilized and their exact location.

9.2.2 Recordkeeping

Complete records are necessary accident prevention tools, but in addition, specific records are required by OSHA. Failure to maintain these records is a citable offense. Also, investigations, resultant reports and cumulative records are necessary for the protection of all concerned parties.

9.3 Procedures

9.3.1 Investigations and Reports

a. Exhibits 8-1 through 8-5 contain administrative instruction and report forms to be used by Contractors and Subcontractors for the following required reports

1. Construction Safety Surveys

2. Report of Accident of Damage to Equipment or Property (Exhibit 8-2)

3. Supervisors' Report of Accidents/Unusual Occurrences (Exhibit 8-3)

4. Accident Experience Summary Report (Exhibit 8-4)

5. Recordkeeping Requirements under the Occupational Safety and Health Act, Reprint 1985 (Exhibit 8-5)

9.3.2 Photographs

Photographs should be taken in conjunction with investigations of accidents involving serious personal injury, all non-project personnel injuries, substantial property damage (including motor vehicle), equipment or material failure, and all accidents that may, even remotely, involve third party action.

Photographs should be sufficient in number to adequately reflect the general area as well as pertinent details from a variety of angles. It is better to take too many than not enough. Photographs should be taken as soon as possible following the accident. Identify each print on its reverse as follows: name of injured (if equipment damage, type; if property damage, location); date of accident; photographer's initial, and time photographs taken (date if different from occurrence); direction facing, and brief description of photo.

9.4 Telephone Reports

Should a serious accident occur resulting in damage to public or MBTA property; or bodily injury to the public or employees of the MBTA, its Consultants, Contractors, or their Subcontractors, a telephone report shall be made as soon as practicable to the Resident Engineer.

SAMPLE OF
CONTRACTOR RIGHT-OF-WAY SAFETY CERTIFICATION
CARD AND HARD HAT STICKER

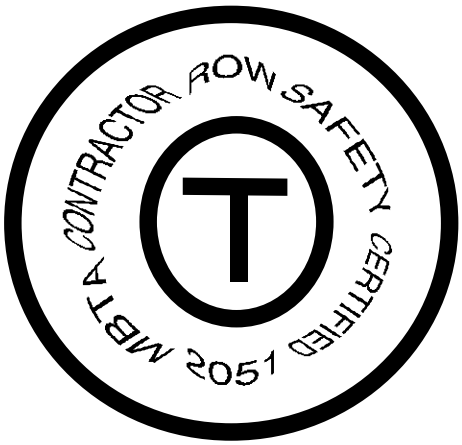
Number_____

__

THIS IS TO CERTIFY THAT

_____
HAS COMPLETED THE ROW CONTRACTOR
SAFETY AWARENESS CERTIFICATION PROGRAM

DATE:_____ INSTRUCTOR:_____



MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
SAFETY POLICY/PROCEDURE

SUBJECT:	ORIGINAL ISSUE DATE:	SAFETY/POLICY PROCEDURE #:
CONTRACTOR SAFETY VIOLATION PROGRAM	July 1, 1996	7.3 REV 2

I. POLICY

The Authority is committed to overseeing that all projects are completed in a safe manner, without injury or losses resulting from accidents. The Safety Department is authorized to conduct workplace safety inspections to ensure contractor compliance with all applicable safety rules, regulations, and Authority requirements.

II. PURPOSE

To establish procedures for notification of and conducting safety inspections and the issuance of safety violation assessments by the MBTA Safety Department to Contractors who compromise the safety and health of the workforce and to enforce contractor compliance with applicable safety and health regulations and job safety requirements.

III. SCOPE

These procedures will apply to the Safety Department, Design and Construction Department, and all MBTA Contractors and Subcontractors. Authority-issued safety violation assessments do not relieve the contractor from any responsibility or obligation for fines or penalties levied upon the Contractor by other local, State or Federal agencies.

Definitions and Abbreviations (see MBTA Standard Specifications-Bidding and Contract Requirements and Division 1-General Requirements, dated November, 1983, and the following:)

Accident/Incident: An **accident** is an unplanned and undesirable event resulting in injury and/or loss. An **incident** is an unplanned and undesirable event that nearly results in injury or loss.

Assessment: Assessment is the monetary amount determined by the Safety Department to be paid by the Contractor for the safety violations cited.

Construction Inspector: The Construction inspector is the Authority's field representative who reports to the Resident Engineer, the Authority's representative at the Project site.

Deputy Director of Design & Construction: The Deputy or Assistant Director of Design and Construction, reports to the Director of Design and Construction, and plans, directs and oversees construction activities, methods and procedures relating to the Authority Design and Construction Projects

Director of Design and Construction: The Director of Design and Construction oversees and implements all MBTA Design and Construction Projects.

Director of Safety: The Director of safety is charged with overseeing Authority Safety Programs, Policies and Procedures and reports directly to the General Manager's Office.

Engineer: The General Manager of the Authority or designee acting within the scope of the particular duties entrusted to this person.

OSHA: The Occupational Safety and Health Administration under the United States Department of Labor. The OSHA Standards are used as minimum safety guidelines for Authority projects.

Project Manager: The MBTA Project Manager reports to the Deputy or Assistant Director of Design and Construction. The Project Manager has responsibility for the project's design and construction budget, cost and quality control, schedules, claims and safety compliance.

Resident Engineer: The Resident Engineer provides onsite supervision of assigned MBTA Construction Inspectors who are responsible for overseeing the Contractor's compliance with the Authority's contract plans and specifications, including Article 5.15 - Safety and First Aid Requirements, as amended.

Safety Official: The Safety Official is the MBTA's Safety Department representative who has knowledge and experience in the safety field. The Safety Official is trained in OSHA standards and in the recognition of safety and health hazards as well as the Authority's Safety Policies and Procedures. The Safety Official is authorized to issue safety violations and assessments (as approved by the MBTA Safety Director) and co-signed by the MBTA's Project Manager and/or Resident Engineer.

SUBJECT: CONTRACTOR SAFETY VIOLATION PROGRAM	ORIGINAL ISSUE DATE: July 1, 1996	SAFETY/POLICY PROCEDURE #: 7.3 REV 2

IV. PROCEDURES

The representatives of the MBTA Safety Department, upon presenting proper identification are authorized to:

X Enter without delay, with reasonable prior notice to the Authority's Resident Engineer, any construction site, workplace, or other areas where work is being performed for the Authority.

X Inspect and investigate, any such place of employment and all pertinent conditions, structures, machines, apparatus, devices, and to question, in confidence, any project employer, owner, operator, agent or employee.

X Issue the General Contractor the Authority's safety violation(s) notice, if applicable.

Under special circumstances, advanced notice will be given to the Authority's Project representatives. Such notice will not be less than 24 hours. The special circumstances include the following:

X Inspections that take place after regular business hours, or that require special preparation.

X Situations in which the Safety Department determines that advance notice would produce a more thorough or effective inspection.

The MBTA Safety Official conducting the site safety inspection will notify the MBTA Resident Engineer and the General Contractor's Safety Supervisor/Representative of any safety violations found before leaving the job site or within the 24 hour period of the inspection, depending on severity of the hazard.

After the Safety Official reports the finding, the MBTA Safety Director will determine whether assessments will be issued. The assessment amounts will be determined based on the violation. The Safety Official shall issue four copies of the safety violations (see Exhibit 1)

One copy will be issued to the MBTA Resident Engineer to ensure the Contractor's corrective action and safety compliance. The second copy will be issued to the General Contractor's on-site representative. The third copy will be sent by certified mail to the General Contractor's Senior Officer and/or the Contractor's Safety Director. A copy will be retained by the MBTA Safety Department, and the information will be entered into the Safety Department's database for follow-up and record keeping purposes.

A follow-up inspection may be conducted to determine whether previously cited safety violations have been corrected. If the Contractor has failed to abate the safety violation, the Safety Official will inform that Contractor that he/she may face additional daily assessments while such failure continues or the safety violation remains unresolved. The Contractor's Senior Office and/or Safety Director will be notified by certified mail.

V. OSHA Violation Categories and Violation Assessment Table (see Exhibit II):

All violations to be determined by the sue of OSHA Regulations CFR 29 including Part 1926 and Part 1910 as amended. These Regulations will be considered as the safety guidelines, unless other more stringent safety requirements are noted in the Contract.

A. OSHA Violation Categories by Types:

X Other-than-Serious Violation--"A violation that has a direct relationship to job safety and health, but would not cause death or physical harm".

X Serious Violation--"A violation where there is a substantial probability that death or serious harm could result".

X Willful Violation---"A violation that the employer intentionally and knowingly commits. The employer is aware that a hazardous condition exists, knows that the condition violates an (OSHA) standard or other obligation of the OSHA Act, and makes no reasonable effort to eliminate it."

X Repeated Violation--"A violation of any standard, regulation, rule or order where, upon reinspection, a similar violation is found and the original citation (violation notice) has become a final order"

X Failure to Abate--"Failure to correct a prior violation may bring a civil penalty (assessment) for each day that the violation continues".

B. MBTA Assessment Ranges based on OSHA Category:

1. Other-than Serious: ($100.-$900.)

2. Serious Violation: ($1000.-$3000.)

3. Willful Violation: ($3000.-$7500.)

4. Repeated Violation: ($5000.-$9500.)

The **First** violation, shall be a written warning or, depending on the severity of the incident, could include assessment up to $3,000. The safety violation will be corrected immediately or within a time frame as noted on the Notice of Violation.

The **Second Repeat** violation, depending on the severity of the violation, will have assessments of $3,000. Up to $7500. Levied upon the General Contractor. The safety violation will be corrected immediately or within a time frame noted on the Notice of Violation.

The **Third Repeat** violation will result in an additional assessment of $5000.-$9500. Being levied upon the General Contractor and may require a formal review of the on site safety program with the

Contractor's insurer and at the Contractor's expense. That review may also require additional safety training for the General Contractor(s) personnel.

V1. DISPUTE RESOLUTION PROCESS (See Exhibit III)

The General Contractor will be held accountable for all safety violations on the Project, including those of any subcontractors on the same project. Upon receipt, by certified mail, of a violation notice with assessments, the Contractor will have a **15 calendar day period** to dispute the assessment violation which written notification must be forwarded along with the "Contractor Safety Violation Dispute Resolution Form" (Exhibit III), to the MBTA Director of Safety (State Transportation Building, 10 Park Plaza Rm. #8350, Boston, MA 02116), and a copy forwarded to the MBTA Project Office.

The MBTA Dispute Resolution Committee shall consist of the Director of Safety or designee, the Director of Design and Construction or designee, and the MBTA Project Manager. The purpose of the committee will be to determine whether the safety violation assessments will be upheld, reduced or dismissed. The dispute resolution meeting will include the General Contractor's Project Manager/Superintendent, the General Contractor's designated site safety supervisor/representative and/or the General Contractor's Corporate Safety Director.

The assessment values determined for the various safety violations will be withheld from subsequent General Contractor's monthly pay estimate request. The Final Payment for work performed will be reduced by those amounts previously assessed. Assessment funds will be used to further promote and reinforce safety and health on the job through continuous site safety reviews and training.

II. EXHIBITS:

1. Violation Notice Form
2. Violations and Assessment Values
3. Dispute Resolution Form

"EXHIBIT I"

MBTA Safety Department Safety Violation No._____

NOTICE OF SAFETY VIOLATION

Warning First Notice Second Repeat Notice Third Repeat Notice

Project Name:_____ Date:_____

Project Location:_____ Time:_____

Contract Number:_____ Weather Conditions:_____

TO: (Name of General Contractor)_____

ATTENTION OF: (Contractor Safety Supervisor/Representative:_____

General Contractor's Address:_____

THE FOLLOWING VIOLATION(S) OF SAFETY CONDITIONS(S) HAS/HAVE BEEN NOTED AND SHOULD BE CORRECTED:

STOP WORK until the violation is corrected: Immediately By_____

Description of Safety Violation(s):

_____

_____

Notice Issued by MBTA Safety Official:_____

Notice Received By:_____ Employer/Title:_____

MBTA SAFETY VIOLATION ASSESSMENT

FIRST Violation
Date:_____
Amount:_____

SECOND Repeat Violation
Date:_____
Amount:_____

THIRD Repeat Violation
Date:_____
Amount:_____

A COPY OF THIS VIOLATION NOTICE MUST ACCOMPANY THE DISPUTE RESOLUTION FORM

SAFETY VIOLATION ASSESSMENT TABLE EXHIBIT II

OSHA CATEGORY	SAFETY VIOLATION OCCURRENCE		
(CFR 29 PART 1926)	First	2nd/Repeat	3rd/Repeat
GENERAL SAFETY AND HEALTH PROVISIONS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROLS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
PERSONAL PROTECTIVE & LIFE SAVING EQUIPMENT	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
FIRE PROTECTION AND PREVENTION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
SIGNS, SIGNALS OR BARRICADES	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
MATERIALS HANDLING, STORAGE, USE AND DISPOSAL	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
TOOLS - HAND AND POWER	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
WELDING AND CUTTING	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
ELECTRICAL	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
SCAFFOLDING	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
FLOOR AND WALL OPENINGS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
CRANES, DERRICKS, HOISTS, ELEVATORS AND CONVEYORS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
MOTOR VEHICLES, MECHANIZED EQUIPMENT AND MARINE OPERATIONS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
EXCAVATIONS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
CONCRETE AND MASONRY CONSTRUCTION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
STEEL ERECTION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
UNDERGROUND CONSTRUCTION, CAISSONS, COFFERDAMS, AND COMPRESSED AIR	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
DEMOLITION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
BLASTING AND USE OF EXPLOSIVES	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
POWER TRANSMISSION AND DISTRIBUTION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
ROLLOVER PROTECTIVE STRUCTURES OVERHEAD PROTECTION	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
STAIRWAYS AND LADDERS	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500
TOXIC AND HAZARDOUS SUBSTANCES	Warning Up To $3000	$3000 - $7,500	$5,000 - $9,500

"EXHIBIT III"

CONTRACTOR SAFETY VIOLATION DISPUTE RESOLUTION FORM

1. Contractor_____

2. Description of Violation: _____

_____ Violation No._____ _____

3. MBTA Contract No. _____ Date of Violation: _____

4. Contract Description: _____ Date of Notice: _____

_____

_____

5. Amount of Assessment(s): _____

6. Contractor Action Taken:

_____

7. Dispute Issues:_____

_____

_____

****

FOR DISPUTE RESOLUTION COMMITTEE COMMENTS (ONLY)

Committee Findings: _____

_____

_____

Committee Action Taken: _____

_____

_____

_____ _____

Director of Safety/Representative Date

_____ _____

Director of Design and Construction/Representative Date

_____ _____

MBTA Project Manager Date

_____ _____

Contractor Project Manager/Superintendent Date

_____ _____

Contractor Site Safety Supervisor/Representative Date

THIS FORM MUST HAVE THE ABOVE ITEMS 1-7 FILLED IN AND ACCOMPANY THE DISPUTE MEETING REQUEST

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the general requirements for protection and final cleaning of the project work area, the providing of operations and maintenance manuals, and the providing of As-Built Drawings.

1.2 PROTECTION AND FINAL CLEANING OF FLOOR COVERINGS

A. Protect all building elements and roofing after completion of Work. Final cleaning of all areas disturbed by the construction shall be the responsibility of the Contractor.

B. Immediately after acceptance by the Authority, clean all new construction and existing areas disturbed by the construction. Clean materials and roofing as recommended by the manufacturer, and in accordance with the manufacturer's directions.

1.3 OPERATIONS AND MAINTENANCE MANUALS

A. At least one month prior to turning over the Project to the Authority for occupancy, deliver to the Engineer three complete indexed files containing approved data as follows:

1. Operating manuals and operating instructions for the various systems, including roofing maintenance guides.
2. Names, addresses and telephone numbers of repair and service companies for each of the major systems installed.

1.4 AS-BUILT DRAWINGS

A. The Authority will provide one set of black or blue line on white drawings to the Contractor to maintain and submit as As-Built Drawings. Maintain these prints at the site and at all times, absolutely, clearly, and completely show the actual installations in accordance with the Contract requirements. Record all subcontractors' changes.

B. Upon completion of the Work and after checking the subcontractors' As-Built Drawings, and all required drawings, submit a complete set of marked-up record drawings to the Engineer by registered mail in time to be used for the final inspection, and acceptance and for verification by the designer. Availability of as-built drawings shall be a prerequisite to scheduling a final inspection of the Contract and these drawings and the Contract Documents will be used in checking completion of the Work. Non-availability of As-Built Drawings or inaccuracies therein may be grounds for cancellation and postponement of any scheduled final inspection by the Authority until such time as the drawings are available or the discrepancy has been corrected. Upon completion of the work, the as-built drawings shall become the property of the Authority. Provide a PDF of the As-Built drawings. If As-Built

Drawings are not maintained as required herein to the satisfaction of the Engineer, the Authority will deduct from monthly partial payments, an amount representing the estimated monthly cost of maintaining the as-built drawings, and will continue deduction of the 5 percent retainage after 50 percent completion of the Contract.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01732

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.

B. Related Sections include the following:

1. Section 01733 – Hazardous Materials Remediation

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to MBTA ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

E. Hazardous Material: Any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a hazard to human health or the environment. Hazardous materials include, but are not limited to, the following categories: flammable and combustible; toxic corrosive; oxidizers; aerosols; and compressed gases. For the purposes of this Specification, hazardous materials specifically include, but are not limited to asbestos containing material (ACM), lead paint, and polychlorinated biphenyls (PCBs). Refer to Appendix A for test results for ACM and lead paint.

1.4 SUBMITTALS

A. Qualification Data: For demolition firm and Professional Engineer

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Locations of proposed dust- and noise-control temporary partitions and means of egress.
5. Coordination of Authority's continuing occupancy of portions of existing building and of Authority's partial occupancy of completed Work.
6. Means of protection for items to remain and items in path of waste removal from building.
7. Coordination with Utility Companies to resume service after Construction.

C. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

D. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations.

E. Hazardous material remediation plan. Refer to Appendix A.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.
6. Review of hazardous material remediation plan.
7. Review of procedures for noise control and dust control.
8. Review requirements for tree relocation.

1.6 PROJECT CONDITIONS

A. Authority will occupy portions of building immediately adjacent to and below the selective demolition area. Conduct selective demolition so Authority's operations will not be disrupted.

1. Comply with requirements specified in Division 1 Section "Summary of the Work"

B. Conditions existing at time of inspection for bidding purpose will be maintained by Authority as far as practical.

C. Notify Design Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed, protected, and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Design Engineer.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand

tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition.
4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
5. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Appendix B.

B. Removed and Salvaged Items:

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 Authority.
4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

E. Promptly repair damage caused by demolition operations.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Refer to Section 01733 (Hazardous Materials Removal) for disposal of hazardous materials.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, complete in place, furnishing and installing all materials, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, will be included in the Contract Lump Sum Prices for the work as indicated herein.

4.2 PAYMENT ITEMS

Item No.	Description	Unit
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 01733

HAZARDOUS MATERIALS REMOVAL

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the following:

1. Removal, containment, transporting and disposal of Asbestos Containing Materials (ACM) and lead paint within the existing roofing materials to be removed as identified in the "Limited Asbestos and Lead Paint Inspection" report dated August 2, 2011 prepared by Covino Environmental Associates. A copy of the report is attached in Appendix A.

2. Removal, containment, transportation and disposal of debris in building attic which is presumed to include Asbestos Containing Materials (ACM) or other ACM not identified in the "Limited Asbestos and Lead Paint Inspection" report in Appendix A as directed by the Engineer.

B. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.02 DESCRIPTION OF WORK

A. This section covers the furnishing of all labor, materials, facilities, equipment, services, employee training and testing, permits and agreements necessary to perform the work required for the removal, transportation and disposal of Asbestos Containing Materials (ACM) and lead paint. Contractor shall perform all work in accordance with these specifications, U.S. Environmental Protection Agency (U.S. EPA) and Occupational Safety & Health Administration (OSHA) regulations, NIOSH recommendations, Massachusetts Department of Environmental Protection (MassDEP) and Department of Labor and Workforce Development (DLWD) regulations, local statutes, local ordinances, local codes and any other applicable federal, state and local government regulations and guidelines. Whenever there is a conflict or overlap of the above referenced requirements, the strongest provisions are applicable as determined by the Owner. Deviations from this specification must be approved in writing by the Owner prior to the Contractor continuing work.

B. The Contractor shall furnish all labor, material, supervision, construction tools, staging, rigging and other equipment necessary to perform the work described below.

C. Provide appropriate worker training, respiratory protection and medical examination.

D. Provide access, support and protection to all authorized visitors and inspectors.

E. Filing of all required notifications and permits and payment of all required associated costs and fees.

F. Perform abatement activities including removal and disposal of Asbestos Containing Material (ACM), recordkeeping, and security.

G. The Contractor shall be responsible for the complete removal and disposal of all identified ACM located at the site as specified herein and as directed by the Engineer.

1.03 SCHEDULING

A. Prior to initiating ACM removal, the Contractor shall prepare an abatement schedule for submittal to the Engineer for review.

B. The Contractor shall update the abatement schedule as requested by the Engineer.

1.04 AUTHORITY TO STOP WORK

A. If the Owner presents a written stop asbestos removal order, the Contractor shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the Owner. A stop asbestos removal order may be issued at any time the Owner determines abatement conditions / activities are not within specification requirements or are not in compliance with applicable regulations. Work stoppage shall continue until conditions have been corrected to the satisfaction of the Owner. All costs related to stop work order, including costs for corrective actions, shall be responsibility of the Contractor.

B. Stop asbestos removal orders may be issued for, but may not be limited to, the following:

1. If the Contractor disregards the authority of the Owner's Project Monitor;

2. If the Contractor disregards laws or regulations of any public body having jurisdiction; or

3. If the Contractor's work presents a risk to the general public, other contractors, owner representatives or the environment.

C. The absence of a stop work order by the Owner shall not in any way be construed as an approval or acceptance of the Contractor's work.

1.05 DEFINITIONS

All terms not defined herein shall have the meaning given in the applicable publications and regulations.

A. Abatement: Procedures to control the release of asbestos fibers from ACM; includes removal, encapsulation, and enclosure of ACM.

B. Adequately Wet: Sufficiently mixed or penetrated with liquid to prevent the release of particulate. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

C. Amended Water: Water containing a wetting agent or surfactant that has been added to increase the ability of the water to penetrate ACM.

D. Asbestos: Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered.

E. Asbestos-Cement Piping (ACP): ACP has been widely used for water and sewer mains and occasionally used as electrical conduits, drainage pipe, and vent pipes. If these ACM are crumbled, pulverized or reduced to a powder, or can be so rendered by hand pressure, they are friable and thus covered by the Asbestos NESHAP. Broken edges of these materials typically are friable. The fractured surface should be rubbed to see if it produces powder. If Category II non-friable ACM has not crumbled, been pulverized or reduced to powder and will not become so during the course of demolition/renovation operations, it is considered non-friable and therefore is not subject to Asbestos NESHAP. If during demolition or renovation activity it becomes crumbled, pulverized or reduced to powder, it is covered by the Asbestos NESHAP.

F. Asbestos Containing Material (ACM): Any material containing equal to or greater than 1% asbestos based on analysis via polarized light microscopy (PLM) is considered ACM.

G. Asbestos Contaminated Material: any material which has become contaminated (surficially or in the materials matrix or composition) with one or more asbestos fibers.

H. Authorized Visitors: Any visitor authorized by the Owner or any representative of a regulatory agency or other agency having jurisdiction over the project.

I. Clean: Visually free of dust, dirt, debris and any foreign material.

J. Competent Person: In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy to minimize asbestos exposure, who has the authority to take prompt corrective measures, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work, who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

K. Critical Barrier: One or more layers of plastic sealed over all openings into a work area or other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

L. Decontamination Area/Unit: An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

M. Employee Exposure: The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

N. Friable Asbestos Material: Material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

O. HEPA Filter: High-Efficiency Particulate Air (HEPA) - An air filter capable of trapping and retaining at least 99.97 percent of all monodispersed particles sized 0.3 micron in diameter or larger.

P. HEPA Vacuum: Vacuum equipment with HEPA filter system for filtering the exhaust air from the unit.

Q. Negative Initial Exposure Assessment: A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL's.

R. NESHAP: National Emission Standards for Hazardous Air Pollutants (Title 40, Part 61).

S. Project Designer: A person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C Sec. 763.90 (g).

T. Project Monitor: An individual who is certified by applicable state agencies to observe abatement activities performed by contractors, to represent the Owner to ensure work is completed according to specifications and in compliance with statutes and regulations, and to perform air monitoring to determine final clearance.

U. Regulated Area: An established area within which airborne concentration of asbestos fibers exceeds or can reasonably be expected to exceed the permissible exposure limit.

V. Removal: All procedures necessary to remove and dispose of ACM from the designated areas in accordance with the contract documents and all applicable regulatory requirements.

W. Waste Generator: Any owner or operator whose act or process produces asbestos-containing waste material.

X. Waste Shipment Record: The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

1.06 CODES, REGULATIONS, AND STANDARDS

A. General Applicability

1. All work under this contract shall be performed in strict accordance with all applicable Federal, State, and Local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.

2. The most recent edition of any relevant regulation, standard, document, code or policy statement shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be utilized.

3. Copies of all standards, regulations, codes and other applicable documents, including this specification shall be available at the work site.

B. Contractor Responsibility

1. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to all aspects of the abatement project. The Contractor is responsible for providing and maintaining training, accreditation, medical exams, medical records, and personal protective equipment as required by applicable Federal, State and Local regulations. The Contractor shall hold the Owner and Owner's Representative harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of the Contractor, Contractor's employees, or subcontractors of the Contractor.

C. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The publications listed below are not intended to be a comprehensive list of all regulations, applicable to this work.

1. Environmental Protection Agency (EPA):

National Emission Standards for Hazardous Air Pollutants (NESHAP) Title 40, Part 61).

A Guide to Respiratory Protection for the Asbestos Abatement Industry.

2. Occupational Safety and Health Administration (OSHA):

Asbestos Construction Standard 29 CFR Part 1926.1101

Asbestos General Industry Standard 29 CFR 1910.1001

Respiratory Protection, 29 CFR 1910.134

Construction Industry Standards, 29 CFR 1926

3. U.S. Department of Transportation

49 CFR 100 - 185, Transportation

4. National Institute for Occupational Safety and Health (NIOSH):

"Respiratory Protection A Guide for the Employee."

5. American National Standards Institute (ANSI):

Z86.1-1973 - Commodity Specification for Air

Z9.2 - HEPA Filter Specifications

Z88.2-1980-Respiratory Protective Equipment

6. Massachusetts Division of Occupational Safety:

   The Removal, Containment or Encapsulation of Asbestos (453 CMR 6), including all clarifications, policy statements, etc.

7. Massachusetts Department of Environmental Protection:

   310 CMR 7.00, 7.09, 7.15 and all related amendments and policy statements.

   MassDEP Policy #BWP-96-012 "Policy Concerning Non-Friable Asbestos-Containing Materials."

1.07 PERSONNEL QUALIFICATIONS

A. All personnel of the Contractor or any approved subcontractors involved with asbestos abatement work shall meet the following minimum qualifications:

   1. Medical examination within the past year in accordance with OSHA 1926.134 with a physician's written opinion that the worker has no condition that would preclude him/her from working with asbestos or wearing a respirator.

B. The Contractor shall employ a Competent Person to oversee all aspects of ACM removal.

C. There shall be a sufficient number of trained and qualified workers, foremen and superintendents to accomplish the work within the required schedule. No untrained nor fully qualified and pre-approved person shall be employed to speed up completion of the abatement work.

D. Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k)(9). Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k)(9)(viii). Training shall have been conducted by an EPA approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

E. Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the opinion that the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

1.08 EMERGENCY PRECAUTIONS

A. A site specific Emergency Action Plan shall be submitted by the Contractor prior to the pre-construction meeting and shall be reviewed by the Owner. The Plan shall meet the requirements of 29 CFR 1926.35.

1.09 RESPIRATORY PROTECTION PROGRAM

A. The Contractor shall develop and implement a Respiratory Protection Program (RPP) which complies with the January 8, 1998 (or more current) OSHA requirements, 29 CFR 1926.1101 and 29 CFR 1910.132 and 134. All respirators used must be approved for asbestos abatement activities by the proper regulatory authority.

B. Minimum respiratory protection required shall conform to current OSHA and Massachusetts Division of Occupational Safety (DOS) regulations including 29 CFR 1926.1101 and 453 CMR 6.00.

1.10 SUBMITTALS

A. Submittals shall be in accordance with Specification Section 01300 - Submittals.

B. The following submittals shall be submitted to the Engineer. Submittals shall be submitted to the Engineer for review 3-weeks prior to the Contractor initiating ACM removal activities.

1. Certificates of training and documentation of medical examination including a physician's determination that the employee is able to wear a respirator and documentation of current successful respirator fit test (29 CFR 1926.1101 Appendix C) of all personnel assigned to the project, including Competent Person.

2. Certification of compliance with OSHA requirements including but not limited to medical surveillance, record keeping and personnel exposure monitoring.

3. Respiratory Protection Program. Include site specific exposure assessment for respirator selection.

4. A written project schedule. The schedule shall be date specific and include all phases of the project.

5. Emergency Action Plan.

6. Proposed waste disposal site and waste transporter. Include name, address, telephone number and operating permits, etc.

7. Material safety data sheets (MSDS) for all materials and products to be used by the Contractor on this project.

8. A work plan outlining the methods to be used during the removal of Asbestos Containing Materials. The work plan shall include the use of the Best Management Practices pertaining to the qualifications of field personnel and methods for dust control, packaging, transportation, and decontamination of equipment.

C. During Abatement

1. Results of personnel exposure monitoring.

2. Project schedule.

D. Post Abatement Submittals

1. Disposal receipts (within timeframes regulated by EPA) signed by the landfill operator demonstrating that the ACM removed from the project has been packaged, transported and disposed of properly.

2. Provide the Engineer with copies of on-site job logs, notifications, permits, accident reports, personnel exposure air monitoring results, waivers of lien.

3. Copies of any notices of non-compliance issued by governmental authorities.

E. The Contractor shall submit a Lead-Based Paint Removal Plan describing the procedures to be employed for complying with this Section and OSHA regulation 29 CFR 1926.62. Include detailed description of methods to be used for removal, containment, packaging, transportation, and disposal of lead paint.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deliver all materials in original packages, containers or bundles bearing the name of the manufacturer.

B. Damaged, deteriorating or contaminated products or equipment shall not be used on this project, and shall be removed from the work site.

C. Polyethylene sheeting shall be at least 6-mil thickness.

D. Duct tape or other waterproof tape, furring strips, staples or other materials shall be available to secure polyethylene sheeting.

E. Disposable bags and/or drums shall be of 6-mil polyethylene, on which labels are directly printed, as required by EPA, OSHA and DOT regulations.

F. Asbestos warning signs that are posted at all approaches and/or entrances to work areas shall conform to OSHA 29 CFR 1926.1101. Warning signs shall be posted in English as well as all other applicable languages if persons who cannot read English are present.

G. Adequately stocked first aid kits shall be on-site.

H. Surfactant (wetting agent) shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by manufacturer. An “equivalent surfactant” shall be understood to mean a material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331-56- (“Surface and Interfacial Tension of Solutions of Surface Active Agents”).

2.02 TOOLS AND EQUIPMENT

A. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transport, and unloading of contaminated waste without exposure to persons or property. The equipment shall be secured at all times and access limited to authorized personnel only.

B. The Contractor shall provide approved respirators and protective clothing to all Contractor personnel. The Contractor shall also provide approved protective clothing to representatives of the Owner, and to representatives of the State or other governmental entity who may inspect the job site.

C. Protective clothing requirements must include, but may not be limited to:

1. One-time use, disposable, full-body coveralls made of Tyvek® fabric or approved equal.
2. Hard Hats
3. Eye protection
4. Gloves
5. Respiratory protective equipment in accordance with OSHA 29 CFR 1926.1101 and 29 CFR 1910.134. Respirators shall be NIOSH/MSHA approved for protection against asbestos exposure.
6. Other as appropriate for site conditions

D. The Contractor shall have sufficient equipment to mix and spray wetting agents.

E. The Contractor shall have a sufficient quantity of, ladders, hand tools and materials to conduct the abatement project in an efficient and workmanlike manner. All equipment shall be used according to OSHA Safety and Health Standards for the Construction Industry (29 CFR Part 1926).

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

A. Examine the areas and conditions under which asbestos will be abated and notify the Project Monitor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

B. Examine the ACM to determine the condition of the material and the applicability of NESHAPS to conducting the work. Notify the Project Monitor in writing if friable asbestos or other conditions requiring work plan modification are encountered.

C. Before any work commences, post danger signs in and around the Work Area to comply with 29 CFR l926.58 (k) (l) as required by federal and state regulations, and as specified herein.

3.02 SITE SECURITY

A. Regulated area access is to be restricted to authorized trained/accredited and protected personnel. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel.

3.03 PERSONAL PROTECTION EQUIPMENT

A. Provide workers with boots, booties, hard hats, goggles, gloves, protective clothing, respirators and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the ACP removal.

B. The Competent Person shall ensure that each time workers enter the regulated area, they observe and follow all required procedures and wear appropriate personal protective equipment.

C. The Contractor shall instruct all employees and workers in the proper care of their personally issued respiratory protection equipment, including daily maintenance and sanitizing procedures.

D. All respiratory protection equipment shall be inspected by Contractor's personnel at the beginning of each work period, including breaks and lunch periods.

3.04 ASBESTOS CEMENT PIPE (ACP) CONNECTION AND REMOVAL PROCEDURES

A. Contractor shall only cut existing ACP as required to allow for removal and disposal. Cutting of ACP shall be performed in accordance with all applicable OSHA standards. Contractor shall select method to cut and machine ACP. Selected method shall minimize release of asbestos cement fibers.

B ACP shall be secured, wrapped and disposed of in a timely manner. Stockpiling of removed pipe in an unsecured area will not be allowed.

C. ACP shall be transported to a licensed facility for proper disposal.

D. Crushing of pipe in-place will not be allowed.

3.05 DISPOSAL ACTIVITIES

A. It is the responsibility of the Contractor to determine current waste handling, transportation, and disposal regulations and or requirements for each waste stream generated at this site by this work and for each waste disposal facility. The landfill destination must be approved by the Owner. The Contractor must comply fully with these regulations and all U. S. Department of Transportation and EPA requirements.

B. The Contractor will document actual disposal of the waste at the designated landfill by completing a WASTE SHIPMENT RECORD and forwarding the original along with the Bill of Lading to the Owner.

C. All waste load-out and disposal activities shall be the responsibility of the Contractor.

D. Contractor shall ensure that transport vehicles do not leak water or other material while being loaded, being transported or while on site partially loaded. At minimum, transport vehicles shall be lined with 2 layers of six-mil thick polyethylene sheeting installed to form a watertight barrier within the vehicle. If water is observed leaking from any transport or storage container, contractor shall immediately stop work, unload the container (including dumpsters and semi-trailers) find and correct the source of the leak, and place waste material back into the container. This process will be repeated each time any water is observed leaking from a storage or transport vehicle that contains asbestos waste. Contractor shall also take all steps necessary, as determined by the Owner's Project Monitor, to decontaminate the ground or other surfaces that became wet due to water leaking from a container that holds asbestos waste.

3.06 GENERAL PROCEDURES

A. All surfaces shall be wetted during removal activities.

B. If ACM is found to be in a friable or will be rendered friable, abatement shall be conducted in containment.

C. ACM shall be removed in an "intact" condition in sizes such that the material may be handled without breakage.

D. If ACM sections can be separated without cutting or without the ACM becoming friable, the removal may be conducted without containment.

E. If ACM sections require breaking/cutting to separate, all breaking/cutting activities shall be conducted within a glove bag or negative pressure regulated work area (containment).

F. The Engineer and the Owner's Design Team shall be notified immediately in the event of breakage.

G. All ACM shall be double wrapped in 6-mil polyethylene sheeting and labeled as ACM prior to transport.

3.07 WORK AREA PREPARATION

A. Prior to any asbestos related work in an area, seal off the entire area to all persons other than trained personnel and authorized visitors. The Contractor shall erect signs around the perimeter in accordance with EPA, OSHA and this specification and provide 24-hour security against unauthorized entry during the abatement process. Maintain a log of all people entering and exiting the workplace.

B. The Contractor shall be responsible for taking whatever steps are necessary to prevent a release to the filter surfaces, environment and additional contamination of the areas beneath the ACM. This shall include sealing the underside of attic roof with polyethylene sheeting to prevent asbestos fibers and dust from entering the occupied spaces below.

C. Construct negative pressure enclosures and install air filtration units, as applicable.

D. Dust and airborne fiber release shall be minimized by the use of air misting techniques and HEPA vacuuming during abatement activities. The Contractor shall prevent visible dust emissions during, abatement, cleaning and all other activities.

3.08 UTILITIES

A. All temporary electrical power shall be in accordance with OSHA Electrical Code for Wet Environment.

3.09 MONITORING, TESTING AND INSPECTION

A. The Contractor is responsible for personnel (employee) exposure monitoring for airborne asbestos fibers and other contaminates in compliance with OSHA regulations. The Owner's Industrial Hygienist may, at his or her discretion, also conduct exposure monitoring on Contractor personnel and area air monitoring at locations inside and outside of the work area.

B. Provide cooperation and support to the Owner's Project Monitor throughout the abatement process.

C. Contractor is responsible for meeting OSHA requirements for his personnel, including but not limited to, monitoring requirements, safety compliance training and record keeping.

3.10 CLEANING AND FINAL DECONTAMINATION

A. After the removal of the ACP has been completed and before removal of barriers (as applicable), the entire area shall be thoroughly wet cleaned and/or vacuumed with HEPA filtered vacuum. All plastic barriers, tapes and disposable contaminated equipment shall also be disposed of as asbestos waste. All reusable contaminated equipment such as masks, hard hats, etc., shall be thoroughly decontaminated through wet cleaning or sealed within 6-mil polyethylene bags before removal from the work area.

3.11 FINAL INSPECTION AND TESTING

A. After a thorough cleaning of the negative pressure regulated work area (as applicable), the Owner's Project Monitor shall determine the workspace is ready for inspection and final testing. The Project Monitor will visually inspect the workspace for the detection of any visible dust or debris. The cleaning procedures shall be repeated until a level of no visible debris is achieved.

B. Following successful visual inspection of the work area and after a sufficient period of time has elapsed to allow complete drying of the work area, the final clearance air sampling will be performed by the Owner's Project Monitor.

C. The final testing within negative pressure regulated work areas (as applicable) shall take place under active agitation of the air in the work space with fans running, leaf blowers operating and any other means found suitable by the Owner's Industrial Hygienist during the final testing. The number of air samples collected within the work area shall be in accordance with the Massachusetts Department of Labor and Work Force Development

regulation 453 CMR 6.00. If analysis of clearance air samples show fiber levels in excess of 0.010 f/cc using phase contrast microscopy (PCM), then repeat cleaning and re-sampling will be required until regulated clearance criteria are met.

3.12 GENERAL APPLICABILITY OF CODES, REGULATIONS, LAWS AND STANDARDS

A. Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, laws and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

3.13 LEAD PAINT REMOVAL

A. The Contractor is responsible for ensuring that all personnel performing work under this section shall be properly trained for lead paint removal operations in accordance with all Federal, state and local regulations, including but not limited to the Occupational Health & Safety Administration's (OSHA) Lead Exposure in Construction Standard (29 CFR 1926.62). The Contractor is required to provide proof of training of any and all employees completing the work of this section as part of an initial Lead Paint Contractor Submittal Package at least 10 days prior to the start of Work.

B. The Contractor shall clean all work areas of any visible debris at the end of each workday using a HEPA vacuum and shall collect and store all lead waste (e.g., lead paint chips) on site in secured container(s) that are properly labeled and meet all regulatory requirements.

C. The Contractor shall be responsible for determining airborne lead concentrations for each task performed that will impact building materials coated with lead-based paint.

D. Work Areas Affected - In general, the following activities are minimum requirements of this Section and affect the demolition performed on the painted components:

1. No torch cutting, mechanical sanding or stripping or abrasive methods shall occur on painted surfaces without the use of HEPA vacuum attachments.

2. No demolition activities may occur that increase the workers' exposure above the Action Level of 30 µg/m3. Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.

3. All workers shall be informed of the components to be demolished that have been identified as containing lead.

E. The Contractor shall provide appropriate respiratory protection, protective clothing, and engineering controls to minimize the exposure of employees to airborne lead. All work involving the disturbance of paints containing lead at the site and all work where employees may be exposed to lead in excess of the Action Level of 30 µg/m3 shall be performed by workers that have received appropriate lead training and personal protective equipment.

F. The Contractor shall be responsible for proper clean-up procedures, handling and disposal of the waste and materials generated in accordance with the methods described in this

Section. The Contractor shall collect all wastes resulting from the work and perform appropriate sampling as required by RCRA and other applicable regulations for the proper packaging, handling, shipment and off-site waste disposal. The Contractor shall provide Engineer with all results of waste characterization and all transport and disposal manifests.

G. The Contractor shall be responsible to make all arrangements for the proper transportation and disposal of lead contaminated materials.

H. Isolate work area from adjacent areas of the building. Post caution signs meeting the specifications of OSHA regulation 29 CFR 1926.62 (k) at any location or approach to a location where airborne lead concentrations may exceed the Action Level of 30 µg/m3. Caution signs shall be posted at a sufficient distance from the work area to permit an employee to read the sign and take the necessary precautionary measures to avoid exposure. Additional caution signs may need to be posted following construction of workplace enclosure barriers (if applicable).

I. Exterior de-leading may include the removal of loose, chipped, cracking, flaking, blistering, or chalking paint in preparation for re-painting as identified in other specification sections. Hand-scraping using wet methods and/or vacuum powered tools and/or caustic paste removal are the only acceptable methods of removal. No lead paint dust shall be generated from construction activities.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Separate measurement and payment for removal, containment, transporting and disposal of Asbestos Containing Materials (ACM) and lead paint as identified in the "Limited Asbestos and Lead Paint Inspection" report dated August 2, 2011 prepared by Covino Environmental Associates (see Appendix A) will not be made for the work of this Section. The cost for all work, complete in place, furnishing and installing all materials, equipment and accessories required; providing all tools, labor, transportation, handling and storage; monitoring; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Price for Item 0751.100 (ROOFING AND FLASHING for the work as indicated herein.

B. Removal, containment, transportation and disposal of debris in the building attic which is presumed to include Asbestos Containing Materials (ACM)) or other hazardous materials including ACM, lead paint and PCBs not identified in the "Limited Asbestos and Lead Paint Inspection" report in Appendix A as directed by the Engineer will be paid for under an allowance for Item 0212.193 (ASBESTOS REMOVAL).

4.2 PAYMENT ITEMS

Item No.	Description	Unit
0212.193	ASBESTOS REMOVAL	ALLOWANCE W/ NO OVERUN
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies the following items:

1. Wood blocking, sleepers and curbing.
2. Plywood sheathing.

B. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.2 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them include the following:

1. ALSC: American Lumber Standard Committee
2. AWPA: American Wood-Preservers Association
3. DHI: Door and Hardware Institute
4 NELMA: Northeastern Lumber Manufacturers Association
5 NHLA: National Hardware Lumber Association
6 NLGA: National Lumber Grades Authority

1.3 SUBMITTALS

A. Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Submit for each type of process and factory-fabricated product. Indicate component materials and dimensions, and include construction and application details.

1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. For the following products, provide compliance documentation with applicable building and state codes:

1. Preservative treated wood.
2. Fire- retardant-treated wood.
3. Power driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2- PRODUCTS

2.1 WOOD PRODUCTS

A. Lumber: Provide lumber graded by DOC PS 20 standards and applicable rules of grading agencies. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, produce minimum dressed sizes for dry lumber.
4. Provide dressed lumber sanded four sides (S4S) unless otherwise indicated.

2.2 WOOD PANEL PRODUCTS

A. Plywood: Complying with the requirements of DOC PS 1.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 WOOD PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process complying in requirements of AWPA C2.

1. Preservative Chemicals: Acceptable to the Authority and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat miscellaneous carpentry, including the following:

1. Wood sills, sleepers, blocking furring and similar concealed members in contact with masonry or concrete.
2. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
3. Wood framing members that are less than 18 inches above the ground in crawl space.
4. Wood floor plates that are installed over concrete slabs-on grade.

2.4 FIRE- RETARDANT-TREATED MATERIALS.

A. General: Comply with performance requirements in AWPA C20 (Lumber) and AWPA C27 (Plywood).

1. Use treatment that does not promote corrosion of metal fasteners.
2. Use exterior type for exterior locations and where indicated.
3. Use Interior Type A, High Temperature for enclosed roof framing and where indicated.
4. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of Underwriters Laboratory.

1. All lumber and plywood to have a flame spread rating of 25 or less when tested in accordance with ASTM E-84, Standard Test Method for Surface Burning Characteristics of Building Materials

C. Application: Treat concealed miscellaneous carpentry, including but not limited to the following:

1. Concealed blocking at equipment roof curbs and parapet caps.
2. Plywood sheathing at parapet caps and concealed framing locations.

D. Products: Subject to compliance with requirements, provide products by one of the following:

1. Dricon; a Division of Hickson Corporation.
2. Hoover Treated Wood Products.
3. Bestway of New England.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking
2. Nailers
3. Cants
4. Furring

B. For items of dimension lumber size, provide Construction or No.2 grade lumber with 15 percent maximum moisture content and any of the following species:

1. Hem-fir (north); NLGA
2. Spruce-Pine-fir;NLGA

B. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Hem-fir or hem fir (North), Construction or 2 Common grade; NLGA.
2. Spruce-pine-fir (south) or spruce-pine fir, Construction or 2 common grade; NELMA or NLGA

C. For blocking not used for attachment of other construction, utility, stud, or No.3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with the attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

F. Application: Provide kiln dried lumber in the following locations:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.6 PLYWOOD

A. Plywood sheathing: DOC PS1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated, or if not indicated, not less than ½ inch nominal thickness.

2.7 FASTENENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 316 stainless steel.

B. Nails, Brads, and Staples: Complying with the requirements of ASTM F 1667.

C. Power-Driven Fasteners: Complying with NES NER-272.

D. Wood Screws: Complying with the requirements of ASME B18 .6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: Complying with the requirements ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material be fastened.

F. Lag Bolts: Complying with ASEM B18. 2.1.

G Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated flat washers.

PART 3- EXECUTION

3.1 GENERAL

A. Set carpentry to required levels and lines with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking and similar supports to comply with requirements for attaching other construction.

B. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items and trim.

C. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and not more than 96 inches on-center (o.c.).with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

D. Sort and select lumber so that natural characteristics will not interfere with installation or fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.

F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Use NER-272 for power driven fasteners.
2. Table 2304.9.1, “Fastening Schedule”, in the International Building Code.

G. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 FIRE- RETARDANT-TREATED (FRT) MATERIALS INSTALLATION

A. Cutting to length, drilling holes, joining cuts and light sanding are permissible. It is not necessary to field treat cut ends to maintain flame spread rating.

1. Ripping, milling and surfacing of FRT lumber is not permitted.
2. FRT Plywood can be cut in either direction without loss of fire protection

3.4 PROTECTION

A. Protect wood that has been treated with inorganic born (SBX) from weather. If, despite protection inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, complete in place, furnishing and installing all materials, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Price for Pay Item 0751.100 for the work as indicated herein.

B. Demolition and repairs to structural and non-structural wood components such as canopy framing, beadboard soffit, and roof decking not specifically referenced in the Contract Documents as directed by the Engineer will be paid for under an allowance for Item 0130.434.

4.2 PAYMENT ITEMS

Item No.	Description	Unit
0130.434	REPAIR OF DAMAGES	ALLOWANCE W/ NO OVERUN
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 06440

ORNAMENTAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior ornamental woodwork.
2. Wood furring, blocking, shims, and hanging strips for installing ornamental work items unless concealed within other construction before woodwork installation.
3. Shop priming of exterior ornamental woodwork.
4. Shop finishing of exterior ornamental woodwork.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 06100 Rough Carpentry

C. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Franklin and Needham Junction Stations.

1.3 SUBMITTALS

A. Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Product Data: For each type of product, historic wood exterior trim, historic wood beadboard, historic decorative wood shingles and historic wood brackets to match existing, fire-retardant-treated materials and finishing materials and processes.

C. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.

D. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

E. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

F. Include copies of warranties from chemical-treatment manufacturers for each type of treatment.

G. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Apply AWI Quality Certification Program label to Shop Drawings.

H. Samples for Initial Selection:

I. Shop-applied opaque finishes.

J. Samples for Verification:

1. Lumber and panel products with shop-applied opaque finish, 5 inches wide by 12 inches long for lumber and 8 by 10 inches for panels, for each finish system and color, with exposed surface finished.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Product Certificates: For each type of product**.**

C. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

B. Installer Qualifications: Certified participant in AWI's Quality Certification Program.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 FIELD CONDITIONS

A. Weather Limitations for Exterior Work: Proceed with installation of exterior ornamental woodwork only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

B. Field Measurements: Where ornamental woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where ornamental woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that ornamental woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 ORNAMENTAL WOODWORK FABRICATORS

A. Fabricators: Subject to compliance with requirements.

2.2 ORNAMENTAL WOODWORK, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of ornamental woodwork indicated for construction, finishes, installation, and other requirements.

1. Provide labels and certificates from AWI certification program indicating that woodwork**,** including installation**,** complies with requirements of grades specified.
2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

2.3 EXTERIOR ORNAMENTAL WORK FOR OPAQUE FINISH

A. Exterior ornamental work for opaque finish includes the following:

1. Historic wood trim to match existing.
2. Historic wood beadboard to match existing.

3. Historic decorative wood shingles to match existing.
4. Historic wood brackets to match existing

B. Grade: Premium.

C. Wood Species: All-heart redwood or Western red cedar.

2.4 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of ornamental woodwork and quality grade specified unless otherwise indicated.

1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
2. Wood Moisture Content for Exterior Materials: 9 to 15 percent.

B. Water-Repellent Preservative Treated Materials: Comply with AWPA N1 (dip, spray, flood, or vacuum-pressure treatment) for exterior ornamental woodwork items indicated to receive water-repellent preservative treatment.

1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC), combined with an insecticide containing chloropyrifos (CPF).
2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
3. Extent of Water-Repellent Preservative Treatment: Treat all exterior ornamental woodwork unless otherwise indicated.
4. Items fabricated from the following wood species need not be treated:

    a. All-heart redwood.
    b. All-heart western red cedar.

2.5 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. For exterior applications, use materials that comply with testing requirements after being subjected to accelerated weathering according to ASTM D 2898.
2. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
3. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
4. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
5. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.

2.6 MISCELLANEOUS MATERIALS

A. Exterior Blocking, Shims, and Nailers: Hardwood lumber**,** pressure-preservative treated and fire-retardant treated, kiln dried to less than 15 percent moisture content.

1. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b.

    a. Kiln dry lumber after treatment to a maximum moisture content of 19 percent.
    b. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
    c. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.

B. Nails for Exterior Use: Stainless steel.

C. Screws for Exterior Use: Stainless steel.

D. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.

E. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

F. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers." Do not use adhesives that contain urea formaldehyde.

G. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Structural Wood Member Adhesive: 140 g/L.
4. Architectural Sealants: 250 g/L.

2.7 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate ornamental woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.

C. Complete fabrication, including assembly and finishing, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Engineer seven days in advance of the dates and times ornamental woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

2.8 SHOP PRIMING

A. Exterior Ornamental Woodwork for Opaque Finish: Shop prime with one coat of wood primer specified in Section 09900 "Painting."

B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing ornamental woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces**.**

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition ornamental woodwork to average prevailing humidity conditions in installation areas.

B. Before installing ornamental woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install ornamental woodwork to comply with same grade as item to be installed.

B. Assemble ornamental woodwork and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install ornamental woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut ornamental woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

F. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.

G. Anchor ornamental woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with ornamental woodwork.

1. For shop-finished items, use filler matching finish of items being installed.

H. Touch up finishing work specified in this Section after installation of ornamental woodwork. Fill nail holes with matching filler where exposed.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.

I. Refer to Section 09900 Painting for final finishing of installed ornamental woodwork.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective ornamental woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace ornamental woodwork. Adjust joinery for uniform appearance.

B. Clean ornamental woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Separate measurement and payment will not be made for work associated with replacement of the wood gutters. The cost for all work associated with removal and replacement of the wood gutters, complete in place, furnishing and installing all materials, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Price for Pay Item 0751.100 (ROOFING AND FLASHING).

B. Demolition and repairs to damaged ornamental and structural wood elements such as canopy framing, beadboard soffit and other wood trim elements as directed by the Engineer and not specifically identified in the Contract Documents will be paid for under an allowance for Item 0130.434.

4.2 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0130.434	REPAIR OF DAMAGES	ALLOWANCE W/ NO OVERUN
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 07312

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Asphalt shingles
2. Underlayments
3. Ridge vents
4. Snow guards

1.2 RELATED SECTIONS

A. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 06100 – ROUGH CARPENTRY
2. Section 06440 - ORNAMENTAL WOODWORK
3. Section 07600 - FLASHING AND SHEET METAL

B. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS

A. ARRA Submittal Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Product Data: For each type of product indicated.

C. Samples for Verification: For the following products, of sizes indicated, to verify color selected:

1. Asphalt Shingles: Full size
2. Ridge and Hip Cap Shingles: Full size

3. Ridge Vent: 12 inch long Sample
4. Underlayment: 12 inches square
5. Exposed Valley Lining: 12 inches square
6. Fasteners: Three fasteners of each type, length, and finish
7. Snow Guard: Base, bracket, and 12-inch-long rail

D. Material Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each shingle variety and type of underlayment material.

E. Maintenance Data: For roofing to include in maintenance manuals.

F. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with the Engineer and Owner's insurer (if requested), testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instaictions and warranty requirements.

B. Environmental Limitations: Install sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Failures include, but are not limited to, the following:
   a Manufacturing defects.
2. Material Warranty Period: 30 (thirty) years from date of Substantial Completion, prorated, with first seven (7) years non-prorated.
3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 110 mph for 20 (twenty) years from date of Substantial Completion.
4. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 15 (fifteen) years from date of Substantial Completion.

B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt-shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 (five) years from date of Substantial Completion.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 100 sq. ft of each type, in unbroken bundles.

PART 2 – PRODUCTS

2.1 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

A. Laminated-Strip, SBS-Modified Asphalt Shingles: ASTM D 3462/D 3462M, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing; complying with UL 2218, Class 4.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a Atlas Roofing Corporation.

b Malarkey Roofing Products Co.

2. Butt Edge: Straight cut.
3. Strip Size: Manufacturer's standard
4. Algae Resistance: Granules resist algae discoloration.
5. Color and Blends: Black. Subject to approval by Engineer.

2.2 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 4869, asphalt-saturated organic felts, non-perforated.

1. Type: Type II.

B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a ALCO Products, LLC.
b Atlas Roofing Corporation.
c Carlisle Residential; a division of Carlisle Construction Products.
d CertainTeed Corporation.
e GAF Materials Corporation.
f Grace, W. R. & Co. - Conn.
g Henry Company.
h Owens Corning.
i Polyguard Products, Inc.
j Protecto Wrap Company.
k TAMKO Building Products, Inc.

2.3 RIDGE VENTS

A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent for use under ridge shingles.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Air Vent, Inc.; a Gibraltar Industries company.
b. Cor-A-Vent, Inc.
c. GAF Materials Corporation.
d. Lomanco, Inc.
e. Obdyke, Benjamin Incorporated.
f. Owens Corning.
g. The Tapco Group; Mid-America Siding Components.

2. Minimum Net Free Area:
3. Width:

4. Thickness:
5. Features:
    a. Nonwoven geotextile filter strips.
    b. External deflector baffles.

2.4 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch diameter, sharp-pointed, with a minimum 3/8-inch diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing.

1. Shank: Barbed.
2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt-Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.

D. Synthetic-Underlayment Fasteners: As recommended in writing by synthetic-underlayment manufacturer for application indicated.

E. Wood Nailers and Beveled Cant Strips: Comply with requirements for pressure preservative-treated wood in Section 06100 - ROUGH CARPENTRY

2.5 METAL FLASHING AND TRIM

A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."

1. Sheet Metal: Copper

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

1. Apron Flashings: Fabricate with lower flange a minimum of 4 inches over and 4 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
2. Step Flashings: Fabricate with a headlap of 2 inches and a minimum extension of 4 inches over the underlying asphalt shingle and up the vertical surface.
3. Cricket or Backer Flashings: Fabricate with concealed flange extending a minimum of 18 inches beneath upslope asphalt shingles and 6 inches beyond each side of chimney and 6 inches above the roof plane.
4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet with 1-inch high, inverted-V profile at center of valley and equal flange widths of 12 inches.
5. Drip Edges: Fabricate in lengths not exceeding 10 feet with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.

C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

2.6 SNOW GUARDS

A. Snow-Guard Pads: Fabricated copper units, designed to be installed without penetrating asphalt shingles, and complete with hooks for anchoring. Snow-guards shall match as closely as possible existing snow –guards to remain.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provision has been made for flashings and penetrations through roofing.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactoiy conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches, staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.

1. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
2. Rakes: Extend from edges of rakes 36 inches beyond interior face of exterior wall.
3. Valleys: Extend from lowest to highest point 18 inches on each side.
4. Hips: Extend 18 inches on each side.
5. Ridges: Extend 36 inches on each side.
6. Sidewalls: Extend 18 inches beyond sidewalls and return vertically against sidewalls not less than 4 inches.
7. Roof-Penetrating Elements: Extend 18 inches beyond penetrating elements and return vertically against penetrating elements not less than 4 inches.

C. Single-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Lap

sides a minimum of 2 inches over underlying course. Lap ends a minimum of 6 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with felt-underlayment nails.

1. Install felt underlayment on roof sheathing not covered by self-adhering sheet underlayment. Lap edges over self-adhering sheet underlayment not less than 3 inches in direction to shed water.
2. Terminate felt underlayment flush against roof projections.

3.3 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07600 - FLASHING AND SHEET METAL.

1. Install metal flashings according to concrete roof tile manufacturer's written instructions and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

D. Cricket or Backer Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.

E. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches (200 mm) in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

F. Retain first subparagraph below if securing flange edges with cleats.

1. Secure hemmed flange edges into metal cleats spaced 12 inches apart and fastened to roof deck.

G. Rake Drip Edges: Install rake drip-edge flashings over underlayment and fasten to roof deck.

H. Eave Drip Edges: Install eave drip-edge flashings below underlayment and fasten to roof sheathing.

I. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT-SHINGLE INSTALLATION

A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip with tabs removed at least 7 inches wide with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 3/4 inch over fasciae at eaves and rakes.
2. Install starter strip along rake edge.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Fasten asphalt-shingle strips with a minimum of four roofing nails located according to manufacturer's written instructions.

1. Where roof slope exceeds 21:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
3. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.

E. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley from highest to lowest point.

1. Set valley edge of asphalt shingles in a 3-inch wide bed of asphalt roofing cement.
2. Do not nail asphalt shingles to metal open-valley flashings.

F. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

G. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

3.5 SNOW-GUARD INSTALLATION

A. Snow-Guard Pads: Install snow-guard pads at locations indicated according to manufacturer's written installation instructions.

3.6 ADJUSTING AND CLEANING

A. Remove and replace damaged or broken asphalt shingles.

B. Remove excess construction debris from Project site.

3.7 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

2. Owner: <Insert name of Owner>.
3. Address: <Insert address>.
4. Building Name/Type: <Insert information>.
5. Address: <Insert address>.

6. Area of the Work: <Insert information>.
7. Acceptance Date: <Insert date>.
8. Warranty Period: <Insert time>.
9. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
   1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

      a Lightning;
      b Peak gust wind speed exceeding 110 mph;
      c Fire;
      d Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
      e Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
      f Vapor condensation on bottom of roofing; and
      g Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
   2. When the work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

E. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.

F. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

G. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.

H. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.

I. This Warranty is recognized to be the only warranty of Roofing Installer on the work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

J. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Prices for the work as indicated herein

4.2 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 07565

PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Remove existing roof shingles and underlayment down to wood deck.

B. Remove all flashing material from all surfaces and penetrations.

C. Check all decking for deterioration and mold penetration. Removal of any deteriorated decking will be as directed by the Engineer and will be paid for as an allowance under Pay Item 0212.193 (ASBESTOS REMOVAL).

1.2 RELATED SECTIONS

A. Related work specified elsewhere:

1. Section 01733 – Hazardous Materials Removal
2. Section 06100 - Rough Carpentry
3. Section 07312 - Asphalt Shingles
4. Section 07600 - Flashing and Sheet Metal
5. Section 07920 - Joint Sealants

B. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.3 PRE-INSTALLATION CONFERENCE

A. Review installation procedures and coordination required with related work.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Do not remove existing roofing system or damaged decking when weather conditions threaten the integrity of the building contents or intended continued occupancy. Maintain continued temporary protection prior to installation of the new roofing system. Only remove sufficient roofing that can be reinstalled during the same work shift or adequately protected to prevent any leakage into interior spaces below.

1.5 PROTECTION

A. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction. A four (4) hour time limit will be given from the time of notification of emergency conditions. In the event of water penetration during rain or a storm, the Contractor shall provide for repair or protection of the building contents and interior. The Contractor shall be back charged for all expenses and damages, if any.

1.6 SCHEDULING

A. Schedule work to coincide with commencement of installation of new roofing system.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Temporary protection; Sheet Polyethylene. Provide weights or fasteners to retain sheeting in position.

B. Base Sheet: ASTM D-4601 Type II. Provide weights or fasteners to retain sheeting in position.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Roofing Contractor to verify existing site conditions, including roof dimensions.

B. Verify that existing roof surface is clear and ready for work of the section.

3.2 MATERIALS REMOVAL

A. Remove all shingles, underlayment, membrane, base flashings, snow guards and any other items needed to install the new asphalt roofing system. In addition, completely remove all nails and other debris to leave a smooth, even surface for re-roofing.

B. All debris dumped from the roof shall be transported from the roof via chutes into dumpsters or trucks, and this debris shall be removed from the premises and disposed of off site when vehicles are full. Contractor shall be responsible for securing a disposal site for the roofing debris. No debris shall be transported from the area being worked on over a previously finished roof without an underlayment of 3/4" plywood. Refer to Appendix B for additional information.

C. All roof equipment not in use or left filled shall be parked on the rafters on 3/4" plywood.

D. Contractor shall provide cut off (night tie in) at the end of each day's work.

E. Removal and disposal of Asbestos Containing Materials (ACM) shall be performed in accordance with Section 01733 (Hazardous Materials Removal).

3.3 TEMPORARY PROTECTION

A. Provide temporary protective sheeting over uncovered deck surfaces.

B. Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights or temporary fasteners.

C. Provide for surface drainage from sheeting to existing drainage facilities.

D. Do not permit traffic over unprotected deck surface.

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. No separate measurement and payment will be made for the work of this Section. All costs in connection therewith will be considered incidental to Pay Item 0751.100 (ROOFING AND FLASHING).

B. Removal, containment, transportation and disposal of Asbestos Containing Materials (ACM)) or other hazardous materials not identified in the "Limited Asbestos and Lead Paint Inspection" report in Appendix A as directed by the Engineer will be paid for under an allowance for Item 0212.193 (ASBESTOS REMOVAL).

4.2 PAYMENT ITEMS

Item No.	Description	Unit
0212.193	ASBESTOS REMOVAL	ALLOWANCE W/ NO OVERUN
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 07600

FLASHING AND SHEET METAL

PART 1 – GENERAL

1.1 SUMMARY

A. Provide all labor, equipment and materials and fabricate and install the following.

1. Edge strip and flashing.
2. Counter flashings over base flashings.
3. Counter flashings at vent stacks
4. Flashing and lining of wood gutter systems
5. Valley, hip and ridge flashing.
6. Other components.

1.2 RELATED SECTIONS

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

B. Related Sections:

1. Section 06100 Rough Carpentry
2. Section 06440 Ornamental Woodwork
3. Section 07312 Asphalt Shingles

C. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.3 REFERENCES

ASTM A-446	Specification for steel sheet
ASTM B-209	Specification for aluminum sheet
ASTM B-221	Specification for aluminum extruded shape
ASTM A792	Steel Sheet, Aluminum-Zinc Alloy-Coated, by the Hot-Dip Process
ASTM B32	Solder Metal
ASTM B209	Aluminum and Alloy Sheet and Plate
ASTM B486	Paste Solder
ASTM D226	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D486	Asphalt Roof Cement, Asbestos-free
FS O-F-506	Flux, Soldering, Paste and Liquid
FM	Factory Mutual
NRCA	National Roofing Contractors Association - Roofing Manual
SMACNA	Architectural Sheet Metal Manual

1.4 SUBMITTALS

A. ARRA Submittal Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Product Data: Provide manufacturer's specification data sheets for each product incorporated in the work.

C. Provide approval letters from metal manufacturer for use of their metal within this particular roofing system type.

D. Submit two samples, 12 x 12 inch in size illustrating typical external corner, internal corner, valley, junction to vertical dissimilar surface, material and finish.

E. Shop Drawings

1. For manufactured and shop fabricated gutter liners, and all other sheet metal fabrications.
2. Shop drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, termination's, and installation details.
3. Indicate type, gauge and finish of metal.

F. Certification

1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
3. Submit certification that metal and fastening system furnished is Tested and Approved by Factory Mutual for 1-105 Wind Up-Lift Requirements.

1.5 QUALITY CONTROL

A. Reference Standards

1. Comply with details and recommendations of SMACNA Manual for workmanship, methods of joining, anchorage, provisions for expansion, etc.
2. Factory Mutual Loss Prevention Data Sheet 1-49 windstorm resistance 1-105.

B. Contractor's Warranty

1. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

1.6 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

A. Contractor must submit any product not specified to the Engineer in order for product to be considered for approval. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

2.2 MATERIALS

A. Miscellaneous Metals and Flashings:

1. All installed metal to be 20 oz. Copper.

2.3 RELATED MATERIALS

A. Metal Primer: Zinc chromate type.

B. Plastic Cement: ASTM D 4586.

C. Sealant: Specified in Section 07900 or on drawings.

D. Lead: Meets Federal Specification QQ-L-201, Grade B, four pounds per square foot.

E. Solder: ANSI/ASTM B32; 95/05 type.

F. Flux: FS O-F-506.

G. Underlayment: ASTM D2178, No15 asphalt saturated roofing felt.

H. Slip Sheet: Rosin sized building paper.

I. Fasteners:

1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
2. Fastening shall conform to Factory Mutual 1-105 requirements or as stated on section details, whichever is more stringent.

J. Termination Bars:

1. Shall be aluminum unless otherwise recommended by membrane manufacturers. Material shall be .125” x 1” (minimum) aluminum conforming to ASTM B-221, mill finish. Bar shall have caulk cup as required.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect contact areas of dissimilar metals with heavy asphalt or other approved coating, specifically made to stop electrolytic action.

3.2 GENERAL

A. Install work watertight, without waves, warps, buckles, fastening stress, or distortion, allowing for expansion and contraction.

B. Fastening of metal to walls and wood blocking shall comply with SMACNA Architectural Sheet Metal Manual, Factory Mutual I-105 wind uplift specifications and/or manufacturer's recommendations whichever is of the highest standard.

C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

D. Metal fascia and copings shall be secured to wood nailers at the bottom edge with a continuous cleat. Cleats shall be at least one gauge heavier than the metal it secures.

3.3 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

D. Field measure site conditions prior to fabricating work.

3.4 SHOP FABRICATED SHEET METAL

A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.

B. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

C. Hem exposed edges.

D. Angle bottom edges of exposed vertical surfaces to form drip.

E. All corners for sheet metal shall be lapped with adjoining pieces fastened and set in sealant.

F. Joints for surface-mount counterflashing shall be formed with a 1/4” opening between sections. The opening shall be covered by a cover plate or backed by an internal drainage plate formed to the profile of fascia piece. The cover plate shall be embedded in mastic, fastened through the opening between the sections and loose locked to the drip edges.

G. Install sheet metal to comply with Architectural Sheet Metal manual, Sheet Metal and Air Conditioning Contractor's National Associations, Inc.

3.5 FLASHING MEMBRANE INSTALLATION

A. Metal Edge Detail

1. Accessories: Joint covers, corners, supports, strip flashing at joining, fastenings and other accessories shall be included.
2. Install continuous cleat fasten 6" O.C. Fasten flange to wood nailer every 6" staggered.
3. Install new metal edge hooked to continuous cleat.
4. Prime metal edge at a rate of 100 square feet per gallon and allow to dry.

B. Plumbing Stack

1. Prime flange and sleeve at a rate of 100 square feet per gallon and allow to dry.
2. Install properly sized sleeves in a 1/4" bed of elastomeric sealant.
3. Turn sleeve a minimum of 1" down inside of stack.
4. Caulk intersection of the membrane and flange with elastomeric sealant.

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Prices for the work as indicated herein

4.2 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: This Section specifies the following:

1. Joint sealants and fillers for exterior applications.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 07312 - Asphalt Shingles
2. Section 06100 - Rough Carpentry

C. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Product Data: For each joint-sealant product indicated.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Qualification Data: For Installer.

E. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in Part 1 "Quality Assurance" Article.

F. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

G. Field Test Report Log: For each elastomeric sealant application.

H. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
3. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
4. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Engineer.
2. Conduct field tests for each application indicated below:

    a. Each type of elastomeric sealant and joint substrate indicated.
    b. Each type of nonelastomeric sealant and joint substrate indicated.

3. Notify Engineer seven days in advance of dates and times when test joints will be erected.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

4. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than or greater than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
5. When substrates have not cured sufficiently.

1.6 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: To be submitted to Engineer for approval.

2.2 JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Single-Component Neutral-Curing Silicone Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

    a. Dow Corning Corporation; 790.
    b. GE Silicones; SilPruf LM SCS2700.
    c. Tremco; Spectrem 1.
    d. Pecora Corporation; 864.

2. Extent of Use: Joints in exterior vertical and soffit surfaces.

D. Multicomponent Pourable Urethane Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

    a. Bostik Findley; Chem-Calk 550.
    b. Meadows, W. R., Inc.; POURTHANE.
    c. Pecora Corporation; Urexpan NR-200.
    d. Tremco; THC-901.

2. Extent of Use: Joints in exterior horizontal surfaces.

E. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Bostik Findley; Chem-Calk 600.
b. Pecora Corporation; AC-20+.
c. Sonneborn, Division of ChemRex Inc.; Sonolac.
d. Tremco; Tremflex 834.

2.3 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bi-cellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include concrete, masonry and unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following metal, glass, porcelain enamel and glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove excess material.
4. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
4. Install in uniform continuous ribbons without gaps or air pockets.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 REPAIR AND CLEANING

A. Remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

B. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, complete in place, furnishing and installing all materials, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Prices for the work as indicated herein.

4.2 PAYMENT ITEMS

Item No.	Description	Unit
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following items.

1. Field painting of exposed exterior items and surfaces.
2. Surface preparation for painting.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 06100 – Rough Carpentry
2. Section 06440 - Ornamental Woodwork
3. Section 07620 - Flashing and Sheet Metal

C. ARRA Requirements: Requirements of the US American Recovery and Reinvestment Act of 2009 (ARRA) apply to this project. All manufactured products and unmanufactured construction materials must be made domestically. Note that ARRA does not contain requirements with regard to the origin of components or subcomponents.

1.2 DEFINITIONS AND EXTENT

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
2. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
3. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

B. This Section includes surface preparation and field painting of exposed exterior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

C. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Engineer will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include, but are not limited to the following factory-finished components:

   a. Masonry.
   b. Slate

2. Finished metal surfaces include the following:

   a. Stainless steel.
   b. Copper and copper alloys
   c. Terra cotta.

1.3 SUBMITTALS

A. ARRA Submittal Requirements: Provide documentation from the manufacturers of materials and systems specified in this Section, documenting that manufactured products and unmanufactured construction materials are made domestically, in compliance with requirements of the US American Recovery and Reinvestment Act of 2009.

B. Product Data: For each paint system indicated, include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit two eight inch by 12 inch Samples for each type of finish coating for Engineer's review of color and texture only.

D. Qualification Data: For Applicator.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in Painting and Decorating Contractors of America PDCA P5. Duplicate finish of approved sample Submittals.

1. Engineer will select one surface to represent surfaces and conditions for application of each type of coating and substrate.

    a. Wall Surfaces: Provide samples on at least 100 sq. ft.
    b. Small Areas and Items: Engineer will designate items or areas required.

2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.

    a. After finishes are accepted, Engineer will use the room or surface to evaluate coating systems of a similar nature.

3. Final approval of colors will be from benchmark samples.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F and a maximum ambient temperature of 95 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Engineer about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats or tie-coats over incompatible primers or remove and reprime.

2. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

   a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
   b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
   c. If transparent finish is required, backprime with spar varnish.
   d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
   e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with The Society for Protective Coating's (SSPC) recommendations.

   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3, SSPC-SP 10/NACE No. 2, or SSPC-SP 12 Water Jetting at 45,000 psi as specified in the Paint Schedule in this Section.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Treat existing painted surfaces with surface preparation methods recommended by coating manufacturer and in accordance with the coating schedule.

4. Previously Painted Cast Iron Surfaces: Pressure wash previously coated cast iron surfaces with water surfaces to be coated using a min. of 4,000psi. Washing system should contain a suitable solution of an environmentally approved cleaning agent to remove all surface contamination and a 0º spinner tip. Follow up with hand and power tools as necessary to remove any remaining loose paint (especially lifted edges from water washing). Allow all surfaces to completely dry before proceeding with the coating application.

5. New Copper Surfaces: New copper surfaces shall be cleaned of all surface contamination via SSPC SP #1 Standard prior to coating. Lightly sand with a non-metallic #120 grit abrasive pad. Remove all sanding debris prior to coating.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
7. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.

2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

G. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Engineer.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in Painting and Decorating Contractors of America PDCA P1.

3.6 PAINT SCHEDULE

A. Schedule: Provide products and number of coats specified. Use of manufacturer's proprietary product names to designate colors, materials, generic class, standard of quality and performance criteria and is not intended to imply that products named are required to be used to the exclusion of equivalent performing products of other manufacturers.

B. Exterior Paint Schedule:

1. Exterior Painted Woodwork

a. Full Prime Coat: One full coat of Tnemec Series 151 Elasto-Grip primer at 1.0-1.5 mils dft.
Finish Coats: Apply two full coats of Tnemec Series 1028 (gloss) or 1029 (semi-gloss) Enduratone at 2.0-2.5 mils dft. per-coat.

b. Or approved equal.

2. Ferrous Metal

a. Surface Preparation: SSPC SP #6 Commercial Blast Clean.
Full Prime Coat: One full coat of Tnemec Series 90G-1K97 Tneme-Zinc at 2.5 mils dft.
Full Prime Coat: One full coat of Tnemec Series N69F Epoxoline II applied to all prepared surfaces at 3.0-4.0 mils dft.
Full Finish Coat: One full coat of Tnemec Series 750 UVX modified polyurethane at 2.5-3.0 mils dft.

b. Or approved equal.

3. Exterior Painted Copper and Cast Iron

a. RD Coatings – Elastometal, distributed by Righter Group, Inc. 11 Upton Drive, Wilmington , MA 01887 (1-800-848-4841)
Tnemec Company, KC MO.

Coating Physical Properties:
Generic Type: Waterborne rust inhibitive elastomeric acrylic.
VOC's: Less than 8 grams/liter
Minimum Solids by Volume: 55-57%
Rust Inhibitor: Zinc phosphate. Non lead or zinc chromate.
Density: Ca. 1.25.
Elasticity: 200% elongation.
Weathering: (ASTM D 5894); minimum 5,000 hours performance, no blistering and no rusting at scribe.

Application:
Prime Coat: One coat of RD-Multiprim, a single component, waterborne acrylic adhesion primer containing zinc phosphate rust inhibitors to all areas of bare clean metal at a min. thickness of 2.0 mils DFT.

Intermediate Coat: One coat of RD-Elastometal, a single component highly elastomeric, low VOC (less than 8 grams/litre), acrylic coating containing zinc phosphate rust inhibitors to all primed surfaces at 5.0-6.0 mils dft.
Detail Coat: All seams, joints and perimeter flashings using Elastometal and reinforcing Fleece, applied by brush or roller at a min. of 5-7 mils DFT. Fill any seams, gaps or joints using Acry Kit caulking.
First Full Finish Coat: One full coat of RD-Elastometal to all areas scheduled for coating at a min. thickness of 6.0-7.0 mils DFT.
Second Full Finish Coat: Apply one full coat of RD-Mur Acryl Satin (Color Selected by Engineer) to entire roof at 2.5-3.0 mils DFT.

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Separate measurement and payment will not be made for the work of this Section. The cost for all work, equipment and accessories required; providing all tools, labor, transportation, handling and storage; and performing all work incidental to completion of work of this Section, shall be included in the Contract Lump Sum Prices for the work as indicated herein

4.2 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0751.100	ROOFING AND FLASHING	LUMP SUM

END OF SECTION

APPENDIX A- ENVIRONMENTAL REPORT

COVINO ENVIRONMENTAL ASSOCIATES INC
300 Wildwood Avenue • Woburn, Massachusetts 01801
Tel: 781.933.2555 • Fax: 781.932.9402 • email: mail@covinoinc.com

August 2, 2011

Ms. Kathleen Ledoux, AIA, LEED AP
Principle Architect
S E A Consultants Inc.
215 First Street, Suite 320
Cambridge, MA 02142-1245

Re: Covino Project 11.01031
Limited Asbestos and Lead Paint Inspection
Franklin Commuter Rail Station
75 Depot Street, Franklin, Massachusetts

Dear Ms. Ledoux:

At your request, a limited inspection was performed for asbestos-containing building materials and lead in paint at the above-referenced site. The inspection was performed prior to renovation activities that reportedly may be performed at this facility. A duly trained representative of Covino Environmental Associates, Inc. (Mr. Robert Pelletier; MA DOS Asbestos Inspector Certification No. AI-030500) performed the inspection at your request on July 21, 2011.

SCOPE OF WORK

The purpose of Covino's inspection was to identify asbestos-containing building materials (ACBM) that may be impacted by the proposed renovation/repair of the roof of the building. Testing for lead in paints that may be disturbed by the repair of the roof and soffit/fascia areas was also performed.

SAMPLING AND ANALYTICAL METHODS

Representative pieces of suspect roofing materials were collected using an appropriate tool. The tool was cleaned between each sampling to prevent cross-contamination of the samples. The samples were then placed in individual zipper lock plastic bags, labeled, and logged onto a data form. The samples were transported to Covino's laboratory, located in Woburn, Massachusetts, for analysis by Polarized Light Microscopy with Dispersion Staining (PLM/DS), in accordance with the United States Environmental Protection Agency's (US EPA) Method for the Determination of Asbestos in Bulk Building Materials (EPA 600/R-93/116).

Testing for lead in paint was performed using a portable x-ray fluorescence (XRF) analyzer (Niton, model XLP 303AW). The XRF analyzer uses a radioactive source to excite the electrons of lead atoms, if present in the sampled paints. As the lead atom electrons return to their normal state of activity, they release excess energy in the form of x-rays of a characteristic frequency. These x-rays

are measured by the XRF analyzer and converted to units of milligrams of lead per square centimeter of sampled surface area.

RESULTS AND DISCUSSION

Asbestos

The US EPA defines ACBM as any building material that contains greater than 1% asbestos. The Massachusetts Department of Environmental Protection (DEP) defines ACBM as any material that contains greater than or equal to 1% percent asbestos.

The table below provides a summary of suspect asbestos-containing materials that were observed and sampled at the site with the associated analytical results.

Inventory of Suspect Asbestos-Containing Building Materials
Franklin Commuter Rail Station
75 Depot Street
Franklin, Massachusetts

July 211, 2011

Material Description/Location	Analytical Results
Tar paper under roof shingles	Contaminated by the roof shingles
Roof shingles	45% Chrysotile asbestos
Debris within Gutters	40% Chrysotile asbestos
Pipe insulation and debris in attic	Presumed asbestos

Lead in Paint

The table below provides a summary of the results of testing existing paints for lead at the site.

Results of Testing for Lead in Paint
Franklin Commuter Rail Station
75 Depot Street
Franklin, Massachusetts

July 21, 2011

Color	Component Type	Substrate	Result (mg/cm^2)
Tan	Upper trim	Wood	17.1
Green	Upper trim	Wood	13.0
Green	Exterior column	Wood	5.8
Green	Porch roof beam	Wood	9.2

Results of Testing for Lead in Paint
Franklin Commuter Rail Station
75 Depot Street
Franklin, Massachusetts

July 21, 2011

Color	Component Type	Substrate	Result (mg/cm^2)
Green	Gutter	Wood	0.1, 0.1, <0.05

Mg/cm^2 – milligrams lead per square centimeter of sampled surface area. Note that anything greater than 1.0 mg/cm^2 is considered to be a significant concentration of lead in paint.

RECOMMENDATIONS

Asbestos

1. Any suspect ACBM that is encountered during renovation/demolition activities that was not previously sampled should be assumed to be an ACBM until appropriate sampling and analysis indicates otherwise.

2. Identified ACBM that will remain should be managed in accordance with a site-specific asbestos operations and maintenance program.

3. The US EPA Regulation 40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants (NESHAP), Paragraph 61.145, Standard for Demolition and Renovation, requires that all regulated ACM be removed from a facility prior to renovation or demolition if the materials may be disturbed by these activities. A certified asbestos contractor should remove identified ACM prior to the start of renovation activities in accordance with EPA, Massachusetts and OSHA regulations.

4. The debris within the attic should be properly removed by a duly licensed asbestos contractor should any work within the attic be required. No one should enter the attic space unless properly trained and protected from exposure to airborne asbestos fibers.

5. The debris in the exterior wood gutters contains approximately 40% Chrysotile asbestos. It appears that this debris is a result of the deterioration of the asbestos-containing roofing shingles. The debris is very friable and loose in the gutter. Observed decay of the gutters and visible holes at the bottoms of the gutters indicates that asbestos debris is likely to leak out of the gutters during rain or snow melt events. If asbestos-containing debris is washed out of the gutters, it is likely to contaminate the sidewalks, grounds or anything else that may be beneath the gutters.

Lead in Paint

Covino's inspection for lead in paint at the site was not intended to be comprehensive. The inspection included those exterior paints which may be affected by roof and/or fascia/soffit renovations.

OSHA Regulation 29 CFR 1926.62 (Lead in Construction) does not recognize a "safe" or "acceptable" level of lead in dried paint film. All employers of persons who disturb paint (or other materials) which contain any amount of lead must comply with OSHA 29 CFR 1926.62. Compliance with this regulation typically includes, but is not limited to:

- A written compliance program
- Training
- Personal exposure monitoring

Certain tasks, including but not limited to manual demolition, cutting, sanding, burning, welding, torch cutting, etc. where paints which contain lead are disturbed require personal protective equipment, hygiene facilities and biological monitoring of employees prior to the start of work.

This discussion of the regulatory requirements of 29 CFR 1926.62 is not comprehensive and does not include all applicable requirements for compliance. Contractors performing renovations to this building must be familiar with all requirements of this and other regulations pertaining to the handling and disposal of building materials coated with paints containing lead.

LIMITATIONS

Covino's inspection for ACBM was limited to readily accessible roofing materials and accessible attic areas of the building. This report should not be considered a definitive evaluation of all ACBM or lead in paint that may exist in the building or at the site. Any suspect ACBM that is encountered during renovation/demolition activities that was not previously sampled should be assumed to be an ACBM until appropriate sampling and analysis indicates otherwise.

Please call if you have any questions or if additional information is required.

Sincerely,
Covino Environmental Associates, Inc.

Robert M. Pelletier
Manager, Special Projects

CLIENT: KLEINFELDER/SEA
215 FIRST STREET
CAMBRIDGE, MA 02142

LOCATION: FRANKLIN COMMUTER RAIL STATION

PROJECT: 11.01031 - 315713
DATE RECEIVED: 07/21/11
ANALYZED: 07/25/11
COLLECTED BY: COVINO
COLLECTED: 07/21/11

ANALYTICAL RESULTS OF BULK SAMPLES

LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS	
315713	FIELD ID: 01	BK	NO ASBESTOS DETECTED	
	MATERIAL: TAR PAPER	N	CELLULOSE	75 %
	LOCATION: UNDER ROOF SHINGLES		NONFIBROUS MATERIAL	25 %
315714	FIELD ID: 02	BK	NO ASBESTOS DETECTED	
	MATERIAL: TAR PAPER	N	CELLULOSE	80 %
	LOCATION: UNDER ROOF SHINGLES		NONFIBROUS MATERIAL	20 %
315715	FIELD ID: 03	BK/GY	ASBESTOS - CHRYSOTILE	40 %
	MATERIAL: DEBRIS	N	CELLULOSE	15 %
	LOCATION: IN GUTTERS		NONFIBROUS MATERIAL	45 %
315716	FIELD ID: 04	MU	ASBESTOS - CHRYSOTILE	45 %
	MATERIAL: ROOF SHINGLES	N	CELLULOSE	15 %
	LOCATION:		NONFIBROUS MATERIAL	40 %

covino ENVIRONMENTAL ASSOCIATES INC
300 Wildwood Avenue • Woburn, Massachusetts 01801 • Tel 781.933.2555 • Fax 781.932.9402 • email mail@covinoinc.com

NOTES: N/A=NOT APPLICABLE

COLOR CODES:	BG	BEIGE	BR	BROWN	GY	GRAY	OR	ORANGE	RD	RED	WH	WHITE
	BK	BLACK	CL	CLEAR	MU	MULTI	PI	PINK	SI	SILVER	YL	YELLOW
	BL	BLUE	GN	GREEN	N/A	NONE	PR	PURPLE	TN	TAN	MA	MAROON

LABORATORY LICENSES AND CERTIFICATIONS: MA #AA000006 CT #PH-0248 RI #AAL-025C3 NVLAP #101781-0 VT #AL017034 ME #LB-061

DATE OF ISSUE: 08/02/11 APPROVED SIGNATORY: KEVIN T. MCKENZIE, LABORATORY MANAGER

THESE SAMPLES WERE ANALYZED BY POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING (PLM/DS) ACCORDING TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) "INTERIM METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK INSULATION SAMPLES" (EPA-600/M4-82-020) AND "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS" (EPA-600/R93/116). THIS METHOD IS CONSIDERED SENSITIVE TO THE PRESENCE OF ASBESTOS AT LESS THAN ONE PERCENT. THIS REPORT RELATES ONLY TO THOSE SAMPLES ANALYZED, AND MAY NOT BE INDICATIVE OF OTHER SIMILAR APPEARING MATERIALS EXISTING AT THIS, OR OTHER SITES.

FLOOR TILES AND RESINOUSLY BOUND MATERIALS ANALYZED BY EPA METHOD 600/R93/116, "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS," MAY YIELD FALSE NEGATIVE RESULTS DUE TO DIFFICULTIES IN ISOLATING SUSPECT FIBERS AND SUBSEQUENTLY IDENTIFYING THEM BENEATH THE MATRIX MATERIAL WHICH ENCAPSULATES THEM. SHEARING DURING THE MANUFACTURE OF VINYL TILE DECREASES THE FIBER SIZE OF THE ASBESTOS COMPONENT; THEREFORE, THE FIBERS MAY NOT BE READILY DETECTABLE USING POLARIZED LIGHT MICROSCOPY. AS A RESULT, LABORATORY ANALYSIS CANNOT ALWAYS BE ACCOMPLISHED USING STANDARD TECHNIQUES. WHEN THE EPA METHOD YIELDS A "NO ASBESTOS DETECTED" RESULT FOR FLOOR TILES AND RESINOUSLY BOUND MATERIALS, COVINO ENVIRONMENTAL ASSOCIATES RECOMMENDS FURTHER ANALYSIS USING SEM OR TEM TECHNIQUES FOR THE IDENTIFICATION OF ASBESTOS.

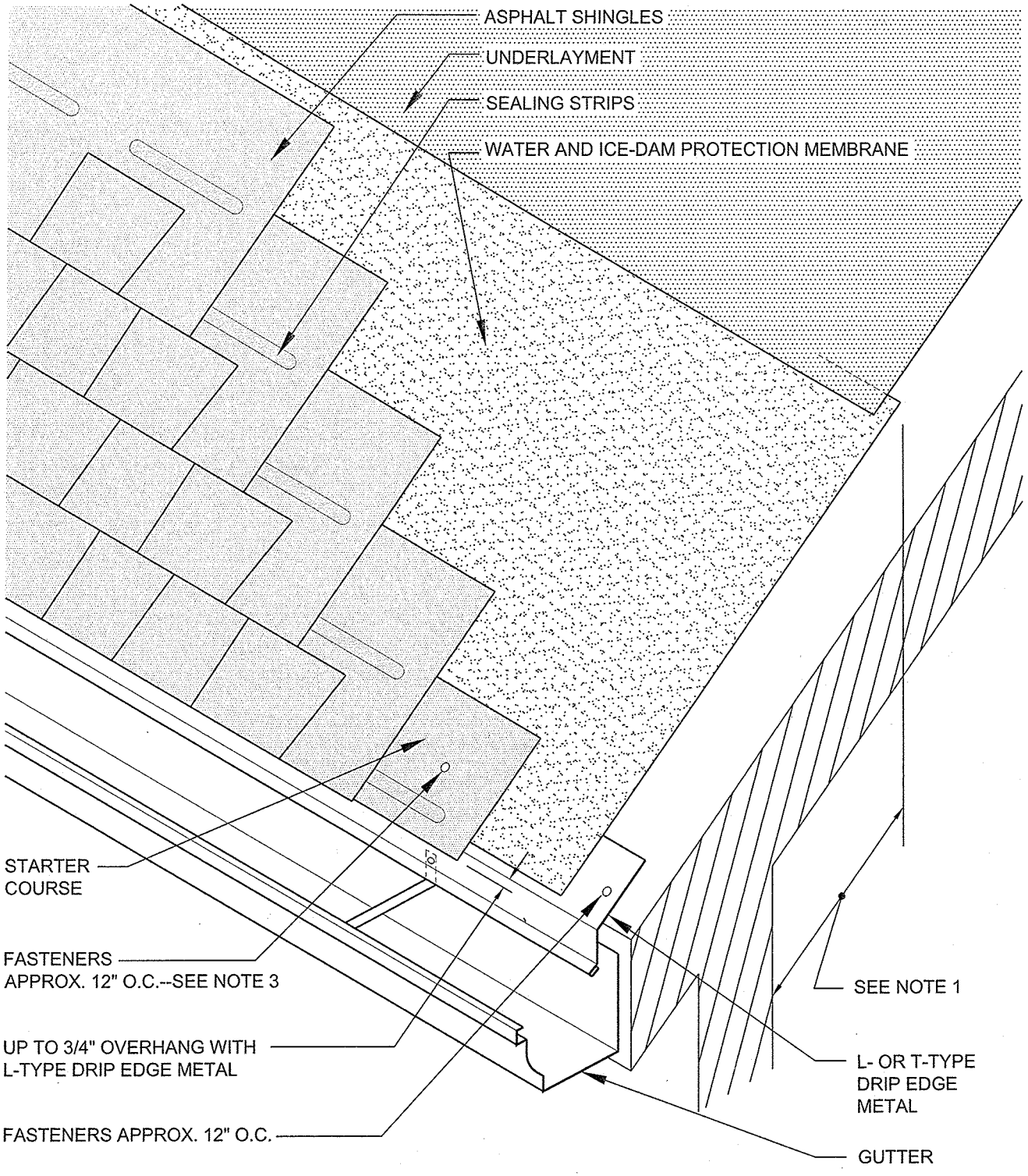
THE EPA REQUIRES THAT FRIABLE SAMPLES WITH ASBESTOS CONTENTS OF LESS THAN 10%, DETERMINED BY A VISUAL ESTIMATION, BE VERIFIED USING THE POINT COUNTING TECHNIQUE OR OTHERWISE BE ASSUMED TO CONTAIN GREATER THAN 1% ASBESTOS BY THE BUILDING OWNER OR OPERATOR. IF ANALYTICAL RESULTS INDICATE THE PRESENCE OF 1% OR LESS ASBESTOS IN A FRIABLE MATERIAL, THAT MATERIAL MUST BE TREATED AS ASBESTOS-CONTAINING MATERIAL UNLESS THESE QUANTITIES ARE VERIFIED USING THE POINT COUNTING TECHNIQUE. FRIABLE SAMPLES WILL BE POINT-COUNTED UPON REQUEST BY THE CLIENT. POINT COUNTING IS NOT REQUIRED FOR THOSE SAMPLES IN WHICH NO ASBESTOS IS DETECTED DURING ANALYSIS BY PLM.

LAYERED SAMPLES ARE ANALYZED IN THE FOLLOWING MANNER: ALL LAYERS ARE ANALYZED SEPARATELY, AND QUANTITIES ARE REPORTED AS A PERCENTAGE OF THE ENTIRE COMPOSITE SAMPLE.

ALL SAMPLES ARE STORED AT THE COVINO LABORATORY FOR A PERIOD OF THREE MONTHS. FURTHER ANALYSIS OR RETURN OF SAMPLES MUST BE REQUESTED WITHIN THIS THREE-MONTH PERIOD TO GUARANTEE THEIR AVAILABILITY.

COVINO ENVIRONMENTAL ASSOCIATES INC
300 Wildwood Avenue • Woburn, Massachusetts 01801 • Tel 781.933.2555 • Fax 781.932.9402 • email mail@covinoinc.com

APPENDIX B- ROOFING DETAILS



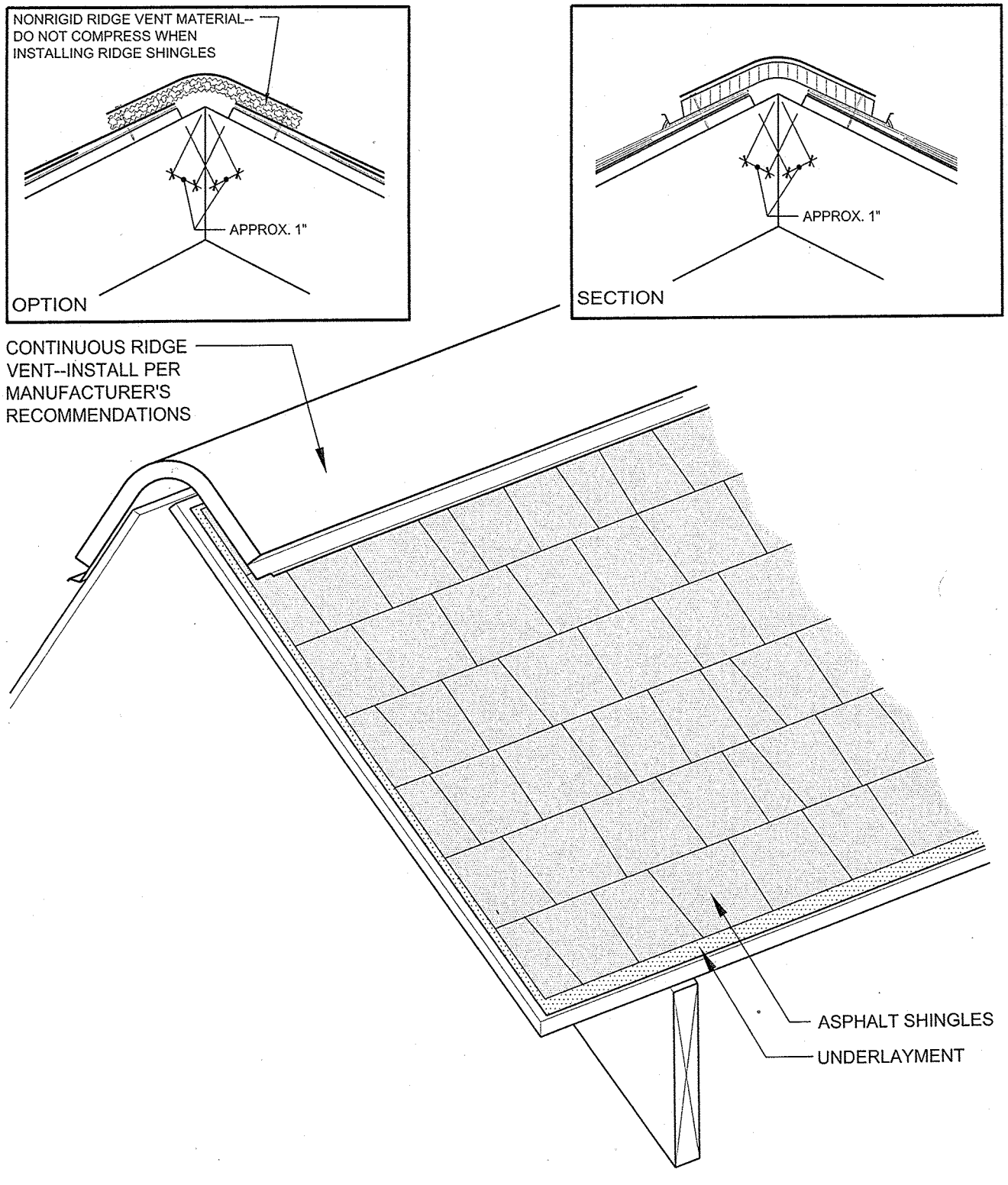
NOTES:

1. WATER AND ICE-DAM PROTECTION MEMBRANE SHOULD EXTEND UPSLOPE A MINIMUM OF 24 INCHES FROM INSIDE THE EXTERIOR WALL LINE. FOR SLOPES LESS THAN 4:12, NRCA RECOMMENDS A MINIMUM OF 36 INCHES.
2. THIS DETAIL SHOWS ONE TYPE OF GUTTER SUPPORT. GUTTER SECUREMENT AND SUPPORT OPTIONS VARY.
3. CLOSER FASTENER SPACING MAY BE REQUIRED FOR HIGH-WIND REGIONS.
4. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

EAVE WITH GUTTER AND WATER AND ICE-DAM PROTECTION MEMBRANE

2009 *NOT DRAWN TO SCALE* **ASPH-2A**

DETAIL 1



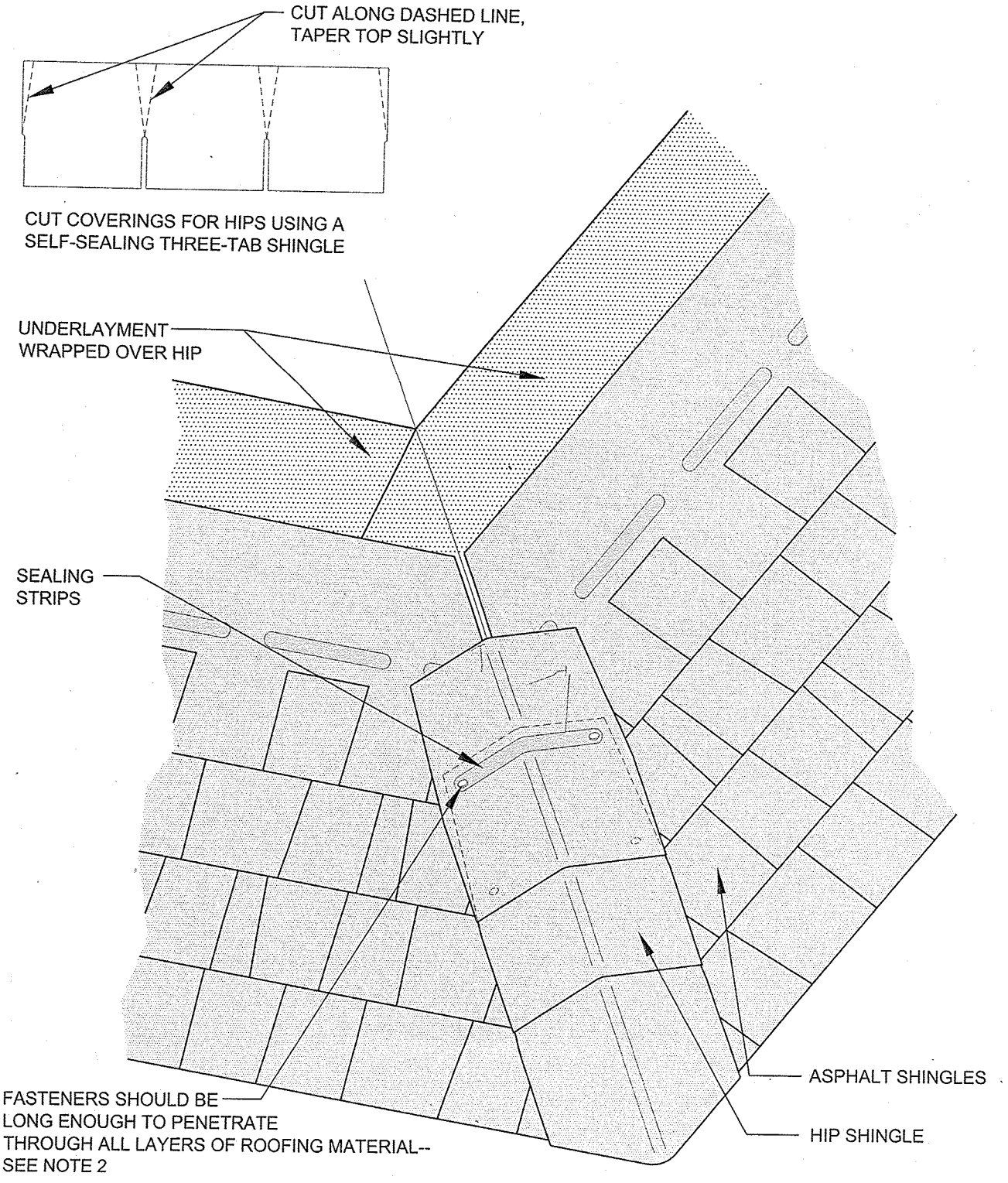
NOTES:

1. THIS DETAIL SHOWS A NONSHINGLE OVER RIDGE VENT WITH BAFFLES. RIDGE VENT TYPES VARY. FOLLOW MANUFACTURERS' INSTALLATION RECOMMENDATIONS.
2. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

RIDGE WITH CONTINUOUS RIDGE VENT

2009 *NOT DRAWN TO SCALE* **ASPH-7**

DETAIL 2



NOTES:

1. MOST MANUFACTURERS SUPPLY SPECIAL HIP SHINGLES. FOLLOW MANUFACTURERS' INSTALLATION INSTRUCTIONS.
2. FASTENERS SHOULD EXTEND A MINIMUM 1/8 INCH THROUGH UNDERSIDE OF ROOF DECKS LESS THAN 3/4 INCH THICK AND PENETRATE AT LEAST 3/4 INCH INTO ROOF DECKS GREATER THAN 3/4 INCH THICK.
3. REFER TO SECTION 4.1–INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

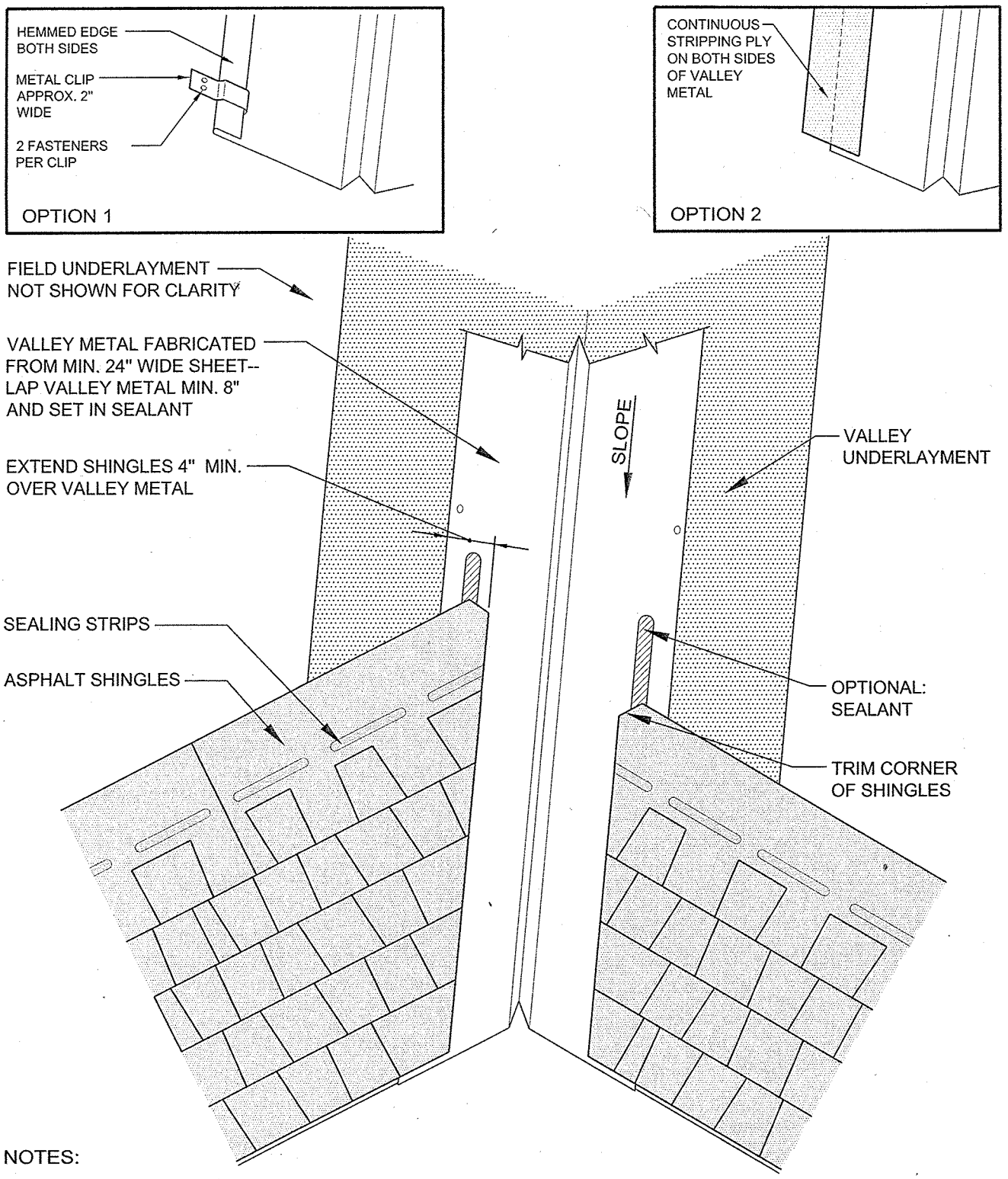
HIP

2009

NOT DRAWN TO SCALE

ASPH-8

DETAIL 3



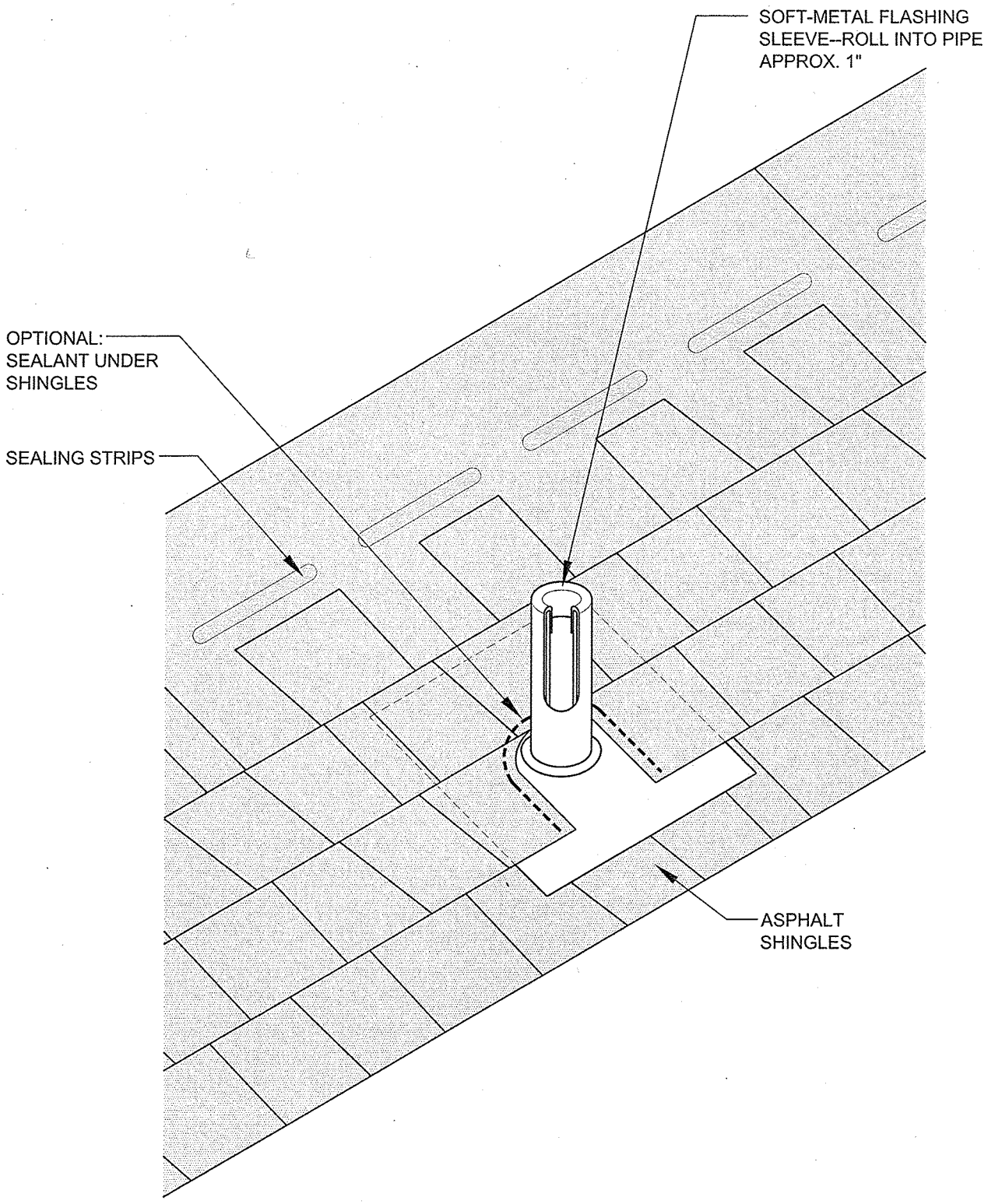
NOTES:

1. VALLEY UNDERLAYMENT TYPE AND NECESSITY MAY VARY DEPENDING ON CLIMATIC CONDITIONS.
2. SHINGLES SHOULD NOT BE FASTENED THROUGH METAL VALLEY.
3. FOR CLIPPED VALLEY DETAIL (OPTION 1), HEAVIER WEIGHT SHINGLES MUST BE USED.
4. VALLEY METAL WITHOUT RIB OR SPLASH DIVERTER MAY BE ACCEPTABLE.
5. SEALANT IS NOT REQUIRED FOR OPTIONS 1 AND 2.
6. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

OPEN VALLEY

2009 *NOT DRAWN TO SCALE* **ASPH-9**

DETAIL 4



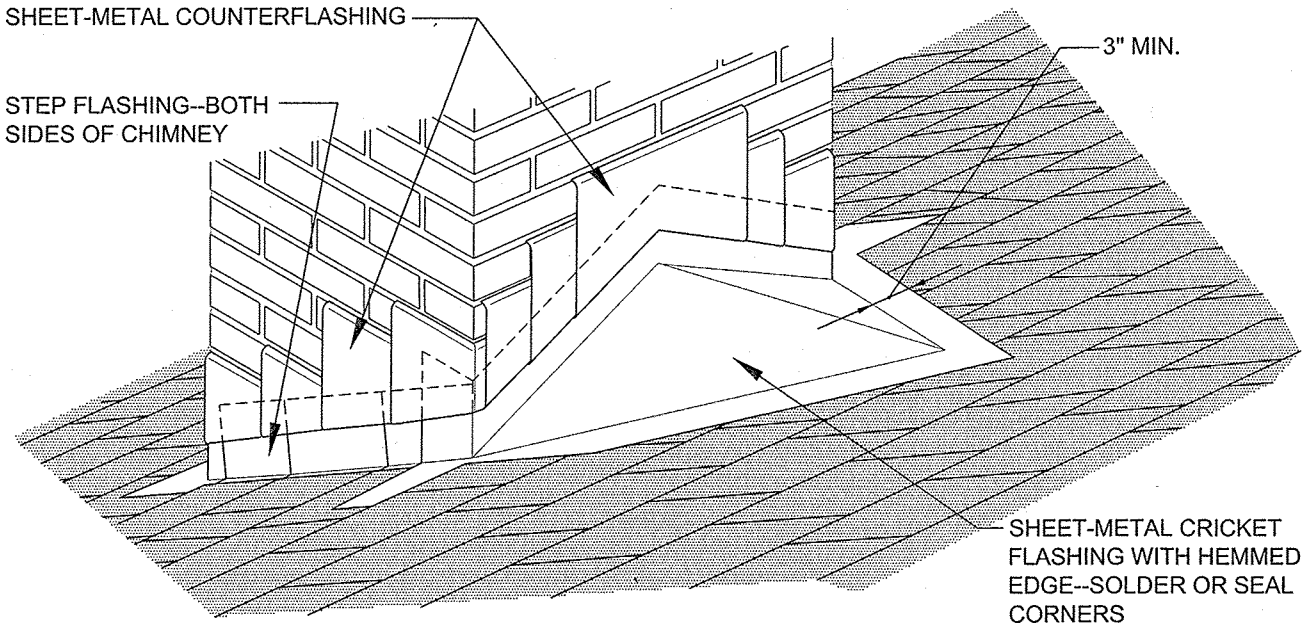
NOTE:

1. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

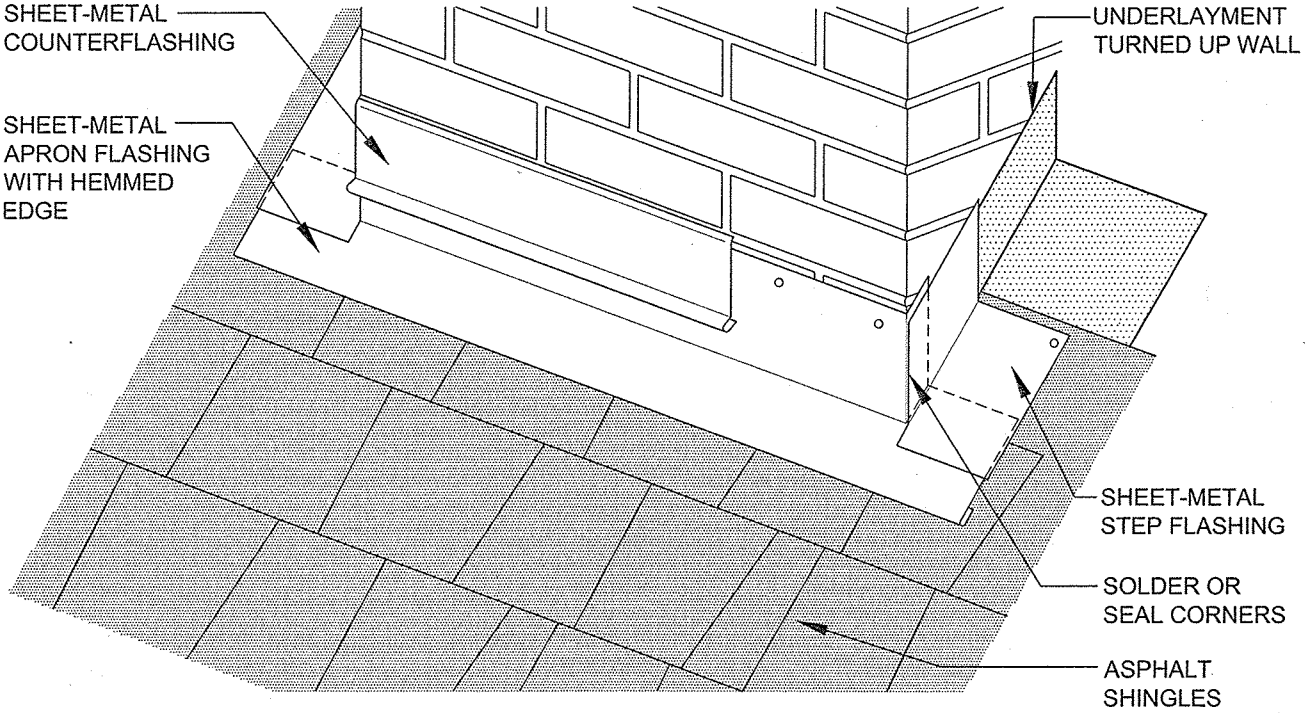
VENT PIPE PENETRATION

2009 *NOT DRAWN TO SCALE* **ASPH-14**

DETAIL 5



A CRICKET FLASHING AT MASONRY CHIMNEY



B APRON FLASHING AT MASONRY CHIMNEY

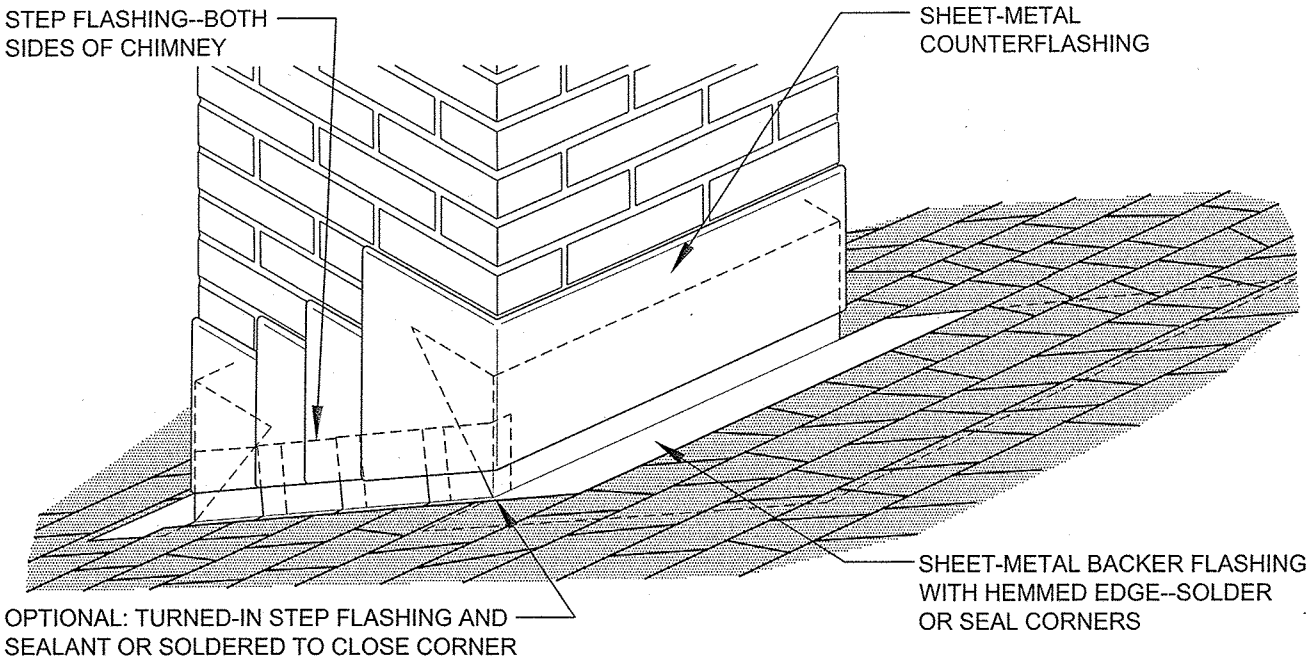
NOTES:

1. THIS DETAIL APPLIES TO CHIMNEYS THAT ARE WIDER THAN 24 INCHES.
2. REFER TO SECTION 4.1–INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR COUNTERFLASHING OPTIONS.
3. FOR SECUREMENT AND JOINERY OPTIONS FOR SHEET METAL, REFER TO THE ARCHITECTURAL SHEET METAL SECTION OF THE NRCA ROOFING AND WATERPROOFING MANUAL, FIFTH EDITION. THIS SECTION WILL BE SUPERSEDED BY THE NRCA ROOFING MANUAL: ARCHITECTURAL METAL FLASHING, MOISTURE CONTROL AND REROOFING--2010.
4. REFER TO SECTION 4.1–INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

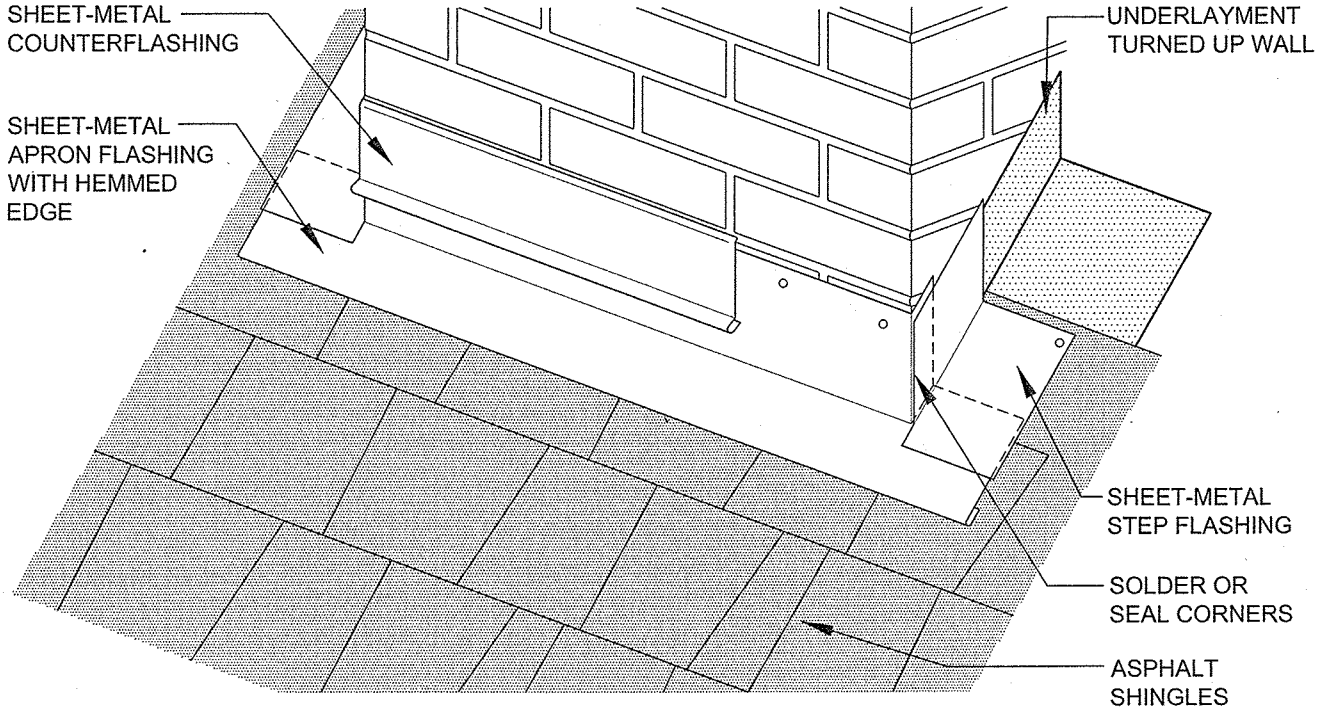
CHIMNEY WITH CRICKET FLASHING

2009 *NOT DRAWN TO SCALE* **ASPH-15**

DETAIL 6



A BACKER FLASHING AT MASONRY CHIMNEY



B APRON FLASHING AT MASONRY CHIMNEY

NOTES:

1. THIS DETAIL APPLIES TO CHIMNEYS THAT ARE 24 INCHES WIDE OR LESS.
2. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR COUNTERFLASHING OPTIONS.
3. FOR SECUREMENT AND JOINERY OPTIONS FOR SHEET METAL, REFER TO THE ARCHITECTURAL SHEET METAL SECTION OF THE NRCA ROOFING AND WATERPROOFING MANUAL, FIFTH EDITION. THIS SECTION WILL BE SUPERSEDED BY THE NRCA ROOFING MANUAL: ARCHITECTURAL METAL FLASHING, MOISTURE CONTROL AND REROOFING--2010.
4. REFER TO SECTION 4.1--INFORMATION APPLICABLE TO ALL CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

CHIMNEY WITH BACKER FLASHING (24 INCHES WIDE OR LESS)

2009 *NOT DRAWN TO SCALE* **ASPH-16**

DETAIL 7