



SECTION 013543

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS that are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.
- C. The Contractor is directed to the Harvard University Construction Environmental Health and Safety Standard located here:
http://www.ehs.harvard.edu/sites/ehs.harvard.edu/files/construction_safety_standard_0.pdf

1.02 DESCRIPTION OF WORK

- A. Furnishing all labor, materials, and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operation under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water, and land, and involves management of runoff, dust, noise and solid waste, as well as other pollutants. Work shall include installing, maintaining, and removing sedimentation and erosion control components within the Limits of Work.
- C. [The project site is subject to an Order of Conditions to be issued by the municipal Conservation Commission. The Order of Conditions is attached as an Appendix to this specification.]

1.03 RELATED SECTIONS

- A. Section 013529 – HAZARDOUS MATERIALS HEALTH AND SAFETY
- B. Section 017419 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
- C. Section 026000 – MISCELLANEOUS HAZARDOUS MATERIAL REMOVAL
- D. Section 026100 – EXCAVATED SOILS AND MATERIAL MANAGEMENT PLAN
- E. Section 028200 – ASBESTOS ABATEMENT AND RELATED WORK



- F. Section 028300 – LEAD-BASED PAINT ABATEMENT AND RELATED WORK
- G. Section 312500 – EROSION AND SEDIMENTATION CONTROLS
- H. (Appendix ____)- CONSTRUCTION MITIGATION SPECIFICATION

1.04 REFERENCES

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 list provided below is not intended to be all inclusive of each regulation prevailing over the work. The latest version of the document listed shall govern the work performed.

- A. Harvard University, Construction Environmental Health and Safety Standard.
- B. Harvard University, Construction Mitigation Specification Prepared by CSL Consulting, August, 2015.
- C. Massachusetts Department of Environmental Protection, 310 CMR 7.09-7.10, Air Pollution Control – Dust, Odor, Construction and Demolition, and Noise
- D. Massachusetts Department of Environmental Protection, 310 CMR 10.00, Wetlands Protection Act.
- E. Massachusetts Department of Environmental Protection, 314 CMR 4.00, Surface Water Quality Standards.
- F. United States Environmental Protection Agency, 42 U.S.C. Sec. 6901, Resource Conservation and Recovery Act (RCRA).

1.05 DEFINITIONS

- A. CO: Carbon Monoxide
- B. Contractor: Refers to the General Contractor and/or Subcontractor responsible for the Work under contract with Project Manager.
- C. Harvard EH&S: Harvard University, Environmental Health and Safety Department
- D. Engineer: Authorized representative of the Harvard Project Manager. Engineer shall be the Architect or Designer of Record for the project
- E. Harvard Project Manager: A representative of the Property Owner, President and Fellows of Harvard College
- F. HC: Hydrocarbons
- G. IAQ: Indoor Air Quality
- H. Mass DEP: Massachusetts Department of Environmental Protection



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- I. NOI: Notice of Intent (NOI) for coverage under the USEPA NPDES Construction Stormwater Permit
- J. NOT: Notice of Termination (NOT) ending coverage under the USEPA NPDES Construction Stormwater Permit.
- K. NDES: National Pollutant Discharge Elimination System
- L. OSHA: Occupational Safety and Health Administration
- M. PM: Particulate Matter
- N. SWPPP: Stormwater Pollution Prevention Plan
- O. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.
- P. USEPA: United States Environmental Protection Agency
- Q. USDOT: United States Department of Transportation
- R. VOCs: Volatile Organic Compounds

1.06 DUST CONTROL

- A. The Contractor shall provide adequate means for the purpose of preventing dust caused by construction operations from creating a hazard, nuisance, and from entering adjacent occupied areas throughout the period of the construction contract.
- B. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include demolition, the excavation, grading, or placement of clean fill, and control measures therefore should be considered.
 - a. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

Object to be measured: Dust, Mists, Aerosols

Size range: <0.1 to 10 microns

Sensitivity: 0.001 mg/m³

Range: 0.001 to 10 mg/m³

Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

Operating Conditions:

Temperature: 0 to 40°C

Humidity: 10 to 99% Relative Humidity

Power: Battery operated with a minimum capacity of eight hours continuous operation

Automatic alarms are required.



Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

- b. The Contractor's Certified Industrial Hygienist (CIH) shall establish a site specific dust Action Level. The Action Level should provide a real-time assessment of on-site air quality to mitigate impacts to both health and safety.
 - c. The CIH shall establish when additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques.
 - d. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below the Action Level and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial action may need to be suspended.
- C. This provision does not supersede any specific requirements for methods of construction or applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the Contractor.

1.07 NOISE CONTROL

- A. [The Owner shall conduct baseline noise level monitoring prior to construction and periodic monitoring of noise levels during the construction.]
- B. The Contractor shall develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum. Most recent local noise ordinances shall govern. The Owner will make final interpretation concerning whether or not nuisance noise conditions exist.
- C. The Contractor is informed that black-out days exist at Harvard (e.g., study periods, exams, and commencement) and shall schedule construction activities accordingly.
- D. The Construction Manager shall conduct base line testing of all equipment delivered to the site for compliance of the 86 DBA at 50 feet guideline and the Harvard University Mitigation Specification prior to commencing work.
- E. The Contractor shall execute construction work by methods and by use of equipment which will reduce excess noise.
- F. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal, State, and local regulations.
- G. The Contractor shall manage vehicular traffic and scheduling to reduce noise.
- H. The Contractor is directed to and shall comply with the Harvard University Construction Mitigation Specification.



1.08 INDOOR AIR QUALITY MANAGEMENT

- A. Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke. Smoking is not allowed anywhere on campus and is prohibited in all Harvard buildings.
- B. The Contractor shall develop a Construction Indoor Air Quality (IAQ) Management Plan for this Project. [And meet requirements of the selected LEED criteria and/or Harvard's Green Building Standards and Sustainability Principles.]
- C. Requirements may include the following during construction:
 - a. During construction meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2007, 2nd Edition
 - b. Protect stored on-site and installed absorptive materials from moisture damage.
 - c. If the Harvard Project Manager authorizes the use of permanent heating, cooling, and ventilating systems during construction, install appropriate filter media. Replace air filters immediately prior to occupancy. Replacement air filters shall meet the most recent and applicable ASHARE standards.
- D. Requirements may include the following before Occupancy: Comply with one of the following requirements, per LEED EQ Cr. 3.2:
 - a. Option 1 - Flush-Out (Owner-engaged indoor-air-quality testing):

After construction ends, prior to occupancy and with interior finishes installed, perform a building flush-out. After the flush-out, replace the filtration media with new appropriately rated filtration media, except the filters solely processing outside air.
 - b. Option 2 - Air Quality Testing (Contractor-engaged indoor-air-quality testing):

Conduct a baseline indoor air quality testing procedure consistent with the United States Environmental Protection Agency's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air."
- E. Construction Indoor Air Quality Management Plan Submittal:
 - a. Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall submit to the Harvard Project Manager a finalized Construction IAQ Management Plan.
 - b. The proposed Plan shall comply with requirements of the selected LEED criteria for the project.
 - c. The proposed Plan shall include, but not be limited to, the following:
 - i. Protection of ventilation system components during construction.
 - ii. Cleaning and replacing contaminated ventilation system components after construction, including filtration media.



- iii. Temporary ventilation.
 - iv. Protection of absorptive materials from moisture damage when stored on-site and after installation, including exterior wall rain protection.
 - v. Sequence of finish installation plan.
 - vi. Selection of cleaning products and procedures to be used during construction and final cleaning.
 - vii. Schedule of emission test data recorded by Contractor's testing laboratory.
- F. Take special care to prevent accumulation of moisture on materials and within packaging during delivery, storage, and handling to prevent development of mold and mildew inside packaging and on products.
- G. Immediately remove from site and properly dispose of materials showing signs of mold and mildew, including materials with moisture stains.
- H. IAQ Plan Implementation:
- a. **IAQ Manager:** The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the Project.
 - b. **Distribution:** The Contractor shall distribute copies of the Construction IAQ Management Plan to the jobsite foreman, each Subcontractor, Harvard's Project Manager, and the Engineer.
 - c. **Instruction:** The Contractor shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the Project.
 - d. **Preconditioning:** Allow products, which have odors and significant VOC emissions, to off-gas in a dry, well-ventilated space for sufficient period to dissipate odors and emissions prior to delivery to Project.
 - e. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
 - f. Condition products in ventilated warehouse or other building.
 - g. Coordinate Construction IAQ Management Plan with final cleaning.

1.09 NOTIFICATIONS

- A. Harvard EH&S may notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may notify the Contractor in writing, through Harvard, of any non-compliance with State or local requirements. After receipt of such notice from Harvard or from the regulatory agency through Harvard, the Contractor shall immediately take corrective action. Such notice,



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when delivered to the Contractor or his/her authorized representative at the site of the Work, shall be deemed sufficient for the purpose. If Contractor fails or refuses to comply promptly, the Harvard Project Manager may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

1.10 APPLICABLE REGULATIONS

- A. The Contractor shall comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.
- B. Fines and related costs resulting from failure to provide adequate protection against any environmentally objectionable acts and corrective action to be taken are the obligations of the Contractor.

PART 2 - PRODUCTS

2.01 WATER

- A. Water used for dust control, equipment, and/or other on-site processes shall be clean and free of salt, oil, and other injurious materials. The Contractor shall provide all necessary water to complete the Work.
- B. The Contractor shall not operate any hydrants, valves, curb stops or corporations, or shall they draw any water from the system, without specific approval of the local authorities responsible for such use. Only local authorities will operate valves, hydrants, corporations, and curb stops unless otherwise directed by the local authorities.
- C. Water meters shall be installed on hydrants prior to use. The Contractor shall consult with the local authorities responsible for such use prior to hydrant operation (see above).

2.02 ONSITE SPILL KIT

- A. The Contractor shall provide the following minimum equipment to be kept onsite at all times during site work activities for any unexpected spills or discharges:
 - a. Sand, absorbent pillows, and speedy dry.
 - b. Four drums (55 gallon, U.S. DOT 17-E or 17-H),
 - c. Shovels
 - d. Steam cleaner for decontamination of tools and equipment.

PART 3 - EXECUTION

3.01 PROTECTION OF GROUNDWATER

- A. Care shall be taken to prevent, or reduce to a minimum, any discharges to the ground of liquids that may infiltrate to the underlying groundwater. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the groundwater shall



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not be discharged from the Site. Such waters shall be collected and disposed of by the Contractor in accordance with all applicable Federal, State and local regulations.

3.02 [PROTECTION OF STREAMS AND WETLANDS]

- A. Care shall be taken to prevent, or reduce to a minimum, any damage to any wetland from pollution by debris, sediment or other material. Manipulation of equipment and/or materials in delineated wetland areas is prohibited. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in downstream waters of the State, shall not be discharged from the Site. Such waters shall be collected and disposed of by the Contractor in accordance with all applicable Federal, State and local regulations.]

3.03 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of activities that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to Limits of Work areas shown on the Drawing.
- B. Outside of the Limits of Work as shown on the Drawings, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. To prevent damage to trees, snow fence and 2"x4" wood posts or other approved equal shall be wrapped around tree trunks if heavy equipment has the potential to damage the tree bark.
- C. The locations of storage and other facilities, required in the performance of the Work, shall not be within wetlands or resource areas.

3.04 [TREE PROTECTION]

- A. [Tree protection fencing shall be one of the following, at the Contractor's option.
 - a. Wire bound wood roll snow fence with 3/8 in. x 1-1/2 in. wide pickets; spaced approximately 2 in. apart bound together with at least 13 gauge galvanized steel wire and with brightly painted top edge. Stakes for fencing shall be steel or wood posts. Posts shall be spaced 5 ft. maximum.
 - b. Galvanized chain link fencing. Posts for fencing shall be nominal 2-1/2 in. diameter, galvanized steel posts, driven a minimum of 3 ft. into the ground. Posts shall be spaced 10 ft. on center, maximum. Fence fabric shall be 2 in. mesh, 11 gauge minimum.
 - c. Polypropylene barricade fencing. Stakes for fencing shall be 2 in. x 4 in. wood posts, driven a minimum of 3 ft. into the ground. Posts shall be spaced 5 ft. maximum.
 - d. Plastic polymer safety fence, Model BX2050 Safety Grid, manufactured by The Tensar Corporation, Morrow, GA 30260, or approved equal. Color shall be high visibility orange. Stakes for fencing shall be x 4 -in. wood posts, driven a minimum of 3 ft. into the ground. Posts shall be spaced 5 ft. o.c. maximum.
 - e. Unless otherwise indicated, height of fencing shall be 6 ft.]

3.05 PROTECTION OF AIR QUALITY



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- A. Burning – Burning for the disposal of refuse and debris and/or heat for workers will not be permitted at the project site.
- B. Dust Control – Maintain all demolition, excavations, stockpiles, waste areas, and all other work areas within or outside of the project boundaries free from dust which could cause or contribute to a condition of air pollution (MassDEP 310 CMR 7.09, -7.10) and which would cause a hazard or nuisance to others. The Contractor shall prepare and submit a Dust Control Plan to address potential sources and abatement measures.
- C. The Contractor shall provide adequate means for the purpose of preventing dust caused by construction operations throughout the period of the construction contract. If the Harvard Project Manager or the Engineer indicates that the level of dust or odors is unacceptable, the Contractor shall employ measures necessary to reduce dust or odors to an acceptable level.
- D. The Contractor shall implement engineering controls (e.g., watering, misting) to control dust whenever required by the Engineer or Harvard.

3.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this Contract, maintain all facilities constructed for pollution, erosion, and sedimentation control as long as the operations creating the particular pollutant are being carried out.

3.07 STORMWATER POLLUTION PREVENTION

- A. The Contractor shall be responsible for [maintaining compliance with the SWPPP and] conducting regular site stormwater inspections [as prescribed in the SWPPP and] as outlined in the applicable specifications and drawings included in the contract documents. Refer to Section 312500 EROSION AND SEDIMENTATION CONTROLS and the Drawings for more information on the stormwater pollution prevention requirements and on erosion and sedimentation controls to be installed.

3.08 MONITORING WELL PROTECTION

- A. Prior to the start of work, the Contractor shall stake out all monitoring wells.
- B. The Contractor shall protect the integrity of the monitoring wells throughout the Project by means and methods of his/her choosing. In the event that a monitoring well is damaged, the Contractor shall pay for decommissioning of the well and the installation of a new well.

3.09 DIESEL EQUIPMENT EMISSION CONTROLS

- A. All motor vehicles and construction equipment shall comply with all pertinent local, state, and federal regulations covering exhaust emission controls and safety and the Harvard University Construction Mitigation Specifications.
- B. The Contractor shall use methods to control nuisance odors associated with diesel emissions from construction equipment including but not limited to the following: (1) turning off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more, as stipulated in the MA state anti-idling law which contains the following exceptions: vehicles being serviced, vehicles making deliveries that need to keep their engines running (to power refrigerators, for example), and vehicles that need to run their engines to operate accessories; (2) locating diesel equipment away



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from the general public and sensitive receptors (e.g., fresh air intakes, air conditioners and windows); and (3) utilizing electronically-powered scissor/man lifts.

3.10 SPILL AND DISCHARGE CONTROL

- A. The Contractor shall provide equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. The collected spill material shall be properly disposed of at the Contractor's expense.
- B. Costs to provide the above spill and discharge control materials shall be included in the contract base bid price.
- C. The Contractor shall provide the name, address and contact information for a spill response contractor in the event response activities are beyond the expertise of the Contractor.

3.11 COLLECTION AND WASTE MANAGEMENT

- A. The Contractor shall provide all necessary equipment, containers and labor necessary for the collection and temporary storage of waste oil and grease, paints, solvents and all wastes generated by the Contractor and its' equipment. The Contractor is responsible for the off-site management of all waste generated by the Contractor.
- B. Surplus Soil Reuse/Recycling/Disposal: Remove all surplus soil materials from the project site as provided in Section 026100 EXCAVATED SOIL AND MATERIAL MANAGEMENT PLAN.
- C. Demolition/Solid Waste Materials: All demolished waste materials including trash and debris shall be removed from the project site and reused, recycled or disposed as provided in Section 017419 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.
- D. Burning on site is prohibited.