CITY OF WORCESTER
MASSACHUSETTS

PROJECT MANUAL

ROOSEVELT ELEMENTARY SCHOOL
SITE IMPROVEMENT

1006 Grafton Street, Worcester, MA 01604

DIVISIONS 00 THROUGH 33

DECEMBER 6, 2024

SET NUMBER

SECTION 00 01 10

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SECTION 01 01 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 PROJECT DESCRIPTION

A. The Work for the Roosevelt Elementary School shall consist of site improvement to include site lighting, earthwork, landscaping, and storm drainage utilities.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:

1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
2. Section 26 00 00 – Electrical
3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 RELATED WORK UNDER OTHER CONTRACTS

A. Work by other contractors, which will be under separate contract, may take place during the work of this contract adjacent to and within the work areas of this site. This work, under other contract, shall be coordinated between the different General Contractors. The security system will be installed by the Owner under separate Contract and the general Contractor shall work with the Owners vendor to coordinate their work with the General contractor’s work.

B. Cooperate fully with separate contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying the work under this contract.

1.05 CONSTRUCTION MANAGEMENT PLAN

A. The Contractor shall be required to prepare a detailed Construction Management Plan (CMP) which must be approved by the owner prior to the start of construction. The CMP will include all the measures the Contractor determines are necessary to successfully complete the project while minimizing project impacts on the school, neighbors and surrounding community. The Contractor should assume that the nearby residences are occupied. The Contractor should assume that the school can be fully operating during events at the school on any given day and time.

B. The CMP must include, but shall not be limited to, the Contractors proposed procedures for following items: a. Work logistics plan: A description of how of the Work will be phased and sequenced to minimize disruption to individual spaces and sections of the building. i) Work hour limitations:
   1. During school summer recess-Normal work hours shall be two shifts, 1st shift from 7:00am - 3:00pm, 2nd shift from 2:00pm – 10:00 pm. Work hours when students are present shall be 3:00pm to 10:30 pm. No noise work shall commence prior to 7:00am, per local ordinance.
   2. Fees for Worcester Public Schools Staff to be present outside of these hours, to be paid by the General Contractor. The contractor shall pay fees for OPM cost and Clerk of works to be on site for other than normal work hours.
   3. Notification procedures regarding weekend, early or late day work:
      a. Provide 48 hour written notification to the OPM and Worcester Public School for work performed during Saturday hours; Work is permitted during school vacations.
   4. No work shall be performed during late evening hours or on Sunday.

C. Refer to Worcester Public School Calendar at the end of this Section.

1.06 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies; perform demolition work in accordance with applicable rules, regulations, codes, and ordinances of local, state, and federal authorities.

B. Obtain and pay for necessary building permits, licenses and certificates and give notices as required during the performance of the Work.

C. Provide 4 copies of shop drawings and literature for Architects review and approval for the items referenced in the specifications.

D. Provide schedule and work plan within one week of the contract signing.

E. Attend weekly meetings (or as scheduled) with the Architect and Owner’s Representative as scheduled.

F. Provide all Closeout documents including final acceptance, warranties, guaranties, and bonds.

1.07 WORK SEQUENCE SCHEDULING AND COORDINATION

A. The Work shall be sequenced, scheduled, and coordinated to achieve the Date of Substantial Completion.
   1. All deliveries must be scheduled for a minimum of 48 hours in advance with the Architect and Owner.
   2. All existing utility tie-ins must be scheduled and coordinated at a minimum of 72 hours in advance with the Architect and Owner.

B. The General Contractor and each Sub-Contractor shall establish and increase or decrease as appropriate the workforce, days of work, number of shifts, work hours, materials, tools, and equipment needed to maintain and achieve the Date of Substantial Completion.

C. The General Contractor and each Sub-Contractor shall increase the workforce, days of work, number of shifts, work hours, materials, tools, and equipment needed to maintain the Date of Substantial Completion as necessary to accommodate any additional work authorized by Construction Change Directives and Change Orders modifications.

D. The General Contractor will be responsible for the proper conduct of the work to ensure that all trades work together, and in harmony, to achieve substantial and final completion as specified.

1.08 WORK HOURS

A. Normal working hours are to be Monday through Friday from 7:00 AM to 3:30 PM, except Legal Holidays. Any working hours outside of these times shall be considered "Extended Hours" and treated as described below.

B. Extended work hours shall require prior scheduling and coordination with the Architect and Owner at a minimum of 48 hours in advance. Extended work hours on Sundays and Legal Holidays may also require a permit from the Police Department.

1. Upon permission from the Architect and Owner, and prior to the start of any extended work, pay for all fees and obtain through the City of Worcester Police Department a work permit for all Sundays and Legal Holidays.

C. The Contractor shall pay any overtime required for the City's Clerk of Works/Owner's Representative to be on site for any work performed outside of normal working hours as defined above. No work shall take place outside of normal working hours without prior approval and the City's Clerk of Works/Owner's Representative on site.

D. Any project related activities may not interfere with the enjoyment and use of abutting areas within the building or adjacent properties during any extended work hours.

1.09 CONTRACTOR USE OF THE PREMISES

A. General Contractor shall have use of the site from date of contract to the Date of Substantial Completion as described above in the Work Hours paragraph.

B. Construction vehicle access and deliveries to the project shall be made during working hours.

C. All contractor personnel shall enter and exit the construction area through Access Driveway.

D. Do not close or obstruct the parking lot, driveways, or sidewalks without the proper permit. Conduct operations with minimum traffic interference.

E. The General Contractor shall also be responsible for returning the public areas adjacent to each work area to their original state prior to the start of work in that area.

F. The use of internal combustion engine driven power equipment is prohibited within the building. Alternate power sources, i.e. generators and compressors, may be placed outside the building to provide power to equipment. Placement of any alternate power sources shall be subject to prior Architect and Owner approval.

G. There will be no washing or washing of any vehicles at the project site. The contractor shall make necessary provisions to accommodate this work off site.

H. All cleaning and washing of tools and/or equipment shall be performed in areas designated only by the Architect. This will be strictly enforced.

1.10 CONTRACTOR USE OF CITY STREETS

A. The General Contractor's personnel, and all other personnel employed on the project, shall limit their parking on the site to within the areas designated for construction parking and as permitted by the General Contractor. Additionally, Contractor personnel may park as legally allowed within City Limits. Parking on street sidewalks is prohibited.

B. Driveway entrances, walks, and yards to abutting properties shall be always kept unobstructed.

1.11 WORK CONDITIONS

A. Neither the General Contractor, nor Sub-Contractors at any level, nor their employees shall bring illegal substances or alcoholic beverages on the premises.

B. Vulgar, abusive, obscene language or behavior will not be tolerated.

C. The Contractor’s personnel engaging in the above shall be removed from the jobsite.

D. Radios or any type of “music” broadcasting systems are not allowed.

E. This site is smoke-free; therefore, smoking is prohibited within the site limits.

1.12 PROJECT MANAGER, SUPERINTENDENTS, FIELD ENGINEER AND FOREMAN

A. The General Contractor shall provide a qualified General Superintendent, who shall be present, full time, on site daily during all work in progress until the Date of Substantial Completion, and for such additional time thereafter as the Architect may determine. Only under extenuating circumstances, with the approval of the Architect and Owner, will the Contractor be allowed to substitute for the General Superintendent prior to the date of Final Completion.

B. The General Superintendent shall supervise and direct the activities of other superintendents and foremen on site. He shall not perform the work of foremen, tradesmen, or home office staff.

C. Each foreman, in addition to his regular duties shall be responsible for establishing, maintaining, and providing record drawings, which are required to be updated prior to submitting the current period’s draft Application for Payment.

D. The General Superintendent and Lead Foreman shall not be discharged or changed without prior written consent of the Architect, which will not be unreasonably withheld. The Architect will require that all as-built information be updated and current prior to granting consent.

1.13 DAILY REPORTS AND WEEKLY OUTLINE SCHEDULE

A. The General Superintendent shall provide a "Daily Report" to the Clerk of Works containing the following:

1. Name and manpower of each Contractor filed Sub-Contractor and Subcontractor.
2. Equipment used.
3. Delivery of products received on site.
4. Weather conditions at the start and end of each day and any significant changes or events during the day.
5. Significant problems, hazards or accidental injury occurring during each shift.
6. Summary of progress made each day.

B. A photocopy may be made of the same "Daily Report," containing the information above, that is used by the General Superintendent. The General Superintendent may obscure confidential portions of his "Daily Report" if desired. Reports are due the following day.

C. The Superintendent shall provide the Clerk of Works a written “Weekly (look ahead) Outline Schedule” of work activities planned at the beginning of each week, for that week. The “Weekly Outline Schedule” may be a simple listing of each trade’s activities delineating areas where work is to be scheduled. Note any significant milestones.

1.14 CERTIFICATE OF SUBSTANTIAL COMPLETION

A. The Architect shall issue a Certificate of Substantial Completion for the work when and if all the following conditions have been met:

1. The work is sufficiently complete to allow the Owner beneficial use of the premises. The work remaining to be done is not a danger to the proposed occupants and is of a minor nature.
2. The work is sufficiently complete that the Architect may make affidavits to the Building Official as required by Controlled Construction provisions of the Building Code.
3. The mechanical and electrical systems are fully operational. Required inspections and tests have been successfully completed, and the Owner has been provided instructions regarding operation and maintenance of mechanical and electrical systems in the building.
4. The Contractor has made notifications required to pay cost of final billing for utilities and termination of property insurance.
5. The Owner has made notifications required to assume the future cost of utilities and provide property insurance.
6. The Building Official has issued a Certificate of Occupancy without restrictions or conditions relating to the contractor’s work.

1.15 CITY OF WORCESTER ORDINANCES, LICENSES, PERMITS, AND FEES

A. All Contractors shall comply with City Ordinances which may affect the work of this contract, and which have not been previously covered in the Contract Documents. Requirements and fees listed are those in effect as of this writing and each Contractor shall be responsible for verifying the requirements and fee cost as currently in effect and throughout the duration of this project. This includes, but is not limited to, the following:

1. Worcester Police Department:
    b. Police Details
        1) Hourly rate for one-half day or full day.
    c. Permits for Sunday and Holiday work.
        1) Fee Required.
2. Department of Public Works, Permits Division
    a. Street Opening Permit Bond
        1) $ 5,000.00
    b. Barricade Placement by DPW
        1) 1st $85 per day
        2) Each additional $ 40 per day

c. Drainlayers License
    1) New $ 200.00
    2) Annual Renewal $ 100.00
d. Drain Permit
    1) $ 180.00
e. Main Inspection
    1) $ 2.90 per Foot
f. Assessment
    1) To be Determined
g. Plan Review
    1) $ 100.00
h. Street Obstruction
    1) $ 150.00 each
i. Street Obstruction (Blanket Permit)
    1) $ 1,000.00 per year
j. Street Opening
    1) Pavement older than 5 years $ 156.00
    2) Pavement 5 years old or less $ 300.00
k. Driveway Opening
    1) Permit $ 156.00
l. Wastewater Discharge
    1) Permit $ 250.00
    2) Inspection $ 400.00
    3) Sewer use $ 6.29/CCF
m. Water meter, etc. Contact the Water Department at 508-799-1492.
n. Traffic and Parking. Contact Department at 508-799-1468.

3. Worcester Fire Department
    a. Fire and Smoke Alarm
    b. Automatic Sprinkler and Standpipes
    c. Contact Worcester Fire Department at 508-799-1826.
    d. Compliance with NFPA 241
4. Department of Inspectional Services
    a. Building Permit
        1) Based on total contract price
            a) $11/$1,000 up to the first million dollars.
            b) $8.00 per $1,000.00 over $1,000,000.
        2) Orders of Building Official under Chapter 1, 780 CMR.
        3) Ticket violation under Chapter 33, 780 CMR.
    b. Trash Control
        1) Ticket for Violations

c. Environmental Control
   1) Air, Water, Noise Pollution - Ticket for Violations
   2) Conservation Commission Enforcement Officer

1.16 UTILITY COMPANY BACKCHARGES

A. The Electric back charge from N-GRID or Verizon Communications are not known at this time, the Electrical Contractor shall file for all N-Grid and Verizon permits and submit all data and documents as required and shall pay the required permit and inspection fees. The actual cost of the N-Grid back charge shall be paid by the City directly. All related inspection costs or other fees shall be paid as part of the Contract.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

SECTION 01 20 00

PROJECT MEETINGS

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
   1. Pre-Construction Conference.
   2. Pre-Installation Conference.
   3. Bi-Weekly Progress Meetings.
   4. Coordination Meetings.
   5. Project Closeout Conference.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section 012900 “Applications for Payment” for procedures on submitting requisitions.
   2. Division 1 Section 013100 “Project Coordination” for procedures for coordinating project meetings with other construction activities.
   3. Division 1 Section 013300 “Submittal Procedures” for submitting the Contractor's Construction Schedule.
   4. Division 1 Section 017700 “Project Closeout” for procedures and issues surrounding Project Completion.

1.03 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction conference before starting construction, immediately after execution of the Agreement. The conference is to be held at the Project Site, or other agreed upon location, at a time convenient to both the Owner and Architect. Conduct the meeting to review responsibilities and personnel assignments. Submit agenda to Architect and Owner three (3) days prior to meeting date.

C. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

D. Agenda: Discuss items of significance that could affect progress, including the following:
   1. Introduction to All Project Members.
   2. Distribution of Contract Documents.

3. Procedures Outlined for Contract Compliance Issues.
4. Tentative Construction Schedule, Making Notes of Critical Dates.
5. Critical Work Sequencing.
6. Pre-Installation Conferences.
7. Work Hours.
8. Use of the Premises.
9. Deliveries.
10. Security Procedures.
11. Parking and Site Access Issues.
12. Office, Work, and Storage Areas.
13. Housekeeping & Cleaning of Construction Areas.
14. Safety Procedures.
15. First Aid.
16. Procedures for Creating Monthly Cash Flow/Schedule.
17. Procedures for processing Draft Application for Payment Periodic Submittals Certification Statement.
18. Procedures for processing Applications for Payment.
19. Procedures for RFI's, SI's, RFP's, COP's, CCD's, CO's, etc.
20. Procedures for Keeping Logs on RFI's, SI's, RFP's, COP's, CCD's, CO's, etc.
21. Project Coordination Procedures & Drawings.
22. Project Meetings & Meeting Minutes.
23. Unit Prices.
24. Procedures for Submittals.
25. Quality Control, Inspections, and Testing.
26. Temporary Facilities.
27. Preparation of Project Closeout Documents.

E. The Contractor shall record and promptly distribute minutes of this meeting to all project members (in attendance or not), including the Architect and Owner, and as additionally directed by the Architect.

1. Meeting Minutes shall be in a standard type-written format to remain consistent for every project meeting and include, but not limited to, the following items:
   a. Detailed notes from all discussions of project business items in chronological order.
   b. Updated Project Contractor, Subcontractor, Vendor List.
   c. Updated Construction Schedule.

1.04 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction.

B. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the activity under consideration at each pre-installation conference, including requirements for the following:
   a. Contract Documents.

b. Options.
c. Related Change Orders.
d. Purchases.
e. Deliveries.
f. Shop Drawings, Product Data, and quality-control samples.
g. Review of mockups or finish samples.
h. Possible conflicts.
i. Compatibility problems.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's recommendations.
m. Warranty requirements.
n. Compatibility of materials.
o. Acceptability of substrates.
p. Temporary facilities.
q. Existing Occupancies.
r. Space and access limitations.
s. Governing regulations.
t. Safety.
u. Inspecting and testing requirements.
v. Required performance results.
w. Recording requirements.
x. Protection.

2. The Contractor shall record significant discussions and agreements and disagreements of each conference, and the approved schedule. The Contractor shall promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.05 PROGRESS MEETINGS

A. Conduct progress meetings at the Project Site weekly. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request. General Contractor to record minutes of all meetings.

B. Attendees: In addition to representatives of the Owner and the Architect, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including the following:
    a. Interface Requirements.
    b. Time & Project Progress.
    c. Work Hours.
    d. Updated Weekly Look-Ahead Schedule.
    e. Critical Work Sequencing.
    f. Off-Site Fabrication Problems.
    g. Updated Pre-Installation Conference Schedule.
    h. Deliveries.
    i. Use of the Premises.
    j. Security Procedures.
    k. Parking Issues & Snow Removal.
    l. Office, Work, and Storage Areas.
    m. Housekeeping & Cleaning of Construction Areas.
    n. Safety Procedures.
    o. First Aid.
    p. Draft Application for Payment Periodic Submittals Certification Statement (At Appropriately Timed Meeting Each Month).
    q. Updated Submittal, RFI, SI, RFP, COP, CCD, and CO Logs.
    r. New Submittals, RFI's, SI's, RFP's, COP's, CCD's, CO's, etc.
    s. Any Project Coordination Issues or Drawings.
    t. Quality Control, Inspections, and Testing.
    u. Temporary Facilities.
    v. Preparation of Project Closeout Documents.
3. The Contractor shall record and promptly distribute minutes of this meeting to all project members (in attendance or not), including the Architect and Owner, and as additionally directed by the Architect.
    a. Meeting Minutes shall be in a standard type-written format to remain consistent for every project meeting and include, but not limited to, the following items:
        1) Detailed notes from all discussions of project business items in chronological order.
        2) Updated Project Contractor, Subcontractor, Vendor List.
        3) Updated Construction Schedule.
        4) Updated Weekly Look-Ahead Schedule.
        5) Updated Submittal, RFI, SI, RFP, COP, CCD, and CO Logs.

1.06 COORDINATION MEETINGS

A. Conduct coordination meetings with all trades convenient for all parties involved. In addition, conduct coordination meetings when requested by the Architect or Clerk of Works.

1.07 TIME OF PROGRESS AND COORDINATION MEETINGS

A. Conduct both meetings weekly on a day agreeable to all parties, at a designated location at the site, or other agreed upon location.

1.08 PROJECT CLOSEOUT CONFERENCE

A. The Project Close-Out Conference shall be conducted at a time convenient for all parties involved prior to Substantial Completion. Refer to Section 01700 – Project Closeout for additional information for requirements.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. The Work of this Section includes, but is not limited to, the following:
   1. Administrative and procedural requirements for inclusion or deletion of certain units of Work into or from the Contract Documents.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:
   1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
   2. Section 26 00 00 – Electrical
   3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
   4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
   5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 UNIT PRICES

A. General Provisions:
   1. Unit prices shall be used to determine adjustments to the Contract Sum for changes in work where the actual quantities of Work defined in the Contract Documents are increased or decreased.
   2. Base conditions or quantities to be carried are identified in the Specifications. No additional compensation shall be considered for the number of occurrences, locations, timeliness, or scheduling of the excavations or other adjustments.
   3. The General Contractor is fully responsible for reviewing the test pit data and borings and becoming familiar with site conditions.
   4. Materials, methods of installation and definitions of terms set forth under the various unit price items are indicated in the Schedule of Unit Prices and indicated in the Contract Documents.

5. Performance of work which is not required under the Contract Documents, or which is not authorized by Change Order, whether such work item is set forth hereunder as a Unit Price Item, shall not be considered cause for any extra payment. The General Contractor shall be held fully responsible for such unauthorized work, including the performance of all corrective measures required by the Architect.
6. For all site-related unit price work, quantities for adjustment shall be calculated by a registered Professional Engineer or Surveyor retained by the General Contractor, as agreed to by the Architect. In the case of ledge, boulders, forest mat, and subsoil, the General Contractor's surveyor shall submit profiles of ledge, work sheets, plans and method of calculation shall be submitted to Architect for approval prior to commencement of removal.
7. Unit prices for excavation shall include the cost of sheeting, bracing, pumping, and dewatering, and all other costs in connection therewith, including labor, equipment, setup, and mobilization, and overhead and profit.

B. Methods of Measurement

1. Quantity of site related materials removed from the site and replaced with compacted structural fill and or ordinary fill as recommended within earthwork spec. and or Geotechnical Report, including but not limited to ledge, boulders, and unsuitable fill, shall be measured in place, before and after excavation by use of electronic GPS calculation, to determine the actual cubic yard volume.

C. Schedule of Unit Prices: As authorized by the Owner, should the quantities of certain classes of Work be increased or decreased, as described below, the Unit Prices shall be the basis of payment to the General Contractor, or credit to the Owner, for such increase or decrease in the Work. The Unit Prices shall represent the exact net amount, per unit, to be paid by the General Contractor, in the case of additions, and the exact net amount to be refunded to the Owner, in the case of decreases. No additional adjustment shall be allowed for overhead, profit, insurance, or other direct or indirect expenses, over-excavation, or other related work, without prior written approval of the Owner. Unit prices to be included within the General Contractor base bid.

1. Unit Price No. 1a: Excavation, stockpiling, and removal of Group A unsuitable soils at trenches and replaced with compacted ordinary fill that is more or less than 900 cubic yards in accordance with requirements of Sections 02 61 00.13 and 02 61 00.13.01.
2. Unit Price No. 1b: Excavation, stockpiling, and removal of Group B unsuitable soils at trenches and replaced with compacted ordinary fill that is more or less than 2,000 cubic yards in accordance with requirements of Sections 02 61 00.13 and 02 61 00.13.01.
3. Unit Price No. 1c: Excavation, stockpiling, and removal of Group C unsuitable soils at trenches and replaced with compacted ordinary fill that is more or less than 100 cubic yards in accordance with requirements of Sections 02 61 00.13 and 02 61 00.13.01.
4. Unit Price No. 2: Excavation, stockpiling, and removal of ledge and boulder measured at 1 cubic yard or larger at trenches and 3 cubic yards or larger at open excavation and replaced with compacted ordinary fill that is more or less than 30 cubic yards in accordance with requirements of Section 31 20 00 - Earth Moving.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. References Standards and Definitions: Refer to Section 014200 "Reference" for applicability of industry standards to products specified.

1. Requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule are included under Section 013300 “Submittal Procedures”.
2. Procedural requirements governing the Contractor's selection of products and product options are included under Section 016000 “Product Requirements”.

1.03 DEFINITIONS

A. Definitions used in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are requests for substitutions. The following are not considered to be requests for substitutions:

1. Specified options of products and construction methods included in the Contract Documents.
2. The Contractor's determination of, and compliance with, governing regulations and orders issued by governing authorities.

1.04 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received within two (2) days after commencement of the Work. Requests received more than two (2) days after commencement of the Work may be considered or rejected at the discretion of the Architect.

1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for Change-Order Proposals.
2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
b. Samples, where applicable or requested.
c. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
d. Cost information, including a proposal of the net change, if any in the Contract Sum.
e. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.

4. Architect's Action: Within five (5) days of receipt of a request for substitution the Architect will request additional information or documentation for evaluation necessary for the evaluation of the request. Within five (5) days of receipt of the request, or of receipt of additional information or documentation, whichever is later, the Architect will notify the Contractor of acceptance or rejection of the substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order when a change in the Contract Sum or Contract Time is required; or in the form of the Architect's Supplementary Instructions when no change to the Contract Sum or Time is required.

1.05 WORK CONDITIONS / SEQUENCE

A. If sub-contractors find that conditions are not appropriate for them to begin the work of their trade or if they are directed to perform their work out of sequence by the General Contractor or if the General Contractor directs sub-contractors to start and continue regardless of job conditions, the sub-contractor shall so notify the Architect in writing by certified mail immediately.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples that relate to construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

B. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record non-compliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents.
3. The request is timely, fully documented, and properly submitted.
4. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

6. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
7. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
8. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

PART 3 - EXECUTION NOT USED

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections: The following sections contain requirements that relate to this Section:
   1. Division 1 Section 012900 “Payment Procedures” for administrative procedures governing applications for payment.
   2. Division 1 Section 013300 “Submittal Procedures” for requirements for the Contractor’s Construction Schedule.
   3. Division 1 Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 MINOR CHANGES IN THE WORK

A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Architect on the City's Form of Supplemental Instructions.

1.04 REQUEST FOR PROPOSAL

A. Owner initiated Request for Proposal: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
   1. Proposal requests issued by the Architect are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.

1.05 PROPOSED CHANGE ORDER

A. Proposed Change Order: Using the form at the end of this section submit your proposal for the adjustment to the Contract Sum or Contract Time in response to a Request for Proposal or for Contractor initiated request for a change with Proposed Change Order.
   1. Unless otherwise indicated in the Request For Proposal, within twenty (20) days of receipt of the proposal request, submit to the Architect for the Owner's review an estimate of cost necessary to execute the proposed change.

a. Include a list of quantities of products to be purchased and unit costs, along with the total number of purchases to be made. Where requested, furnish survey data to substantiate quantities.
   1) Indicate delivery charges, equipment rental, and amounts of trade discounts.
   2) Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor initiated request for change with Proposed Change Order: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
   1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
      a. Include a list of quantities of products to be purchased and unit costs along with the total number of purchases to be made. Where requested, furnish survey data to substantiate quantities.
      b. Indicate delivery charges, equipment rental, and amounts of trade discounts.
      c. Comply with requirements in Section 01631 "Product Substitutions" if the proposed change in the Work requires the substitution of one product or system for a product or system specified.

1.06 ALLOWANCES

A. Allowance Adjustment: Base each Change Order Proposal Request for an allowance cost adjustment solely on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
   1. Include installation costs in the purchase amount only where indicated as part of the allowance.
   2. When requested, prepare explanations and documentation to substantiate the margins claimed.
   3. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit, within twenty (20) days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Claims submitted later than twenty (20) days will be rejected.
   1. The Change Order cost amount shall not include the Contractor's indirect expense except when it is clearly demonstrated that either the nature or scope of work required was changed from that which could have been foreseen from information in Contract Documents.
   2. No change to the Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated.

1.07 CONSTRUCTION CHANGE DIRECTIVE

A. A Construction Change Directive shall be issued for all work involving a change in contract cost or time. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time or is for a lump sum amount approved by the Architect.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive, if so, directed by the Architect.
   1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.08 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Owner and Contractor.

1.09 OVERHEAD AND PROFIT

A. Overhead and Profit will be as noted elsewhere in these specifications.
   1. Labor rates shall not exceed those shown in the contract specifications as set forth by the Department of Labor and Industries.

B. In reviewing Change Orders, the Architect will exercise his right to request a complete breakdown from the contractor showing exact costs for labor and material, as well as delivery slips and invoices from suppliers and other subcontractors.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Progress Schedule, Schedule of Values, and Contractor's Applications for Payment.
   1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.

B. The Contractor's Construction Schedule and Submittal Schedule are included in Section 013300 "Submittals".

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:
   1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
   2. Section 26 00 00 – Electrical
   3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
   4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
   5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 PROGRESS SCHEDULE

A. Prepare the Progress Schedule in accordance with Article 8, Paragraphs 8.2.3 and 8.2.4 of the General Conditions for approval by the Architect.
   1. The Progress Schedule shall conform to the requirements in Section 013300, paragraph 1.4, Contractor’s Progress Schedule, and the sample bound in the aforementioned paragraph.

1.05 SCHEDULE OF VALUES

A. Coordinate preparation of the Schedule of Values with preparation of the Progress Schedule.
   1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
      a. Contractor's Progress Schedule.
      b. Application for Payment forms.

c. List of products.
d. Schedule of allowances, if any.
e. Schedule of alternates, if any.
f. Schedule of unit prices, if any.
g. List of products.
h. List of principal suppliers and fabricators.
i. Schedule of submittals.

2. Submit the Schedule of Values to the Architect as soon as possible, but no later than seven (7) days before the date scheduled for submittal of the initial Application for Payment.

B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Provide at least one (1) line item for each Specification Section. Coordinate with the Architect for exact breakdown of major categories of work including, but not limited to major equipment and project closeout submittals.

1. Include the following Project identification on the Schedule of Values:
   a. Project name and location.
   b. Name of the Architect.
   c. Project number.
   d. Contractor's name and address.
   e. Date of submittal.
2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
   a. Generic name.
   b. Related Specification Section.
   c. Description of Work.
   d. Name of subcontractor.
   e. Name of manufacturer or fabricator.
   f. Name of supplier.
   g. Change Orders (numbers) that have affected value.
   h. Dollar value to nearest dollar.
   i. Percentage of Contract Sum to the nearest percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Breakdown shall be done by sequence. Coordinate with the Project Manual Table of Contents. Break principal subcontract amounts down into several line items, including but not limited to major equipment and project closeout submittals.
4. Do not round amount off to the nearest whole dollar; carry all amounts out to the two (2) decimal places and the totals shall equal the Contract Sum.
5. For each part of the Work where an Application for Payment may include materials or equipment, purchased, or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete, including its total cost and proportionate share of general overhead and profit margin for each item.

a. Temporary facilities, project closeout submittals, and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

7. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Application for Payment when Change Orders or Construction Change Directives result in a change to the Contract Sum.

1.06 APPLICATIONS FOR PAYMENT

A. Draft Application Preparation: Submit three (3) **draft** copies of the (current) Application for Payment at the weekly project meeting for Architect's review seven (7) days in advance of the "Payment Application Time" as indicated in the Agreement.

1. Draft Application for Payment transmittal shall include a fully executed Draft Cover Sheet or **Periodic Submittal Certification Statement** on Contractor letterhead (bound at the end of this section hereafter) certifying that the following Periodic Submittals are current for the appropriate period:
   a. Originals of All Waivers of Mechanics Lien & Corresponding Logs Covering Status of All Waivers
   b. Certified payrolls
   c. Contract Compliance Submittals
   d. Insurance and transfer title certificates for any material stored off site
   e. Updated as-built drawings of record reflecting Work for the current Application period

B. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.

1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

C. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

D. Payment Application Cover Sheet Form: Complete the enclosed **Application and Certification for Payment Cover Sheet** on Contractor letterhead (bound at the end of this Section hereafter) and transmit with each Payment Application Form submittal.

E. Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment. **No exceptions will be made.**

F. Application Preparation: Complete every entry on the form, including notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
2. Include only amounts of approved and fully executed Change Orders. Obtain approval from the Architect prior to inclusion into the Application.
3. Each Application for Payment **must** be accompanied by an updated Progress Schedule. The format to which is subject to the Architect’s approval.

G. Payment for materials and/or equipment stored off site shall be considered upon the Owner's approved submission by the Contractor bill(s) of sale or such other documentation or procedures satisfactory to the Owner to establish the Owner's clear and legal title to such materials and/or equipment or otherwise provided to protect the Owner's interest. This shall include applicable insurance and transportation to the project site for those materials and/or equipment suitably stored off site under consideration for payment.

1. Any Contractor making an application for payment pursuant to Section 00200 – General Conditions, paragraph 9.3.2, shall provide the following written documentation to the Architect through the General Contractor as delineated below and as otherwise maybe reasonably requested by the Owner:
   a. Bill of Material, Purchase Order, or Invoice Number.
   b. Product Description Listing.
   c. Serial Numbers (If Applicable)
   d. Materials and/or Equipment (wares) shall be segregated from all other stock or equipment and clearly labeled and/or marked as City of Worcester Property.
   e. Wares shall be always available for inspection and in any event within twenty-four (24) hours after receiving prior notice from the Owner/Architect.
   f. Provide written directions from the project site to the location of the stored wares.
   g. Name of contact person at the storage site and applicable telephone numbers.
   h. Method and mode of transportation from off-site storage location to the job site.

H. Retainage: In accordance with the Supplemental General Conditions, the Awarding Authority (Owner) shall deduct a retainage not exceeding five (5) percent of the approved amount of the periodic payment. The aforesaid five (5) percent retainage deduction by the Owner is the only retainage authorized hereunder. The contractor shall not deduct any amounts from payments received on behalf of subcontractors, except those deductions specifically authorized by M.G.L. Chapter 30, Section 39(1)(a).

1. Upon the initial and any subsequent Application for Payment; requesting or reflecting a "Release of Retainage" provide a Summary cover sheet indicating the derivation arithmetically, by each line item, of the total released to date and the of the current total retainage sum.

I. Transmittal: Upon receipt of the required periodic submittals enumerated above and upon approval of the "Draft Application", submit six (6) fully executed and notarized original copies with Cover Sheet of the current Application for Payment to the Architect by means ensuring receipt within twenty-four (24) hours. One (1) copy shall be complete, including waivers of lien and similar attachments.

1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
2. With each requisition, after the first requisition, submit one (1) copy of up-dated as-built drawings for all underground and concealed work, showing locations, depths, or elevations.

J. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien from every entity who may lawfully be entitled to file a mechanics lien arising out of the Contract, and related to the Work covered by the payment.

1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the previously paid application.
    a. Submit final Application for Payment with, or preceded by, final waivers from every entity involved with performance of Work covered by the application that could lawfully be entitled to a lien.
5. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.

K. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

1. List of subcontractors; at all tiers.
2. List of principal suppliers and fabricators.
3. Approved Schedule of Values.
4. Approved Contractor’s Progress Schedule see Section 01300, Paragraph 1.4.
5. Contractor's Construction Schedule (preliminary if not final).
6. Schedule of principal products.
7. Submittal Schedule (preliminary, if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations, permits and licenses from governing authorities for performance of the Work.
12. Initial progress report.
13. Report of pre-construction meeting.
14. Schedule of Pre-installation meetings.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.
17. Data needed to acquire Owner's insurance.
18. Initial settlement survey and damage report, if required.
19. List of Contractor's personnel names and titles assigned on the project and emergency telephone numbers.

L. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and Submittals that shall precede or coincide with this application include:
    a. Occupancy permits and similar approvals.
    b. Warranties (guarantees) and maintenance agreements.
    c. Test/adjust/balance records.

d. Maintenance instructions.
e. Meter readings.
f. Start-up performance reports.
g. Changeover information related to Owner's occupancy, use, operation and maintenance.
h. Final cleaning.
i. Application for reduction of retainage, and consent of surety
j. Advice on shifting insurance coverage.
k. Final progress photographs.
l. List of incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.

M. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final payment Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion
3. Assurance that unsettled claims will be settled.
4. Assurance that incomplete Work and Work not accepted will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner.
6. Certified property survey.
7. Proof that taxes, fees and similar obligations have been paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish and similar elements.
10. Change of door locks to Owner's access.
11. Order of Conditions Certificate of Compliance, if applicable.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

CONTRACTOR LETTER HEAD

APPLICATION AND CERTIFICATION FOR PAYMENT COVER SHEET

PROJECT:_____ APPLICATION NO: _____

For
Period
Ending: _____ AMOUNT CERTIFIED: $_____

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief, the Work covered by this Application for Payment has been completed in accordance with the Contract Documents; and the current Payment shown herein is now due.

The Contractor further certifies that the entire amount of all previous Payments received for labor performed and materials furnished have been promptly paid to all Subcontractors whose work was certified for payment on previous applications, less, where applicable, only an amount specified in any court proceeding barring such payment and/or an amount claimed due from the Subcontractor by the Contractor as expressly authorized by M.G. L. Chapter 30, Section 39F (1) (a). No other amounts have been deducted or retained from such payments by the contractor.

Contractor: _____ **STATE OF:** _____

Signed by: _____ **COUNTY OF:** _____

Date: _____ Subscribed and sworn to before me on this _____ Day of _____ 20__.

Notary public: _____
My Commission Expires: _____

APPROVED FOR PAYMENT:

Signed:_____
By: Ryan B. Hacker, Assistant Director of Facilities

Date:_____

Signed:_____
By: David Turcotte, MVG Architects, Inc.

Date:_____

Signed:_____
By:

Date:_____

Signed:_____
By:

Date:_____

CONTRACTOR LETTER HEAD

DRAFT APPLICATION FOR PAYMENT
PERIODIC SUBMITTAL CERTIFICATION STATEMENT

Project Name: Draft Application Date: _____

Draft Application No._____ (Requisition No.)

For Period:
Starting _____
Through Period
Ending _____

_____(Name of Contractor) _____ ,
certifies that the "Draft Application for Payment" as herein submitted with all of the following Periodic Submittals fully and completely executed and current for the appropriate time period(s) as required.
FURNISH THE FOLLOWING PERIODIC SUBMITTALS AND PROVIDE ALL REQUIRED INFORMATION FOR THE APPROPRIATE TIME PERIOD(S) AS REQUESTED. PLEASE SUBMIT ON **SEPARATE** SHEETS:

I. **Original Waivers of Mechanic Lien:** List every entity who may be lawfully entitled to file a lien resulting out of this Contract, including but not limited to; contractors/subcontractors, at all tiers, vendors, and suppliers. Submit current originals of all Waivers covering all WORK completed through the period ending thirty (30) days prior to this periods "Application" date and as further required in I above.

II. **Certified Payrolls:** All payroll reports have been submitted as required by the Contract Compliance Office.

III. **Contract Compliance Reports:** All contract compliance reports have been submitted as required by the Contract Compliance Office.

IV. **Insurance & Title Transfer Certificates** for material stored off site, if applicable.

V. **Updated As-Built Drawings:** Record drawings have been submitted reflecting the work completed up to the time of Application.

This Draft Application for Payment Certification Statement and corresponding Periodic Submittals (attached) shall be reviewed by the Awarding Authority for completeness. Any deficiency, discrepancies or missing items shall cause this Draft Application for Payment to be returned to the Contractor with no action taken.

I, _____ hereby certify, that the Periodic
(Name of contractor)

Submittals indicated herein have been reviewed by the undersigned and are complete and current as required under provisions of this Contract.

_____
_____
(Name of Authorized Person) (Date)

_____
(Title)

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section

1.02 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for project coordination including, but not limited to the following:
   1. Coordination and cutting, drilling, and patching.
   2. General installation provisions.
   3. Administrative and supervisory personnel.
   4. Cleaning and protection.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Project meetings, coordination meetings, and pre-installation conferences are included in Section “Project Meetings.”
   2. Requirements for preparing and submitting the Contractor's Construction Schedule are included in Section “Submittals.”

1.03 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the specifications that depend on each other for proper installation, connection, and operation.
   1. Where installation of one part of the Work depends on installation of other components, either before or after its own installation, schedule construction operations in the sequence required to obtain the best results.
   2. Where availability of space is limited coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
   3. Make provisions to accommodate items scheduled for later installation.
   4. The General Contractor shall as part of his work provide for all cutting, patching, and drilling, not specified to be the work of others.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
   1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.04 SUBMITTALS

A. Coordination Drawings: Prepare coordination Drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section 01300 – Submittals.
4. Format to be as directed by the Architect.

B. Staff Names: Within fifteen (15) days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers. Provide twenty-four (24) hour Emergency telephone numbers listed separately.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.
2. The Contractor shall provide a copy of the list, and updates as its changes, to the Worcester Public Schools Facilities Department and other City Departments as directed by the Architect.

PART 2 – PRODUCTS NOT USED

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer’s Instructions: Comply with manufacturer’s written instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than the requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

F. Re-check measurements and dimensions, before starting each installation.

G. Install each component during weather conditions that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decision to the Architect for final decision.

3.02 CLEANING AND PROTECTION

A. During handling and installation clean and protect construction in progress and adjoining materials in place. Apply protective covering where required and as necessary to assure protection from damage or deterioration.

B. Clean and maintain all completed construction as frequently as necessary through the remainder of the construction period.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in-progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive vibration.
2. Excessive static or dynamic loading.
3. Excessive internal or external pressures.
4. Excessively high or low temperatures.
5. Thermal shock.
6. Excessively high or low humidity.
7. Air contamination or pollution.
8. Air borne debris/dust or construction particulates.
9. Water or ice.
10. Solvents.
11. Chemicals.
12. Light.
13. Puncture.
14. Abrasion.
15. Heavy traffic.
16. Soiling, staining, and corrosion.
17. Bacteria.

18. Rodent and insect infestation.
19. Combustion.
20. Electrical current.
21. High-speed operation.
22. Improper lubrication.
23. Unusual wear or other misuse.
24. Contact between incompatible materials.
25. Destructive testing.
26. Misalignment.
27. Excessive weathering.
28. Unprotected storage.
29. Improper shipping or handling.
30. Theft.
31. Vandalism.

END OF SECTION

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1. The submittals enumerated below shall require review and/or approval by the Architect.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including:

1. Contractor's Progress Schedule.
2. Major delivery schedule.
3. Existing utility tie-in's schedule.
4. Submittal schedule.
5. Pre-Installation Conference Schedule (By Specification Section).
6. Daily construction reports.
7. Shop drawings.
8. Product data.
9. Samples.
10. Coordination Drawings.
11. Quality assurance submittals.
12. Submittal of three (3) sets of plans and specifications, complete with all addendums posted to the City of Worcester Building Department to obtain a building permit.

B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Product Substitution.
2. Periodic Submittals.
3. Permits.
4. Applications for Payment.
5. Performance and payment bonds.
6. Insurance Certificates.
7. List of Project Contractors, Subcontractors, Vendors, etc.
8. List of Personnel and Emergency Telephone Numbers.
9. City Ordinance Program Forms.

C. The Schedule of Values submittal is included in Section 01027 "Applications for Payment".

D. "Project Closeout", Section 01700, specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:

1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
2. Section 26 00 00 – Electrical
3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 SUBMITTAL PROCEDURES/SHOP DRAWINGS

A. Submittal procedures shall be electronic for all submittals for approval and distribution unless otherwise noted. Provide the owner with one copy of all approved submittals in an organized manner with a submittal log. All color samples must be distributed as hard copies, and electronically filed to track. Electronic files shall be clean, clear, and readable. Plan files to be PDF and/or AutoCAD and be to scale as appropriate. Contractor to transmit and update each submittal and process electronically, maintain a log that is distributed and updated weekly. All e-mails to clearly identify the submittal number and shall include the log, Or the contactor to maintain a web-based system used for submittals, and the construction process.

B. Distribution: Distribution of submittals shall be distributed as follows unless otherwise noted:

1. Architect.
2. Clerk of Works.
3. Owner – electronic and paper copy.
4. A minimum of Three (3) copies for the Contractor as necessary for distribution to subcontractors, suppliers, installers, manufacturers, fabricators, and any other applicable parties.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

D. Processing: All Contractors are directed to the timeliness and critical importance of expediting the submittal process. Any lead times, which may impact sequencing, should be prioritized to meet the project schedule. Architects must be notified if any delays arise that will impact on lead times.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
3. To avoid the need to delay installation because of the time required to process submittals and to allow sufficient time for submittal review, all contractors' submittals shall be submitted for processing and have received final Architect's approval within 45 days from the date of Contract.

a. Allow ample time for initial review to achieve efficient construction sequencing. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
b. If an intermediate submittal is necessary, process the same as the initial submittal.
c. Allow ample time for reprocessing each submittal to achieve efficient construction sequencing.
d. No extension of Contract Time will be authorized because of the contractor's failure to transmit submittals to the Architect for processing sufficiently in advance of the scheduled Work.

E. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
2. Include the following information on the label for processing and recording action taken.
a. Project name.
b. Date.
c. Name and address of the Architect.
d. Name and address of the Contractor.
e. Name and address of the subcontractor.
f. Name and address of the supplier.
g. Name of the manufacturer.
h. Number and title of appropriate Specification Section.
i. Drawing number and detail references, as appropriate.

F. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.

G. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.05 CONTRACTOR'S PROGRESS SCHEDULE

A. Bar (Gantt) Chart Schedule: Meeting the requirements of Section 00200 Paragraphs 4.10, 4.10.1, 8.2.3 through 8.2.9. Prepare a fully developed, horizontal bar type of chart titled: "Progress Schedule". A sample is attached at the end of this section, some requirements specified here are not shown in the sample.

B. Time, the horizontal (x) axis in this schedule shall show the start of on site work through the Date of Substantial Completion, show the time for completion of punch list items, and show the time for general warranty and completion of commissioning.

C. Provide a separate time bar for each line in the approved "Schedule of Values" with the incremental value of work in place for each month. Work Completed (in place) must be 99% of contract value to achieve Substantial Completion. Provide a continuous vertical line to identify the first working day of each month.

D. At the bottom of the progress schedule provide:
   1. a first line showing the total value of the work planned to be completed (in place) for each month,
   2. a second line showing the cumulative total value of the work planned to be completed (in place) to date,
   3. a third line showing the actual total value of the work certified as completed (in place) on the Application and Certificate for Payment for the month, and
   4. a fourth line showing the actual total cumulative value of the work certified as completed (in place) on the Application and Certificate for payment to date.
   5. Refer to Division 1 Section 01027 "Applications for Payment" for cost reporting and payment procedures.

E. Distribution: Following approval of the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to provide actual work in place and conform to schedule.

F. Revisions: Revisions to values and or time shown in the Progress Schedule may only be made to reflect a Change Order and in accordance with Section 00200 Paragraph 8.2.7. When revisions are made, distribute to the same parties and post at the jobsite. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

G. Progress Schedule Updating: Revise the schedule after each meeting, where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

Progress Schedule (as required by Article 8, Paragraphs 8.2.3 & 8.2.4 of the General Conditions)

(Project Name)	(Architect)	(Date)	(Approved by Architect)
(City of Worcester Dept. or Facility)	(Construction Manager)	(Revision Date)	
(Project Address)	(Contractor)	(Revised Through)	

Section Number	Section or Filed Sub-bid Section	Mar-98	Apr-98	May-98	Jun-98	Jul-98	Oct-98	Nov-98	Dec-98	
		1	2	3	4	5	6	7	8	Totals
01000	General Requirements	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$32,000
02000	Sitework	$10,000	$10,000						$10,000	$30,000
03000	Concrete		$4,000	$12,000			$8,000			$24,000
04000	Masonry			$8,000	$10,000	$12,000				$30,000
05000	Metals			$20,000						$20,000
05500	Metal Fabrications							$7,000		$7,000
06000	Wood & Plastics								$4,000	$4,000
07100	Waterproofing & Caulking				$3,000					$3,000
07600	Roofing & Flashing					$12,000				$12,000
08000	Doors & Windows						$4,000			$4,000
08520	Alum. Windows							$8,000		$8,000
08800	Glass & Glazing								$1,000	$1,000
09250	Gypsum Drywall						$6,000	$5,000		$11,000
09310	Ceramic Tile							$2,000		$2,000
09511	Accoustical Ceilings							$1,000	$1,000	$2,000
09650	Resilient Flooring								$3,000	$3,000
09900	Painting								$2,000	$2,000
10000	Specialties								$14,000	$14,000
14204	Hydraulic Elevators						$8,000	$8,000	$8,000	$24,000
15400	Plumbing			$1,000	$2,000			$3,000	$5,000	$11,000
15600	HVAC					$4,000	$5,000		$4,000	$13,000
16000	Electrical			$1,000	$3,000			$4,000	$4,000	$12,000
	Total Planned to be Completed This Month	$14,000	$18,000	$46,000	$22,000	$32,000	$35,000	$42,000	$60,000	
	Total planned to be Completed To Date	$14,000	$32,000	$78,000	$100,000	$132,000	$167,000	$209,000	$269,000	$269,000
	Actual Total Completed This Month	$11,000	$22,000	$38,000						
	Actual Total Completed To Date	$11,000	$33,000	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000	$470,000

1.06 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's Progress Schedule, prepare a complete Submittal Schedule and promptly submit the schedule to the Architect.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates.

C. Submittal Schedule Updating: Revise the Submittal Schedule after each meeting or activity where revisions have been recognized or made. Issue the updated project schedule concurrently with each Application for Payment.

1.07 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report recording the following information concerning events at the site, and submit copies to the Architect and Clerk of Works at weekly intervals:

1. List of subcontractors at the site.
2. Count of personnel at the site.
3. Accidents and unusual events.
4. Meetings and significant decisions.
5. Stoppages, delays, shortages, and losses.
6. Emergency procedures.
7. Services connected, disconnected.
8. Equipment or system tests and startups.
9. General daily work tasks and progress.

1.08 SHOP DRAWINGS

A. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples that relate to construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

B. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

C. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates, and similar Drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.

1.09 PRODUCT DATA

A. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples that relate to construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

B. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.

1. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as “Shop Drawings”.
2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
   a. Manufacturer's printed recommendations.

b. Compliance with trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.

C. Do not submit Product Data until compliance with the requirements of the Contract Documents has been confirmed.

D. Unless non-compliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

E. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.10 SAMPLES

A. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples that relate to construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

B. Mount or display samples in the manner to facilitate review of qualities indicated. Prepare samples to match the Architect's sample. Include the following:

1. Specification Section number and reference.
2. Generic description of the sample.
3. Sample source.
4. Product name or name of the manufacturer.
5. Compliance with recognized standards.
6. Availability and delivery time.

C. Submit samples for review of size, kind, color, pattern, and texture. Submit samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

D. Preliminary Submittals: Submit a full set of choices where samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.

1. Preliminary submittals will be reviewed and returned with the Architect's mark, indicating selection and other action.

E. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three (3) sets. One (1) set will be returned marked with the action taken.

1. Maintain sets of samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

F. Unless non-compliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

1. Sample sets may be used to obtain final acceptance of the construction associated with each set.

1.11 QUALITY ASSURANCE SUBMITTALS

A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements; submit a notarized certification from the manufacturer certifying compliance with specified requirements.

1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

1.12 ARCHITECT'S ACTION

A. Except for submittals of record or information, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return as noted in Paragraph 1.3A.

B. Compliance with specified characteristics is the Contractor's responsibility.

C. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The Architect will mark the stamp appropriately to indicate the action taken:

D. Final Unrestricted Release: When submittals are marked "Approved", the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend on that compliance.

1. Final-But-Restricted Release: When submittals are marked "Approved as Noted", that Work covered by the submittal may proceed provided it complies with markings or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

2. Returned for Resubmittal: When submittal is marked “Approved as Noted - Revise and Resubmit” or “Not Approved, Revise and Resubmit", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the markings and resubmit without delay. Repeat if necessary to obtain different action mark.

E. The Contractor shall not use or permit to be used submittals marked “Approved as Noted - Revise and Resubmit” or "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.

F. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned marked "Action Not Required".

1.13 DRAWINGS TO BUILDING DEPARTMENT

A. The Contractor shall submit three (3) sets of fully addendumized plans and specifications to the City of Worcester Building Department upon application for the building permit.
   1. Submit drawings to architect prior to permit application for "wet stamping" of architect and engineers professional seal to the drawings. Allow up to three (3) days for this process.
   2. Any reduction in addenda plan must be legible.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for Quality-Control Services.

B. Quality-Control Services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide inspections, tests, and other similar Quality-Control Services specified in individual Specification Sections and as required by governing authorities. Costs for these services are included in the Contract Sum.

1. The Contractor shall employ and pay a qualified independent testing agency to perform specified Quality-Control Services.
2. Where the Owner has engaged an independent testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage a testing entity for the same or related part or element of the Work, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

3. Re-testing: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
    a. The cost of re-testing construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction.
4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
    a. Provide access to the Work and furnish incidental labor, facilities and equipment necessary to facilitate inspections and tests.
    b. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
    c. Provide facilities for storage and curing of test samples.
    d. Provide security and protection of samples and test equipment at the Project Site.

B. Owner Responsibilities: The Owner will engage and pay for the services of an independent testing agency to perform inspections, tests or other Quality-Control Services specified to be performed by independent testing agencies and not specified as the responsibility of the Contractor and/or are provided for by another identified entity. Costs for these services are not included in the Contract Sum.
    1. The Owner shall employ and pay for the services of a qualified independent testing agency, testing laboratory or other qualified entity to perform Quality-Control Services, which are the Owner’s responsibility.

C. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
    1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during the performance of its services.
    2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
    3. The agency shall not perform any duties of the Contractor.

D. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
    1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.04 SUBMITTALS

A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and an interpretation of test results.
    j. Ambient conditions at the time of sample taking and testing.
    k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting.

1.05 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State of Massachusetts.

1.06 WORK CONDITIONS / SEQUENCE

A. If sub-contractors find that conditions are not appropriate for them to begin the work of their trade or if they are directed to perform their work out of sequence by the General Contractor or if the General Contractor directs sub-contractors to start and continue regardless of job conditions, the sub-contractor shall so notify the Architect in writing by certified mail immediately.

PART 2 – PRODUCTS NOT USED

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality-control service activities and protect repaired construction.

C. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.

D. Approved: The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulations: The term regulations include laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term furnish means supply and delivery to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations to the location within the project where the product will finally be installed.

G. Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Provide: The term provides means to furnish and install, complete and ready for the intended use.

I. Installer: An Installer is the Contractor, or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged in performing.

1. The term experienced, when used with the term Installer, means having a minimum of five (5) previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that the requirements specified apply exclusively to tradespersons of the corresponding generic name.
3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
    a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

J. Project site is the space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is located.

K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret the results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16 Division format and MASTERFORMAT numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated, as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
    a. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two (2) or more standards is specified and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different but apparently equal and other uncertainties to the Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

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

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the Text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but not ensured, to be accurate and up to date as of the date of Contract Documents.

AA	**Aluminum Association** **900 19th St., NW, Suite 300** **Washington, DC 20006**	**(202) 862-5100**
AABC	**Associated Air Balance Council** **1518 K St., NW** **Washington, DC 20005**	**(202) 737-0202**
AAMA	**American Architectural Manufacturers Association** **1540 E. Dundee Road, Suite 310** **Palatine, IL 60067**	**(708) 202-1350**
AASHTO	**American Association of State Highway and Transportation Officials** **444 North Capitol St., Suite 225** **Washington, DC 20001**	**(202) 624-5800**

AATCC	**American Association of Textile Chemists and Colorists** **P.O. Box 12215** **Research Triangle Park, NC**	**(919) 549-8141**
ACI	**American Concrete Institute** **P.O. Box 19150** **Detroit, MI 48219**	**(313) 532-2600**
ACIL	**American Council of Independent Laboratories** **1629 K St., NW** **Washington, DC 20006**	**(202) 887-5872**
ACPA	**American Concrete Pipe Association** **8300 Boone Blvd., Suite 400** **Vienna, VA 22182**	**(703) 821-1990**
ADC	**Air Diffusion Council** **One Illinois Center, Suite 200** **111 East Wacker Drive** **Chicago, IL 60601-4298**	**(312) 616-0800**
AFBMA	**Anti-Friction Bearing Manufacturers Association** **1101 Connecticut Ave., NW, Suite 700** **Washington, DC 20036**	**(202) 429-5155**
AGA	**American Gas Association** **1515 Wilson Blvd.** **Arlington, VA 22209**	**(703) 841-8400**
AHA	**American Hardboard Association** **520 North Hicks Road** **Palatine, IL 60067**	**(708) 934-8800**
AHAM	**Association of Home Appliance Manufacturers** **20 North Wacker Drive** **Chicago, IL 60606**	**(312) 984-5800**
AI	**Asphalt Institute** **Research Park Drive** **P.O. Box 14052** **Lexington, KY 40512-4052**	**(606) 288-4960**
AIA	**American Institute of Architects** **1735 New York Ave., NW** **Washington, DC 20006**	**(202) 626-7300**
A.I.A.	**American Insurance Association** **1130 Connecticut Ave., NW, Suite 1000** **Washington, DC 20036**	**(202) 828-7100**

AIHA	**American Industrial Hygiene Association** **P.O. Box 8390** **345 White Pond Drive** **Akron, OH 44320**	**(216) 873-2442**
AISC	**American Institute of Steel Construction** **One East Wacker Drive, Suite 3100** **Chicago, IL 60601-2001**	**(312) 670-2400**
AITC	**American Institute of Timber Construction** **11818 SE Mill Plain Blvd., Suite 415** **Vancouver, WA 98684**	**(206) 254-9132**
ALI	**Associated Laboratories, Inc.** **500 South Vermont Street** **Palatine, IL 60067**	**(708) 358-7400**
ALSC	**American Lumber Standards Committee** **P.O. Box 210** **Germantown, MD 20875**	**(301) 972-1700**
AMCA	**Air Movement and Control Association** **30 W. University Drive** **Arlington Heights, IL 60004-1893**	**(708) 394-0150**
ANSI	**American National Standards Institute** **11 West 42nd Street, 13th Floor** **New York, NY 10036**	**(212) 642-4900**
AOAC	**Association of Official Analytical Chemists** **2200 Wilson Blvd., Suite 400** **Arlington, VA 22201-3301**	**(703) 522-3032**
AOSA	**Association of Official Seed Analysts** **c/o Larry J. Prentice** **268 Plant Science 1ANR-UNL, Box 19281** **Lincoln, NE 68583-0911**	**(402) 472-8649**
APA	**American Plywood Association** **P.O. Box 11700** **Tacoma, WA 98411**	**(206) 565-6600**
API	**American Petroleum Institute** **1220 L St., NW** **Washington, DC 20005**	**(202) 682-8000**
ARI	**Air Conditioning and Refrigeration Institute** **1501 Wilson Blvd., 6th Floor** **Arlington, VA 22209**	**(703) 524-8800**
ARMA	**Asphalt Roofing Manufacturers Association** **6288 Montrose Rd.** **Rockville, MD 20852**	**(301) 231-9050**

ASA	**Acoustical Society of America** **500 Sunnyside Blvd.** **Woodbury, NY 11797**	**(516) 349-7800**
ASC	**Adhesive and Sealant Council** **1627 K Street, NW, Suite 1000** **Washington, DC 20006-1707**	**(202) 452-1500**
ASHRAE	**American Society of Heating, Refrigerating and Air-Conditioning Engineers** **1791 Tullie Circle, NE** **Atlanta, GA 30329**	**(404) 636-8400**
ASME	**American Society of Mechanical Engineers** **345 East 47th St.** **New York, NY 10017**	**(212) 705-7722**
ASPE	**American Society of Plumbing Engineers** **3617 Thousand Oaks Blvd., Suite 210** **Westlake, CA 91362**	**(805) 495-7120**
ASSE	**American Society of Sanitary Engineering** **P.O. Box 40362** **Bay Village, OH 44140**	**(216) 835-3040**
ASTM	**American Society for Testing and Materials** **1916 Race St.** **Philadelphia, PA 19103-1187**	**(215) 977-9679**
ATIS	**Alliance for Telecommunications Industry Solutions** **1200 G Street, NW, Suite 500** **Washington, DC 20005**	**(202) 628-6380**
AWCMA	**American Window Covering Manufacturers Association** **355 Lexington Avenue** **New York, NY 10017**	**(212) 661-4261**
AWI	**Architectural Woodwork Institute** **P.O. Box 1550** **13924 Braddock Rd., Suite 100** **Centreville, VA 22020**	**(703) 222-1100**
AWPA	**American Wood Preservers' Association** **4128-1/2 California Ave. SW, No. 171** **Seattle, WA 98116**	**(206) 937-5338**
AWPB	**American Wood Preservers Bureau** **4 E. Washington Street** **Newnan, GA 30263**	**(404) 254-9877**

AWS	**American Welding Society** **550 LeJeune Road, NW** **P.O. Box 351040** **Miami, FL 33135**	**(305) 443-9353**
AWWA	**American Water Works Association** **6666 West Quincy Avenue** **Denver, CO 80235**	**(303) 794-7711**
BHMA	**Builders' Hardware Manufacturers Association** **355 Lexington Ave., 17th Floor** **New York, NY 10017**	**(212) 661-4261**
BIA	**Brick Institute of America** **11490 Commerce Park Drive** **Reston, VA 22091**	**(703) 620-0010**
BIFMA	**Business and Institutional Furniture Manufacturers Assoc.** **2335 Burton Street, SE** **Grand Rapids, MI 49506**	**(616) 243-1681**
CAGI	**Compressed Air and Gas Institute** **c/o John H. Addington** **Thomas Associates, Inc.** **1300 Sumner Avenue** **Cleveland, OH 44115-2851**	**(216) 241-7333**
CAUS	**Color Association of the United States** **409 West 44th Street** **New York, NY 10036**	**(212) 582-6884**
CBM	**Certified Ballast Manufacturers Association** **Hanna Building, No. 772** **1422 Euclid Avenue** **Cleveland, OH 44115-2851**	**(216) 241-0711**
CCC	**Carpet Cushion Council** **P.O. Box 546** **Riverside, CT 06878**	**(203) 637-1312**
CDA	**Copper Development Association** **2 Greenwich Office Park, Box 1840** **Greenwich, CT 06836**	**(203) 625-8210**
CFFA	**Chemical Fabrics & Film Association, Inc.** **c/o Thomas Associates, Inc.** **1300 Sumner Avenue** **Cleveland, OH 44115-2851**	**(216) 241-7333**
CGA	**Compressed Gas Association** **1725 Jefferson Davis Highway, Suite 1004** **Arlington, VA 22202-4100**	**(703) 979-0900**

CISCA	**Ceiling and Interior Systems Construction Association** **5700 Old Orchard Road, 1st Floor** **Skokie, IL 60077**	**(708) 965-2776**
CISPI	**Cast Iron Soil Pipe Institute** **5959 Shallowford Road, Suite 419** **Chattanooga, TN 37421**	**(615) 892-0137**
CRI	**Carpet and Rug Institute** **P.O. Box 2048** **Dalton, GA 30722**	**(404) 278-3176**
CRSI	**Concrete Reinforcing Steel Institute** **933 Plum Grove Road** **Schaumburg, IL 60173**	**(708) 517-1200**
DHI	**Door and Hardware Institute** **14170 New Brook Drive** **Chantilly, VA 22022**	**(703) 222-2010**
DIPRA	**Ductile Iron Pipe Research Association** **245 Riverchase Parkway East, Suite O** **Birmingham, AL 35244**	**(205) 988-9870**
DLPA	**Decorative Laminate Products Association** **600 South Federal Street, Suite 400** **Chicago, IL 60605**	**(312) 922-6222**
ECSA	**Exchange Carriers Standards Association** **5430 Grosvenor Lane, Suite 200** **Bethesda, MD 20814**	**(301) 564-4505**
EIA	**Electronic Industries Association** **2001 Pennsylvania Avenue, NW** **Washington, DC 20006-1813**	**(202) 457-4900**
EIMA	**Exterior Insulation Manufacturers Association** **2759 State Road 580, Suite 112** **Clearwater, FL 34621**	**(813) 726-6477**
EJMA	**Expansion Joint Manufacturers Association** **25 North Broadway** **Tarrytown, NY 10591**	**(914) 332-0040**
ETL	**ETL Testing Laboratories, Inc.** **P.O. Box 2040** **Route 11, Industrial Park** **Cortland, NY 13045**	**(607) 753-6711**
FCI	**Fluid Controls Institute** **P.O. Box 9036** **Morristown, NJ 07960**	**(201) 829-0990**

FCIB	**Floor Covering Installation Board** **310 Holiday Avenue** **Dalton, GA 30720**	**(706) 226-5488**
FGMA	**Flat Glass Marketing Association** **White Lakes Professional Building** **3310 Southwest Harrison** **Topeka, KS 66611-2279**	**(913) 266-7013**
FM	**Factory Mutual Research Organization** **1151 Boston-Providence Turnpike** **P.O. Box 9102** **Norwood, MA 02062**	**(617) 762-4300**
GA	**Gypsum Association** **810 First Street, NE, Suite 510** **Washington, DC 20002**	**(202) 289-5440**
HEI	**Heat Exchange Institute** **c/o John H. Addington** **Thomas Associates, Inc.** **1300 Sumner Avenue** **Cleveland, OH 44115-2851**	**(216) 241-7333**
HI	**Hydronics Institute** **P.O. Box 218** **35 Russo Place** **Berkeley Heights, NJ 07922**	**(908) 464-8200**
H.I.	**Hydraulic Institute** **30200 Detroit Road** **Cleveland, OH 44145-1967**	**(216) 899-0010**
HMA	**Hardwood Manufacturers Assoc.** **400 Penn Center Blvd.** **Pittsburgh, PA 15235**	**(412) 829-0770**
HPMA	**Hardwood Plywood Manufacturers Assoc.** **1825 Michael Farraday Drive** **P.O. Box 2789** **Reston, VA 22090-2789**	**(703) 435-2900**
IBD	**Institute of Business Designers** **341 Merchandise Mart** **Chicago, IL 60654**	**(312) 647-1950**
ICEA	**Insulated Cable Engineers Association, Inc.** **P.O. Box 440** **South Yarmouth, MA 02664**	**(508) 394-4424**

IEC	**International Electrotechnical Commission** **(Available from ANSI)** **1430 Broadway** **New York, NY 10018**	**(212) 354-3300**
IEEE	**Institute of Electrical and Electronic Engineers** **345 East 47th Street** **New York, NY 10017**	**(212) 705-7900**
IESNA	**Illuminating Engineering Society of North America** **345 East 47th Street** **New York, NY 10017**	**(212) 705-7926**
IGCC	**Insulating Glass Certification Council** **c/o ETL Testing Laboratories, Inc.** **P.O. Box 2040** **Route 11, Industrial Park** **Cortland, NY 13045**	**(607) 753-6711**
IMSA	**International Municipal Signal Association** **165 East Union Street** **P.O. Box 539** **Newark, NY 14513**	**(315) 331-2182**
IRI	**Industrial Risk Insurers** **85 Woodland Street** **Hartford, CT 06102**	**(203) 520-7300**
ISA	**Instrument Society of America** **P.O. Box 12277** **67 Alexander Drive** **Research Triangle Park, NC 27709**	**(919) 549-8411**
KCMA	**Kitchen Cabinet Manufacturers Association** **1899 Preston White Drive** **Reston, VA 22091-4326**	**(703) 264-1690**
LIA	**Lead Industries Association, Inc.** **295 Madison Avenue** **New York, NY 10017**	**(212) 578-4750**
LPI	**Lightning Protection Institute** **3365 North Arlington Heights Road, Suite J** **Arlington Heights, IL 60004**	**(708) 255-3003**
MCAA	**Mechanical Contractors Association of America** **1385 Piccard Drive** **Rockville, MD 20850-4329**	**(301) 869-5800**

ML/SFA	**Metal Lath/Steel Framing Association** **(A Division of the National Association of Architectural Metal Manufacturers)** **600 South Federal Street, Suite 400** **Chicago, IL 60605**	**(312) 922-6222**
MSS	**Manufacturers Standardization Society of the Valve and Fittings Industry** **127 Park Street, NE** **Vienna, VA 22180**	**(703) 281-6613**
NAAMM	**National Association of Architectural Metal Manufacturers** **600 South Federal Street, Suite 400** **Chicago, IL 60605**	**(312) 922-6222**
NAIMA	**North American Insulation Manufacturers Association** **44 Canal Center Plaza, Suite 310** **Alexandria, VA 22314**	**(703) 684-0084**
NBHA	**National Builders Hardware Association** **(Now DHI)**	
NCMA	**National Concrete Masonry Association** **P.O. Box 781** **Herndon, VA 22070-0781**	**(703) 435-4900**
NCRPM	**National Council on Radiation Protection and Measurements** **7910 Woodmont Avenue, Suite 800** **Bethesda, MD 20814**	**(301) 657-2652**
NCSPA	**National Corrugated Steel Pipe Association** **2011 Eye Street, NW** **Washington, DC 20006**	**(202) 223-2217**
NEC	**National Electrical Code (from NFPA)**	
NECA	**National Electrical Contractors Association** **7315 Wisconsin Avenue** **Bethesda, MD 20814**	**(301) 657-3110**
NEMA	**National Electrical Manufacturers Association** **2101 L Street, NW, Suite 300** **Washington, DC 20037**	**(202) 457-8400**
NETA	**International Electrical Testing Association** **P.O. Box 687** **Morrison, CO 80465**	**(303) 467-0526**

NFPA	**National Fire Protection Association** **One Batterymarch Park** **P.O. Box 9101** **Quincy, MA 02269-9101**	**(617) 770-3000** **(800) 344-3555**
N.F.P.A.	**National Forest Products Association** **1250 Connecticut Avenue, NW, Suite 200** **Washington, DC 20036**	**(202) 463-2700**
NHLA	**National Hardwood Lumber Association** **P.O. Box 34518** **Memphis, TN 38184-0518**	**(901) 377-1818**
NKCA	**National Kitchen Cabinet Association** **(Now KCMA)**	
NLGA	**National Lumber Grades Authority** **1055 West Hastings Street, Suite 260** **Vancouver, British Columbia** **Canada V6E 2E9**	**(604) 687-2171**
NOFMA	**National Oak Flooring Manufacturers Association** **P.O. Box 3009** **Memphis, TN 38173-0009**	**(901) 526-5016**
NPA	**National Particleboard Association** **18928 Premiere Court** **Gaithersburg, MD 20879**	**(301) 670-0604**
NPCA	**National Paint and Coatings Association** **1500 Rhode Island Avenue, NW** **Washington, DC 20005**	**(202) 462-6272**
NRCA	**National Roofing Contractors Association** **10255 West Higgins Road, Suite 600** **Rosemont, IL 60018-5607**	**(708) 299-9070**
NSF	**National Sanitation Foundation** **3475 Plymouth Road** **P.O. Box 1468** **Ann Arbor, MI 48106**	**(313) 769-8010**
NWMA	**National Woodwork Manufacturers Association** **(Now NWWDA)**	
NWWDA	**National Wood Window and Door Association** **1400 East Touhy Avenue, #G54** **Des Plaines, IL 60018**	**(708) 299-5200**
PCA	**Portland Cement Association** **5420 Old Orchard Road** **Skokie, IL 60077**	**(708) 966-6200**

PCI	**Precast/Prestressed Concrete Institute** **175 West Jackson Blvd.** **Chicago, IL 60604**	**(312) 786-0300**
PDI	**Plumbing and Drainage Institute** **c/o Sol Baker** **1106 West 77th Street, South Drive** **Indianapolis, IN 46260**	**(317) 251-6970**
PEI	**Porcelain Enamel Institute** **1101 Connecticut Avenue, NW, Suite 700** **Washington, DC 20036**	**(202) 857-1134**
RFCI	**Resilient Floor Covering Institute** **966 Hungerford Drive, Suite 12-B** **Rockville, MD 20805**	**(301) 340-8580**
RIS	**Redwood Inspection Service** **405 Enfrente Drive, Suite 200** **Novato, CA 94949**	**(415) 382-0662**
RMA	**Rubber Manufacturers Association** **1400 K Street, NW** **Washington DC 20005**	**(202) 682-4800**
SDI	**Steel Deck Institute** **P.O. Box 9506** **Canton, OH 44711**	**(216) 493-7886**
S.D.I.	**Steel Door Institute** **30200 Detroit Road** **Cleveland, OH 44145**	**(216) 889-0010**
SGCC	**Safety Glazing Certification Council** **c/o ETL Testing Laboratories** **Route 11, Industrial Park** **Cortland, NY 13045**	**(607) 753-6711**
SHLMA	**Southern Hardwood Lumber Manufacturers Association** **(Now HMA)**	
SIGMA	**Sealed Insulating Glass Manufacturers Association** **401 North Michigan Avenue** **Chicago, IL 60611**	**(312) 644-6610**
SMA	**Screen Manufacturers Association** **3950 Lake Shore Drive, Suite 502-A** **Chicago, IL 60613-3431**	**(312) 525-2644**
SMACNA	**Sheet Metal and Air Conditioning** **Contractors National Association** **4201 Lafayette Center Drive** **Chantilly, VA 22021**	**(703) 803-2980**

SPIB	**Southern Pine Inspection Bureau** **4709 Scenic Highway** **Pensacola, FL 32504**	**(904) 434-2611**
SPRI	**Single Ply Roofing Institute** **20 Walnut Street** **Wellesley Hills, MA 02189**	**(617) 237-7879**
SSPC	**Steel Structures Painting Council** **4400 Fifth Avenue** **Pittsburgh, PA 15213-2683**	**(412) 268-3327**
SSPMA	**Sump and Sewage Pump Manufacturers Association** **P.O. Box 298** **Winnetka, IL 60093**	**(708) 835-8911**
SWI	**Steel Window Institute** **c/o Thomas Associates, Inc.** **1300 Sumner Ave,** **Cleveland, OH 44115-2851**	**(216) 241-7333**
SWPA	**Submersible Wastewater Pump Association** **600 South Federal Street, Suite 400** **Chicago, IL 60605**	**(312) 922-6222**
TIMA	**Thermal Insulation Manufacturers Association** **29 Bank Street** **Stamford, CT 06901** **(Standards now issued by NAIMA)**	**(203) 324-7533**
TPI	**Truss Plate Institute** **583 D'Onofrio Drive, Suite 200** **Madison, WI 53719**	**(608) 833-5900**
UFAC	**Upholstered Furniture Action Council** **Box 2436** **High Point, NC 27261**	**(919) 885-5065**
UL	**Underwriters Laboratories, Inc.** **333 Pfingsten Road** **Northbrook, IL 60062**	**(708) 272-8800**
USP	**U.S. Pharmacopoeial Convention** **12601 Twinbrook Parkway** **Rockville, MD 20852**	**(301) 881-0666**
WCLIB	**West Coast Lumber Inspection Bureau** **P.O. Box 23145** **Portland, OR 97223**	**(503) 639-0651**

WCMA	**Wallcovering Manufacturers Association** **355 Lexington Avenue, 17th Floor** **New York, NY 10017** **(WCMA has moved from this location, perhaps to the Chicago area. Address and telephone number not confirmed.)**	**(212) 661-4261**
WIC	**Woodwork Institute of California** **P.O. Box 11428** **Fresno, CA 93773-1428**	**(209) 233-9035**
WRI	**Wire Reinforcement Institute** **1101 Connecticut Avenue NW, Suite 700** **Washington, DC 20036-4303**	**(202) 429-5125**
WSC	**Water Systems Council** **600 South Federal Street, Suite 400** **Chicago, IL 60605**	**(312) 922-6222**
WSFI	**Wood and Synthetic Flooring Institute** **4415 West Harrison Street, Suite 242-C** **Hillside, IL 60162**	**(708) 449-2933**
WLPDIA	**Western Lath, Plaster, Drywall Industries Association** **(Formerly California Lath & Plaster Association)** **8635 Navajo Road** **San Diego, CA 92119**	**(619) 466-9070**
WWPA	**Western Wood Products Association** **Yeon Building** **522 SW 5th Avenue** **Portland, OR 97204-2122**	**(503) 224-3930**
W.W.P.A.	**Woven Wire Products Association** **2515 North Nordica Avenue** **Chicago, IL 60635**	**(312) 637-1359**

G. Federal Government Agencies: Names and titles of federal government standard or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

CE	**Corps of Engineers** **(U.S. Department of the Army)** **Chief of Engineers – Referral** **Washington, DC 20314**	**(202) 272-0660**
CFR	**Code of Federal Regulations** **(Available from the Government Printing Office)** **North Capitol Street between G and H Streets, NW** **Washington, DC 20402**	

(Material is usually first published in the "Federal Register")
(202) 783-3238

CPSC	**Consumer Product Safety Commission** **5401 Westbard Avenue** **Bethesda, MD 20207**	**(301) 492-6580** **(800) 638-2772**
CS	**Commercial Standard** **(U.S. Department of Commerce)** **Washington, DC 20230**	**(202) 482-2000**
DOC	**U.S. Department of Commerce** **14th Street and Constitution Avenue, NW** **Washington, DC 20230**	**(202) 482-2000**
DOT	**Department of Transportation** **400 Seventh Street, SW** **Washington, DC 20590**	**(202) 366-4000**
EPA	**Environmental Protection Agency** **401 M Street, SW** **Washington, DC 20460**	**(202) 382-2090**
FAA	**Federal Aviation Administration** **(U.S. Department of Transportation)** **800 Independence Avenue, SW** **Washington, DC 20590**	**(202) 366-4000**
FCC	**Federal Communications Commission** **1919 M Street, NW** **Washington, DC 20554**	**(202) 632-7000**
FHA	**Federal Housing Administration** **(U.S. Department of Housing and Urban Development)** **Director, Manufactured Housing and Construction Standards Division** **451 Seventh Street, SW, Room 9158** **Washington, DC 20201**	**(202) 755-5210**
FS	**Federal Specification (from GSA)** **Specifications Unit (WFSIS)** **7th and D Streets, SW** **Washington, DC 20407**	**(202) 708-9205**
GSA	**General Services Administration** **F and 18th Streets, NW** **Washington, DC 20405**	**(202) 708-5082**
MIL	**Military Standardization Documents** **(U.S. Department of Defense)** **Naval Publications and Forms Center** **5801 Tabor Avenue**	

	Philadelphia, PA 19120	
NIST	**National Institute of Standards and Technology** **(U.S. Department of Commerce)** **Gaithersburg, MD 20899**	**(301) 975-2000**
OSHA	**Occupational Safety and Health Administration** **(U.S. Department of Labor)** **N3647** **200 Constitution Avenue, NW** **Washington, DC 20210**	**(202) 219-8148**
PS	**Product Standard of NBS** **(U.S. Department of Commerce)** **Washington, DC 20230**	**(202) 482-2000**
REA	**Rural Electrification Administration** **(U.S. Department of Agriculture)** **14th Street and Independence Avenue, SW** **Washington, DC 20250**	**(202) 447-2791**
USDA	**U.S. Department of Agriculture** **14th Street and Independence Avenue, SW** **Washington, DC 20250**	**(202) 447-2791**
USPS	**U.S. Postal Service** **475 L'Enfant Plaza, SW** **Washington, DC 20260-0010**	**(202) 268-2000**

1.05 GOVERNING REGULATIONS AND AUTHORITIES

A. Copies of Regulations: Obtain copies of governing regulations and retain them at the Project site to be available for reference by parties who have a reasonable need, if requested by the Architect.

1.06 SUBMITTALS

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

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security, and protection.

B. Temporary construction and support facilities required include, but are not limited to:
   1. Waste disposal services.
   2. Temporary yard and storage on and off-site.
   3. Construction aids and miscellaneous services and facilities.
   4. Sweeping compound.
   5. Emergency portable generators of size required if permanent power is temporarily unavailable.
   6. Water service and distribution if water supply to adjacent occupied spaces is temporarily unavailable.
   7. Parking

C. Security and protection facilities required include, but are not limited to:
   1. Temporary weather protection, enclosures, and covers.
   2. Temporary fire protection and fire watch if required by Worcester Fire Department.
   3. Barricades, warning signs, lights.
   4. Temporary partitions between occupied areas and construction areas, STC 48 or better.

D. Where a distinction is made in this specification section between temporary services to be provided by a General Contractor and those to be provided by a Subcontractor, the purpose is only to clarify which costs are to be included by the applicable parties for inclusion in the applicable bids and contracts that would follow. These distinctions have no bearing upon the Contract between the Owner and General Contractor and do not limit in any way the General Contractor's responsibility to provide all such temporary services without additional cost to the Owner. For the sake of clarity in this specification section, the term General Contractor has been used for the person called the Contractor in other specification sections, when the intent is that that person shall provide a service directly at his own expense rather than at the expense of one of the Subcontractors from whom the Owner has taken filed sub-bids.

E. The temporary services described in this specification section may not be adequate to provide for all the needs of the General Contractor or all Subcontractors but are intended only to provide a basis for obtaining filed sub-bids. The General Contractor or any Subcontractor requiring additional temporary services for the proper execution of his work or because of climatic conditions shall arrange for and obtain such services at his own expense without further compensation by the Owner.

F. The Contractor shall be responsible for restoring all landscaped areas affected by the work of this project to their original "like-new" state that existed prior to work commencing. This restoration work shall include, but not be limited to, planting beds with mulch, trees, shrubs, and lawn areas. Great care should be taken during the work not to damage nor destroy any landscaping impacted by this work. Any landscaping disturbed, damaged, or destroyed shall be restored, repaired, or replaced in-kind at no cost to the Owner.

G. Rubbish Removal

1. The General Contractor shall remove and dispose daily of all waste and debris caused by the Work of this Contract and legally dispose off-site to avoid large accumulations of construction and demolition waste.
2. The General Contractor shall provide dumpsters and waste barrels at designated drop off areas within the construction site.
3. Burning or on-site disposal of waste and debris are not allowed.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:

1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
2. Section 26 00 00 – Electrical
3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 SUBMITTALS

A. Schedule: Submit a schedule indicating implementation and termination of each temporary utility within fifteen (15) days of the date established for Commencement of the Work.

1.05 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Commonwealth of Massachusetts State Building Code requirements; 6th Edition.
2. Federal, State and City Health and safety regulations.
3. Utility company regulations.
4. Police, Fire Department and Rescue Squad rules.
5. Environmental protection regulations.

B. Standards: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
   1. NFPA Code 241.
   2. NFPA 70.
   3. ANSI A10.
   4. NECA NJG-6.

C. Electric Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.

D. Inspections: Arrange for authorities having jurisdiction to inspect and test temporary utilities prior to use. Obtain required certifications and permits.

1.06 PROJECT CONDITIONS

A. Temporary Utilities: At the earliest feasible time, when acceptable to the Owner, change from use of temporary service to use of permanent service.

B. Conditions of Use: Maintain temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload temporary facilities or permit them to interfere with progress. Do not allow hazardous, dangerous, unsanitary conditions, or public nuisances to develop or persist on the site.

C. Always maintain the continuity of all utility services across all Phases of the Construction Project, unless otherwise directed by the Architect or Owner.

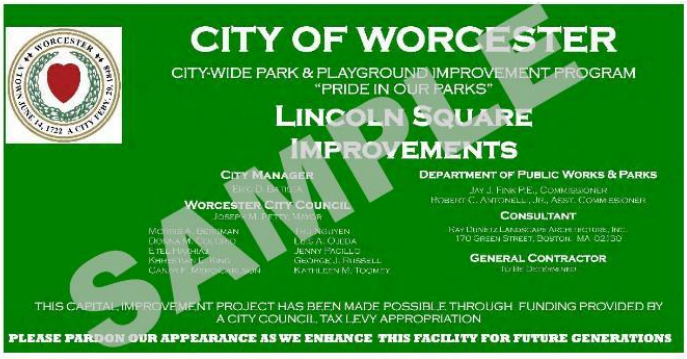
1.07 PROJECT CONSTRUCTION SIGN

A. The Contractor will provide and temporarily install one monolithic 48” high x 96” wide x 3/4” thick Project sign and 2- 4”x 4” posts to identify the Project at a location to be determined in the field by the Owner.

B. The Project sign shall conform exactly to the City of Worcester’s DPW and Parks, Parks, Recreation and Cemetery Division’s prototype Projects sign including but not limited to size, backer material, font style, size and relief, capitalization, color, weather proofing, fasteners and fastener locations.

C. **Final Graphic and language will be provided by the Owner** (Background color is forest green, text is white). **The sample below is for reference only**.

D. The Contractor shall be responsible for installation and removal of signs and posts.



PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide new materials suitable for the use intended, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY WATER

A. Definitions:
   1. Water Access Point: A point, within the Project area, at which water is available during construction.

B. Charges: The General Contractor shall pay for all facilities to provide water during construction, while the Owner will supply and pay for water during the construction. The General Contractors shall pay for backflow preventer if utilizing Owners Hydrant for water.
   1. The furnishing of water by the Owner shall be conditional upon all contractors being conservative and prudent in its use. In the event of any contractor is repeatedly wasteful in the use of water thus provided, the Owner reserves the right to charge the General Contractor for wasteful usage at an equitable rate for the additional portion of water used.

C. Temporary Water: The General Contractor shall be responsible for all facilities to provide water during construction as defined above and further specified as follows:
   1. Except under unusual circumstances, when otherwise specified or approved by the Architect, all water shall be of potable quality.
   2. The General Contractor shall provide all necessary piping, valving, hose bibbs, hosing, etc. to provide temporary water during construction from a water access point determined by the Owner's Representative. Any facilities running within the building are required not to leak. Any damage incurred due to leaks shall be repaired at the expense of the General Contractor.
   3. The General Contractor shall pay for and be responsible for the protection of Temporary Water, which he installs, from freezing and other damage.

2.03 TEMPORARY SANITARY FACILTIES

A. The General Contractor shall provide ample toilet facilities with proper enclosures for the use of workmen employed on the work to be as located within the construction areas on site were permitted by the Architect.
   1. Provide the Architect with a schedule of maintenance and cleaning. Provide toilet facilities with hand washing sanitizer dispenser, paper towels, and cleaners.
   2. Toilet facilities shall be installed and maintained in conformity with the governing laws and building code. They shall be properly lit, ventilated, and always kept clean.
   3. At no time shall any Contractor Personnel use toilet facilities outside the work areas or in any Owner-occupied parts of the building.

2.10 TEMPORARY BRACING, SHORING, SHEETING, AND TIE-DOWNS

A. The General Contractor shall take all precautions to protect the Work against collapse or other damage by earth or construction loads, high winds, snow and rain loads, damage by adverse weather conditions or geological disturbances, or other cause, by temporary bracing shoring, sheeting, guying, lacing, covering, weighting, and other reasonable and prudent means.

2.11 TEMPORARY FENCING, BARRIERS, AND PARTITIONS

A. Protection: The General Contractor shall be fully responsible for the security of the work areas of the site and for patrolling and protecting the work under construction and his and the Owner's materials stored or otherwise located on the site.

B. Temporary Barricading: In addition, the General Contractor shall provide other temporary fencing, barricading, and overhead protection of substantial nature to protect workmen, other personnel, and the public against various hazards and attendant nuisances that come about as the work progresses such as, but not necessarily limited to, falling materials, dangerous excavations, dangerous projections, or obstructions, stored or stockpiled materials, etc. Comply fully with recommendations of the Association of General Contractors and provisions of the governing laws and codes.

Note: As part of requirement for overhead protection, include substantial, well-constructed, walkways cover sufficient to assure pedestrian safety, in accordance with recommendations of the Association of General Contractors and provisions of the governing laws and codes.

C. In addition, the General Contractor shall provide all necessary protective barriers within the existing building as required to assure the safety of persons and property wherever work on this Contract is being carried out. Include substantial, well-constructed, protective barriers at all construction work-limit-lines separating Contract work areas from areas occupied by the Owner. Also include flameproof dust-curtaining and block or filter mechanical return air systems in a safe manner, in cooperation with Mechanical trade, between areas where dust effusive work is being carried out and other interior areas of the new addition and existing building to prevent passage of dirt and dust. Barriers, curtaining, etc., must be self-supporting, and must not depend on building construction for primary structure or anchorage. Locations and quantities of barriers and dust curtaining shall always be subject to Owner's and Architect's approval, but such approval, or lack of inspection or approval, by the Owner or the Architect, shall not be construed as relieving the Contractor of any of his responsibilities under the Contract.

2.12 TEMPORARY STORAGE FACILITIES

A. Space for storage of materials shall be confined to the construction areas outside the building and as designated and/or approved by the Architect.

B. Locations where construction equipment may be stored during non-working hours shall be as acceptable to the Owner. Construction equipment shall not present a hazard when stored.

2.13 NOISE, DUST, AND POLLUTION CONTROL

A. All work performed under the Contract shall conform to the requirements of Chapter III, Section 31C and Section 142D of the General Laws, Commonwealth of Massachusetts and Rules and Regulations adopted thereto by the Commonwealth of Massachusetts, Department of Public Health, and the requirements of local noise, dust, and pollution control laws, ordinances, and regulative agencies applicable to the work.

B. The General Contractor shall provide temporary partitions to prevent noise, dust, pollution or order from entering occupied spaces. Temporary partitions shall have STC of 50. Submit location plan and type of construction for temporary partitions for approval.

C. Control of air borne dust or pollution from the site with spray or as otherwise may be necessary to prevent the migration of any dust or pollutants.

D. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, or pollution.
2. Vacuum equipment shall be equipped with HEPA filters.
3. Vacuum carpeted areas.
4. Wet mop floors to eliminate trackable dirt.
5. Sweeping shall be allowed only with the use of a non-oil based sweeping compound followed by vacuuming any remaining residue.
6. Wipe down walls and doors of demolition enclosure.

E. Disposal: Remove and transport debris, in a manner that will prevent spillage on adjacent surfaces and areas, to the construction dumpster(s).

F. Cleaning: Clean areas adjacent to the work area of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

2.14 WATER CONTROL

A. The General Contractor shall be responsible for site drainage and snow removal within the limit-of-work lines and shall maintain such drainage and removal during the life of the Contract in a manner approved by the Owner and Architect, and so as not to adversely affect the adjacent areas.

B. Water from the Work of this Project shall be disposed of in such a manner as not to be a threat to public health nor cause damage to public or private property. It shall not be disposed of over surfaces of roads, walks, and streets, nor be permitted to cause any interference with the normal use of the same.

C. Removal of snow and ice from within the limit-of-work lines at the site as required to maintain the continual progress of the work, including that required to keep work areas, access roads, and storage areas clear, free, and in use, and as required to prevent damage to existing construction and new work in places.

2.15 CONSTRUCTION CLEANING AND CONSTRUCTION DUMPSTERS

A. The General Contractor shall provide and pay for temporary dumpster type trash containers outside the building for use by all Subcontractors, and shall have the containers replaced, hauled away, and the contents legally disposed of at sufficient intervals to always maintain them in sufficiently empty condition that they are ready to receive trash and debris.

B. All construction dumpsters shall be in the parking lot within the construction staging area and were permitted by the Owner.

C. Each Contractor on the project shall be responsible for removing their own trash and debris from the building to the construction dumpster(s).

D. Waste materials and rubbish, which might otherwise raise dust, shall be sprinkled during handling and loading to minimize this effect. Debris shall be carried out of the structure in containers or dropped in fully enclosed chutes and shall not be passed through, or thrown from, windows or other wall openings, and in no case shall the debris or trash be permitted to drop freely from the openings.

E. The Work Areas shall be inspected daily and all debris, waste, rubbish, etc. shall be removed and placed in a dumpster.

F. All waste materials and rubbish shall be disposed of legally, off site.

2.16 WATCHMEN, FLAGMEN, AND POLICE DETAILS

A. The General Contractor shall provide the services of flagmen, traffic directors, and police details as necessary and as required by authorities having jurisdiction. Please refer to Section 01010 – Summary of Work for additional information regarding the police details and the appropriate pay rates.

2.17 PARKING

A. Parking will be permitted on site or as directed by the owner.

PART 3 - EXECUTION

3.01 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition, until removal. Protect from damage. If damage occurs, repair it immediately upon discovery. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour per day basis.

C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended. Clean and renovate permanent facilities that have been used during construction period, including:

1. Replace air filters and clean inside of ductwork and housings.
2. Replace worn parts.
3. Replace lamps.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

B. Reference Standards and Definitions: Refer to Section 014200 “References” for the applicability of industry standards to products specified.

C. The Contractor’s Construction Schedule and the Submittal Schedule are specified under Section 013300 “Submittals Procedures”.

D. Administration procedures for handling requests for substitutions made after award of the Contract are specified under Section 012500 “Substitution Procedures”.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:

1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
2. Section 26 00 00 – Electrical
3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories", and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material", "equipment", "system", and terms of similar intent.

a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.

2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational parts, whether motorized or manually operated, that require service connections, such as wiring or piping.

1.05 SUBMITTALS

A. Product List: Prepare a schedule in tabular form showing each product listed. Include the manufacturer's name and proprietary product names for each item listed.
   1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.
   2. Form: Prepare product list with information on each item tabulated under the following column headings:
      a. Related Specification Section number.
      b. Generic name used in Contract Documents.
      c. Proprietary name, model number, and similar designations.
      d. Manufacturer's name and address.
      e. Supplier's name and address.
      f. Installer's name and address.
      g. Projected delivery date or time span of delivery period.
      h. Specific Product “Material Safety Data Sheet” reference.
   3. Submittal: Within twenty (20) days after the date of commencement of the Work, submit four (4) copies of an initial product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.
      a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.
   4. Architect's Action: The Architect will respond in writing to Contractor. No response constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. The Architect's response will include the following:
      a. A list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.06 MATERIAL SAFETY DATA SHEETS MANUAL

A. Within ten (10) days after submission of Product List Schedule and before materials may be delivered to jobsite, submit one (1) or more 8 ½ x 11 paper size three (3) ring binder with the Product List Schedule and Material Safety Data Sheet for each product. Using the Product List Schedule as table of contents arrange Materials Safety Data Sheets in table of contents order.

B. Submit one (1) copy of materials Safety Data Sheet Manual to Clerk of the Works and Architect.
   1. Provide one (1) copy of Material Safety Data Sheets for insertion in Manual for products listed on additional Product List Schedules.

C. This requirement is in addition to any obligation the Contractor has to maintain Material Safety Data Sheets at job site or elsewhere.

1.07 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
   1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.08 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
   1. Schedule delivery to minimize long-term storage at the site.
   2. Coordinate delivery with installation time.
   3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
   5. Store products at the site in a manner that will facilitate inspection.
   6. Store and maintain products within acceptable environmental ranges and conditions required by manufacturer’s instructions.

1.09 WORK CONDITIONS / SEQUENCE

A. If sub-contractors find that conditions are not appropriate for them to begin the work of their trade or if they are directed to perform their work out of sequence by the General Contractor or if the General Contractor directs sub-contractors to start and continue regardless of job conditions, the sub-contractor shall so notify the Architect in writing by certified mail immediately.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.

B. Product Selection Procedures: Product Selection is governed by the Contract Documents and governing regulations; not by previous project experience. Procedures governing product selection include the following:

1. Where products or manufacturers are specified by name, accompanied by the term "or equal" or "or approved equal", comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
2. Non-proprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, they do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. General overall performance of a Product is implied where the product is specified for a specific application.
    a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
5. Compliance with Standards, Codes, and Regulations: Where the Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
    a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for non-compliance with specified requirements.
7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 01 74 00

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer’s standard warranties on products and special warranties.
   1. Refer to the General Conditions for terms of the Contractor's special warranty on workmanship and materials.

B. General Closeout requirements and procedures are included in Section 017000 “Project Closeout”.
   1. Specific requirements for warranties on products and installations specified to be warranted are included in the individual Sections of Divisions 2 through 16.
   2. Certifications and other commitments and agreements for continuing services to the Owner are specified elsewhere in the Contract Documents.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

D. Separate Prime Contracts: Each prime contractor is responsible for warranties related to its own contract.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:
   1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
   2. Section 26 00 00 – Electrical
   3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
   4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
   5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 DEFINITIONS

A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.05 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove, and replace construction that has been damaged because of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation, as determined by the Architect.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace, or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with the requirements of the Contract Documents.

E. The Owner reserves the right to refuse to accept the Work for the Project where a special warranty, certification or similar commitment on the Work or part of the Work is required, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.06 SUBMITTALS

A. Submit written warranties to the Architect bound in the Project Closeout Manual as described in Section 017700 – Closeout Procedures. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within ten (10) days of completion of that designated portion of the Work.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier, or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties, submit a draft to the Architect, for approval prior to final execution.

C. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor and subcontractor, supplier, or manufacturer. Submit a draft to the Architect for approval prior to final execution.

1. Refer to individual Sections of Divisions 2 through 16 for specific content requirements and particular requirements for submitting special warranties.

PART 2 – PRODUCTS NOT USED

PART 3 - EXECUTION

3.01 WARRANTIES

A. Schedule: Provide warranties on products and installations as specified in the appropriate Sections of the Specification.

1. When products, equipment, or materials fail and/or continue to be a repetitive source of problems, with no satisfactory resolution (e.g. HVAC Equipment) during the warranty period, the Owner reserves the right to extend the period of the initial warranty period. If no satisfactory resolution can be reached during this resolution period, then the Owner reserves the right to demand for the full replacement of the item in question, including all associated work required to execute this replacement at no cost to the Owner.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections are hereby made a part of this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
   1. Inspection procedures.
   2. Contractor's monetized punch list.
   3. Project Record Document Submittal.
   4. Project Closeout Manual Submittal.
   5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:
   1. DIVISION 01 – GENERAL REQUIREMENTS; including all Sections contained therein.
   2. Section 26 00 00 – Electrical
   3. DIVISION 31 – EARTHWORK; including all Sections contained therein.
   4. DIVISION 32 – EXTERIOR IMPROVEMENTS; including all Sections contained therein.
   5. DIVISION 33 – UTILITIES; including all Sections contained therein.

1.04 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request for which the architect shall review and/or approve.
   1. The contractor shall prepare and submit a monetized punch list. No exceptions will be considered.
   2. In the Application for Payment that coincides with, or first allows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
      a. If 100 percent completion cannot be shown, the contractor shall provide his monetized punch list including, but not limited to, the following:

1) A list of incomplete items.
2) The value of each incomplete item.
3) A Reason each item is not complete.

3. Advise the Owner of pending insurance changeover requirements.
4. Submit application for reduction of retainage.
5. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents, as further described below.
6. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
7. Submit record drawings, maintenance manuals, damage or settlement surveys, and similar final record information, as further described below.
8. Deliver tools, spare parts, extra stock, and similar items.
9. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
10. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
11. Complete final cleanup requirements, including touch-up painting.
12. Touch-up and otherwise repair and restore, marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.05 FINAL ACCEPTANCE

A. Preliminary procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed, and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
4. Submit consent to surety of final payment.
5. Submit a final liquidated damages settlement statement.
6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, the re-inspection will be repeated.

1.06 RECORD DOCUMENTS

A. General: Maintain a complete set of Record Documents at the site. Do not use Record Documents for construction purposes. Provide access to Record Documents for Architect and Owner's reference. Generally, without limitation, Record Documents shall include the following:

1. Record Drawings: Maintain a clean set of Contract Drawings and shop drawings, updated weekly to show actual installation. Give particular attention to concealed items.
2. Record Project Manual: Maintain a clean Project Manual, including Addenda, Change Orders, Architect Field Orders, and other modifications, updated weekly to show changes in actual work performed. Give particular attention to substitutions, selection of options, and similar information.
3. Record Product Data: Maintain one copy of each approved Product Data submittal, updated weekly to show changes from products delivered, work performed, and from manufacturer's recommended installation instructions.
4. Record Samples: Maintain one copy of each approved Sample submitted.
5. Record Field Test Reports: Maintain one copy of each Field Test Report.
6. Daily Progress Reports: Maintain one copy of each Daily Progress Report.

B. Maintenance of Documents and Samples: Store documents and samples in Contractor's field office apart from documents used for construction. Provide files and racks for document storage. Provide locked cabinet or secure storage space for storage of samples. File documents and samples in accordance with CSI format. Maintain documents in clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes. Always make documents and samples available for inspection by Architect.

C. Recording: Label each document "PROJECT RECORD" in neat large, printed letters. Record all information concurrently with the progress of construction. Do not conceal any work until required information is recorded.

D. Drawings: Legibly update all Drawings to record actual construction, including the following:

1. Field changes of dimension and detail.
2. Changes made by Field Order or Change Order.
3. Details not in original Contract Documents.

E. Specifications and Addenda: Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.
2. Changes made by Field Order or by Change Order.

F. Submittal: At Contract Closeout, deliver Record Documents to Architect. Accompany submittal with transmittal letter in duplicate, indicating the date, Project title and number, Contractor's name and address, title and number of Record Document, and signature of Contractor or his authorized representative.

1.07 PROJECT CLOSEOUT MANUAL

A. General: Prepare and submit Project Closeout Manual as specified in this Section and as approved by the Architect for format. Organize data into suitable sets, bound and indexed using the specification's Table of Contents as a guide. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Contact Persons' Names
2. Telephone Numbers
3. Pager or Beeper Numbers
4. Cellular Phone Numbers
5. Description of each warranty item covered.
6. Instructions Describing Protocol for Requesting Warranty Service.
7. Emergency Numbers – 911, Fire, Rescue, Police.
8. Utility Company Contacts.

B. Instruct Owner's personnel in use and layout of manual.

C. Format of Data: Prepare data in form of user's guide-type manual for use by Owner's personnel. Format shall be 8-1/2 in. x 11 in., 20-pound minimum, white, typed pages. Text shall be printed or neatly typewritten. Drawings shall be bound with text, with reinforced punched binder tabs. Fold larger drawings to the size of text pages. Provide flyleaf for each separate section. Provide typed descriptions of each product and piece of major equipment. Provide indexed tabs to divide sections. Provide reference in each section to other binders for actual Operating and Maintenance Data. Coordinate Project Closeout Manual with Operating and Maintenance Data.

1. Binders: Provide commercial quality three-ring binders with durable and cleanable plastic covers, with maximum ring size of three (3) inches. Only use one (1) binder for this manual.
2. Binder Cover: Identify each volume with typed or printed title "PROJECT CLOSEOUT MANUAL". List title of Project, identity of separate structure as applicable, and identity of general subject matter covered in the manual.

D. Submittal of Project Closeout Manual: Submit two copies of preliminary draft of proposed formats and outlines of contents prior to start of Work.

1. The Architect will review the draft and return one copy with comments.
2. Submit one copy of complete data in final form 15 days prior to final inspection or acceptance. Copy will be returned after final inspection or acceptance, with comments.
3. Submit three copies of approved data in final form ten days after final inspection or acceptance.

1.08 OPERATING AND MAINTENANCE DATA

A. General: Prepare and submit Operating and Maintenance Data as specified in this Section and referenced in other pertinent Sections of Specifications. Organize Operating and Maintenance Data into suitable sets, bound and indexed. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Inspection procedures.

B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

C. Preparation of data shall be done by personnel trained and experienced in maintenance and operation of described products.

D. Format of Data: Prepare data in form of instructional manual for use by Owner's personnel. Format shall be 8-1/2 in. x 11 in., 20-pound minimum, white, typed pages. Text shall be manufacturer's printed data, or neatly typewritten. Drawings shall be bound with text, with reinforced punched binder tabs. Fold larger drawings to the size of text pages. Provide flyleaf for each separate product or each piece of operating equipment. Provide typed description of product and major component parts of equipment. Provide indexed tabs.

1. Binders: Provide commercial quality three-ring binders with durable and cleanable plastic covers, with maximum ring size of two (2) inches. When multiple binders are used, correlate the data into related consistent groupings.
2. Binder Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List title of Project, identity of separate structure as applicable, and identity of general subject matter covered in the manual.

E. Content of Manual: Neatly typewritten table of contents for each volume, arranged in systematic order, indicating Contractor name and address, and a list of each product, indexed to content of the volume. Provide a separate list with each product, name, address, and telephone number of subcontractor or installer, and local source of supply for parts and replacement.

1. Provide in each volume a copy of each warranty, bond, and service contract issued.

F. Submittal of Maintenance and Operating Manual: Submit two copies of preliminary draft of proposed formats and outlines of contents prior to start of Work.

1. The Architect will review the draft and return one copy with comments.
2. Submit one copy of complete data in final form 15 days prior to final inspection or acceptance. Copy will be returned after final inspection or acceptance, with comments.
3. Submit three copies of approved data in final form ten days after final inspection or acceptance.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction.

1. Review contents of manual with personnel in full detail to explain all aspects of operation and maintenance.

1.10 WARRANTIES AND BONDS

A. General: Assemble warranties, bonds, and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors into the Project Closeout Manual.

B. Refer to Section 01 74 00 – Warranties and Bonds for additional requirements.

1.11 FINAL CLEANING

A. General: General cleaning during construction operations is specified as Work of Section 01 50 00 – Temporary Facilities & Controls.

B. Employ experienced workers or professional cleaners for Final Cleaning. Clean each surface to the condition expected in a normal building cleaning and maintenance program. Comply with manufacturer's instructions and recommendations.

PART 2 – PRODUCTS

2.01 CLEANING MATERIALS

A. General: Provide cleaning materials that will not create hazards to health or property and will not damage surfaces or finishes.

B. Use cleaning materials and methods recommended by the manufacturer of surface to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

2.02 FINAL CLEANING

A. Employ skilled workers for final cleaning.

B. Clean and restore general work areas and adjoining surfaces and other work soiled or damaged during installation; replace work damaged beyond successful restoration. Where performance of subsequent work could result in damage to complete unit or element, provide protective covering and other provisions to minimize potential for damage.

C. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

D. Special Cleaning for Windows: New glass installed as part of this project shall be thoroughly cleaned inside and out by professional window cleaners at the conclusion of all other work and prior substantial completion. All damaged, broken, or scratched items shall be replaced without costs to Owner, as described under the appropriate Trade Section(s).

E. Complete the following cleaning operations prior to requesting inspection for Certification of Substantial Completion:

1. Concrete and masonry shall be cleaned free of all foreign matter. If, in the opinion of the Architect, further cleaning of specific areas is required they shall be scrubbed with water or other cleaning agents. Acid cleaners shall not be used, except as may otherwise specifically be permitted in the trade sections.

2. Metal surfaces, hardware, fixtures, appliances, equipment, and similar items shall be cleaned free of all foreign matter and, if necessary, shall be lightly scrubbed at specific stains with clean water, mild soap, and soft rags, thoroughly rinsed and wiped with clean, soft white rags. Abrasive cleaners shall not be used.
3. Architectural woodwork shall be thoroughly dusted and cleaned of all stains, spots, etc., using methods and cleaning agents, which will not damage the various finishes.
4. Ceramic tile, porcelain, and other surfaces with integral finishes, shall be washed with clean water, mild soap, and soft rags, thoroughly rinsed, and then wiped with clean, soft white rags. Abrasive cleaners shall not be used.
5. Resilient flooring shall be given final cleaning and buffing.
6. Carpeting shall be vacuum cleaned and shall have all spots and stains removed.
7. Painted surfaces shall be cleaned free of all foreign matter, and if necessary, shall be lightly scrubbed at specific stains with clean water, mild soap, and soft rags, thoroughly rinsed, and wiped with clean, soft white rags.
8. All advertising matter and temporary instructional material shall be removed from exposed surfaces throughout.
9. Remove labels that are not permanent.
10. Clean interior and exterior finishes to a clean, dust-free condition. Remove stains, films, and similar foreign substances.
11. Vacuum and mop hard floor surfaces.
12. Clean plumbing fixtures to a sanitary condition.
13. Clean site areas of rubbish, litter, and other foreign substances.
14. Sweep paved areas broom clean, rake ground surfaces clean.

F. Before final completion and Owner-occupancy, inspect sight-exposed interior and exterior surfaces and work areas to verify that Work is clean.

END OF SECTION

SECTION 02 61 00.13

HANDLING AND DISPOSAL OF EXCAVATED MATERIALS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

A. The Work of this Section consists of all labor, equipment, materials, and services for handling, characterizing/sampling, segregating, reusing, tracking, transporting, and off-site recycling and/or disposing of excavated material generated during the course of the Work.

B. The Engineer collected soil samples to pre-characterize and facilitate acceptance of surplus excavated materials by off-site reuse, recycling and/or disposal facilities. The Contractor shall profile surplus excavated materials based on the pre-characterization results provided as attachment to these specifications. The Engineer will provide soil acceptance request letters and appropriate back-up information for the Contractor's use in obtaining acceptance for excavated materials prior to commencing with the excavation work. As described herein, the Contractor is required to supplement the precharacterization as needed to expedite readiness to haul and dispose.

C. Excavated materials not approved by the OWNER for backfilling because of physical or chemical characteristics shall be disposed of as specified herein.

1.02 RELATED WORK:

A. Section 31 25 00, EROSION AND SEDIMENTATION CONTROLS

B. Section 31 20 00, EARTH MOVING

1.03 SUBMITTALS:

A. The Contractor shall submit to the Engineer for review, an Excavated Materials Management Plan (EMMP), which includes at a minimum the information required by Paragraph 1.03.B of this Section, no more than 14 days after issuance of the Notice to Proceed.

B. The Contractor's EMMP shall include the following:

1. Plans outlining the proposed procedures and sequence for the excavation of materials to be reused on-site and disposed/recycled off-site, procedures used to track excavated materials to be transported off-site and a proposed implementation schedule.

2. All pertinent information relating to the transport of excavated material, at a minimum, shall include:

a. Name and address of all transporters.

b. Transporter identification number (USEPA or Massachusetts Department of Transportation Transporter) and expiration date.

c. Proof of permit, license, or authorization to transport excavated material, when applicable, in all affected states.

d. Dust control measures.

3. The Contractor shall identify appropriate reuse sites and/or disposal/recycling facilities that will accept each category of excavated material identified in Paragraph 3.04 of this Section. The Contractor shall submit names of a minimum two (2) sites or facilities for each category. Disposal/recycling facilities listed in the EPA Superfund Program will not be accepted for this Work. For each facility, the Contractor shall submit the following information:

   a. General Information:

      1) Facility Name
      2) Facility Address
      3) Name of Contact Person
      4) Title of Contact Person
      5) Telephone Number of Contact Person
      6) Permit Number

   b. The facility shall specify the volume of material that can be accepted from the site on a weekly and a total basis.

   c. The facility shall provide written confirmation that they are permitted to accept and will accept the excavated material and/or accumulated sediment of the general quality and quantity described by these Specifications.

   d. The facility shall provide a listing of all current and valid permits, licenses, letters of approval, and other authorizations to operate that they hold, pertaining to the receipt and management of the soils or materials specified in this Contract.

   e. The Contractor shall submit a complete list of the reuse sites and disposal/recycling facility's permitted allowable contaminant levels and physical characteristic requirements for contaminated material, and list any required regulatory approvals for individual waste streams.

   f. After the Contractor obtains approval for off-site reuse and/or disposal/recycling of surplus excavated materials, the Contractor shall submit to the Engineer, approvals or letters of intent and facility information for each facility proposed, prior to transporting material off-site.

4. The Contractor shall include procedures for decontamination of vehicles and equipment in the EMMP.

5. The Contractor shall include procedures for the monitoring and control of dust in the EMMP.

6. Submit a site specific Health and Safety Plan (HASP). Contractor shall prepare HASP that addresses all of the expected physical and chemical hazards likely to be encountered during the work of this Section.

7. Contractor shall provide to the Engineer copies of all weight slips, both tare and gross, for every load weighed and disposed of at the disposal or recycling facilities. The Owner will only allow progress payments after receipt of these weight slips.

1.04 REFERENCES:

A. Massachusetts Department of Environmental Protection (DEP) Policy Number(s):

1. WSC-94-400, Interim Remediation Waste Management Policy for Petroleum Contaminated Soils.
2. WSC-94-320, Construction Activities in Contaminated Areas.
3. COMM-97-001, Reuse and Disposal of Contaminated Soils at Massachusetts Landfills.
4. WSC-13-500, Similar Soils Provision Guidance

B. Massachusetts Contingency Plan (MCP), 310 CMR 40.0000.

C. Toxic Substances Control Act (TSCA), 40 CFR 761.00.

D. Massachusetts Hazardous Waste Regulations, 310 CMR 30.000 and the Resource Conservation Recovery Act (RCRA), 40 CFR 148 and 268.

E. All other applicable Federal, State, and local regulations.

1.05 DEFINITIONS:

A. Excavated Material: All soil, sediment, sewer grit, and miscellaneous materials and/or debris excavated from within the limit of work.

B. Suspected Contaminated Material: Excavated material with any of the following characteristics: significant petroleum and/or chemical odor; an oily sheen; and/or material with staining or significant change of color.

1.06 PERMIT REQUIREMENTS:

A. The Contractor shall obtain all Federal, State, and local permits required for the transport and disposal of excavated material. The Contractor shall adhere to all permit requirements.

B. The Contractor shall document that their proposed offsite receiving facilities have all current

certifications and permits as required by Federal, State, and local regulatory agencies to receive and dispose/recycle/reuse of the excavated material.

1.07 EXISTING CONDITIONS:

A. The Contractor shall note that the work in this Section includes handling soil containing semi-volatile organic compounds (SVOCs), metals, total petroleum hydrocarbons (TPH), and herbicides and pesticides.

B. In June and October 2024, the Engineer performed environmental subsurface investigations to pre-characterize two (2) on-site soil stockpiles and surplus excavated materials to be generated during construction activities. A summary of the environmental testing results is appended to these specifications. The Contractor shall profile excavated materials based on the pre-characterization data. Additional testing to meet off-site receiving facility acceptance criteria is the Contractor's responsibility.

1.08 QUALITY CONTROL:

A. The Contractor shall engage the services of an Environmental Consultant prior to and during the course of the Work. The responsibilities and requirements of the Contractor's Consultant shall include, but not be limited to, the following:

1. Staff of the Contractor's Environmental Consultant shall have completed the 40-hour OSHA health and safety training course, with 8-hour OSHA refresher training, as needed to maintain continual certification.

2. Evaluation of existing analytical data to identify suitable off-site reuse, recycling and disposal facilities for surplus excavated materials generated during the work.

3. Ensure compliance with all references listed in Paragraph 1.04 of this Section.

4. Ensure the work conforms to local, State and Federal regulatory agencies governing the handling of contaminated and hazardous materials.

5. Ensure that best management practices take place while performing the work described in this Section.

6. Develop and implement site-specific emergency response and health and safety protocols and procedures.

7. Notify the Engineer at least three working days in advance of the schedule for off- site disposal/recycling and coordinate handling, transport, and off-site disposal of Excavated Materials in accordance with state and federal regulations.

8. Keep records, including daily logs, of all waste streams, weights, stockpiles, and excavated materials for the purposes of tracking points of origin for excavated materials.

9. Develop and implement dust control measures, which will adequately protect workers

and resident in the nearby community and prevent off-site migration of dust.

PART 2 – PRODUCTS

2.01 GENERAL:

A. All the Contractor's personnel and Sub-Contractors shall wear personal protective equipment and protective clothing consistent with the levels of protection for this Work.

B. Containers and truck beds used by the Contractor for storing and/or hauling the excavated material shall be constructed of steel, in good condition and designed for the intended purpose of safe, secure storage of contaminated and hazardous materials during loading and transport. The containers shall have a secure cover that will prevent a release of material from trucks during transportation. The containers and covers shall be provided at no additional cost to the Owner and shall be approved by the Engineer prior to mobilization of any trucks/containers. The containers must be approved by and labeled in accordance with the U.S Department of Transportation (DOT). The containers shall be sift proof and water resistant in accordance with the DOT.

2.02 CONTAINERS:

A. Containers used for storing surplus excavated soil (i.e. roll-off containers), if required, and hauling contaminated material shall be constructed of steel, in good condition and designed for the intended purpose of safe, secure storage of contaminated material during loading and transport to an approved facility. The containers shall have a secure cover, which will prevent a release of material from truck during transportation. The containers must be approved by and labeled in accordance with the U.S Department of Transportation (DOT). The containers shall be sift proof and water resistant in accordance with the DOT regulations.

PART 3 – EXECUTION

3.01 GENERAL:

A. Soil within the work zone has been pre-characterized for the Contractor's use profiling and obtaining acceptance for surplus excavated materials to be transported off-site. The Contractor shall select an appropriate off-site facility based on the 2024 pre-characterization data provided and the excavated material categories listed in Paragraph 3.04. The Engineer will provide a signed Opinion Letter along with all required facility acceptance forms and shipping documents for the Contractor's use in securing acceptance letters for the material after approving the Contractor's intended disposal facilities identified in the EMMP.

B. The Contractor shall maximize the reuse of all excavated materials on-site as backfill. The excavated materials shall be reused as backfill in the general area where they were generated.

C. The Owner will be the generator of all excavated materials removed from the site and will sign all Material Shipping Records and Massachusetts Bills of Lading. The Contractor shall be the generator of material contaminated as a result of the Contractor or Sub-Contractors

release of oil/hazardous materials on the site caused by them.

D. The Owner shall have final approval over all reuse/disposal/recycling options based on the analytical data.

E. The Contractor shall immediately notify the Engineer of suspected contaminated materials with visible stains or unnatural odor, or if other potentially contaminated and/or hazardous material is encountered. The Contractor shall excavate and manage areas of suspected contaminated and/or hazardous material as required by the Engineer.

F. If an Imminent Hazard, Potential Imminent Hazard, or any other condition requiring an Immediate Response Action as defined in the Massachusetts Contingency Plan 310 CMR 40.0000 is encountered, activities shall be suspended and the Engineer notified immediately.

3.02 DISPOSAL CHARACTERIZATION SAMPLING – GENERAL:

A. Pre-characterization sampling soil data and the associated laboratory reports are provided as an attachment to these specifications. No additional samples shall be collected without approval by the Engineer.

B. If necessary, the Contractor shall perform any additional sampling and characterizing of excavated materials for the purpose of obtaining approvals from reuse/disposal/recycling facilities. No additional sampling or analysis shall be performed in lieu of profiling excavated materials using the pre-characterization data collected by Engineer, only where supplementing the existing data set is required to obtain approval by off-site receiving facilities.

C. The Owner may conduct additional sampling upon excavation of the work site. The Engineer may stop the Contractor's work in a particular location at any time in order to have samples taken and analyzed. If necessary, the Contractor shall assist the Engineer in collecting samples. The work shall not resume in that area until required by the Engineer. Stoppage of work for this reason, or until laboratory results are delivered to the Engineer, shall not be a cause for the Contractor to request additional compensation or an extension of time to the Contract or to other intermediate Contract deadlines.

3.03 HANDLING AND TEMPORARY STOCKPILING OF EXCAVATED MATERIALS:

A. Excavated contaminated soil shall be stockpiled on-site, in an area approved by the Owner and Engineer, and managed to protect public health, safety and the environment, in accordance with state and local requirements.

B. Stockpiled material must be removed and reused/disposed/recycled off-site as soon as possible and in all cases within two (2) weeks from the day of its initial excavation.

C. The Contractor shall manage temporary stockpiles to prevent the cross-contamination of excavated materials between different excavated materials categories, and to prevent cross-contamination between the stockpiles and underlying materials.

D. Temporary stockpiles shall not exceed 250 cubic yards.

E. Temporary stockpiles shall be clearly and securely barricaded from contact by workers and the general public.

F. All excavated material shall be placed entirely on 10-mil (minimum) NRPE or 20-mil (minimum) polyethylene sheeting, as indicated in Paragraph 2.02 of this Section, and shall be covered at the end of each day's work with the same material to minimize the infiltration of precipitation and erosion of the stockpile. Any cover material used shall be properly secured and possess the necessary physical strength to resist tearing by the wind and other elements.

G. The Contractor shall prevent run-off and erosion of temporary stockpiles by placing hay bales, silt fence, or other appropriate erosion and sedimentation controls around each temporary stockpile location.

H. Any failure of materials or procedures used in employing the base layer or cover layer shall be immediately repaired, replaced or re-secured so as to minimize precipitation infiltration, dust, and erosion/runoff of the excavated material.

I. Contractor shall segregate materials of different excavated materials categories as defined by this Section. Cross contamination of excavated material of differing soil categories for off-site disposal is prohibited. Disposal of material that is contaminated as a result of careless handling or use of unauthorized procedures shall be disposed of off-site at the Contractor's expense. Delays of Work resulting from temporary storage of excavated material shall be at no additional cost to the Owner.

J. The Contractor shall handle excavated material that minimizes the creation of visible dust. Contractor shall manage dust control according to the requirements of Section 31 20 00.

3.04 EXCAVATED MATERIAL CATEGORIES:

A. Excavated materials shall be categorized and managed as described in Paragraphs 3.02 and 3.03 of this Section. The Contractor shall transport the material for off-site disposal or treatment at a DEP-approved landfill or facility based on the following categories and the pre-characterization analytical data appended to these specifications.

B. Group A – Excavated material which excavated materials with contaminant concentrations less than (<) MCP Reportable Concentrations, category S-1 (RCS-1), that meet the acceptance criteria for in-state soil reclamation project or similar soils reuse facilities with a written Soil Management Plan (SMP) and approved Administrative Consent Order (ACO) from MassDEP.

C. Group B – Excavated material which meets DEP criteria for disposal at in-state landfills, to be used as daily cover, intermediate cover, and pre-cap contouring material. The material must not exceed the contaminant levels listed in DEP Policy #COMM-97-001. Alternatively, receiving facilities for this category of excavated materials included licensed asphalt recycling facility or meets the criteria for thermal treatment at a thermal treatment processing facility.

D. Group C – Excavated material with contaminant concentrations that do not meet acceptance

for an in-state lined or unlined landfill, thermal treatment or recycling facility (i.e., Group A), requiring disposal at an out-of-state, non-hazardous landfill or licensed thermal desorption/recycling facility.

E. Contaminated material shipped to a Group A, B, or C disposal facility must meet the selected facility's chemical and physical acceptance criteria. Selected facilities must be established, fully operational, appropriately insured, and be operating in compliance with all applicable local, state, and federal regulations.

F. The existing soil stockpiles will be managed as Group B materials based on the pre-characterization data provided.

G. Subsurface soil generated from proposed parking lot improvements will be managed according to the excavation cells provided in pre-characterization summary attached to these specifications. Subsurface soil includes both Group B and Group C materials.

3.05 WEIGHT AND MEASUREMENT:

A. The Contractor shall provide certified tare and gross weight slips for each load received at the accepted facility and these shall be attached to each returned hazardous waste manifests, Massachusetts Bill of Ladings or Material Shipping Records within 21 days of obtaining all final signatures from a representative of the reuse/disposal/recycling facility, the Contractor (transporter), Engineer (if applicable), and the Owner.

B. Measurement for payment will be based on the actual weight in tons of material excavated and disposed of as measured at the receiving facility.

3.06 WASTE PROFILES AND MANIFESTS:

A. The Contractor shall submit to the Engineer for review all waste profile applications and questionnaires, and coordinate with disposal facilities and all Federal and State Environmental Agencies.

B. The Owner will be designated as generator and will sign all manifests and waste profile application or questionnaires.

C. The Contractor shall submit to the Engineer, prior to receiving progress payment, documentation certifying that all materials were transported to, accepted, and disposed of, at the selected disposal facility(ies). The documentation shall include the following, as a minimum:

1. Documentation shall be provided for each load from the site to the disposal facility, including all manifests and any other transfer documentation as applicable.

3.07 TRANSPORT OF EXCAVATED MATERIAL:

A. The Contractor shall not be permitted to transport excavated materials off-site until all applicable disposal or recycling facility documentation has been received, reviewed, and

approved by the Engineer. The Contractor shall transport the excavated material under a Material Shipping Record and Massachusetts Bill of Lading and the requirements of this Section.

B. The Contractor shall take all precautions and any actions necessary, at no additional cost to the Owner, to prevent cross-contamination from transport vehicles to areas outside the Limit of Work.

C. The Contractor shall transport excavated materials from the site to the storage, disposal, reuse of recycling facility or off-site reuse location in accordance with all United States Department of Transportation (DOT), USEPA, DEP, and applicable state and local regulations.

D. The Hauler(s) shall be licensed in all states affected by transport.

E. The Contractor shall be responsible for ensuring that free liquid is properly transported. “Wet soils” shall not be loaded for transport. The Contractor shall dewater “wet soils”, and properly dispose of free liquid in accordance with local, State, and Federal regulations and at no additional cost to the Owner. The Contractor shall also dispose of any free liquids that may result during transportation in accordance with local, State, and Federal regulations and at no additional cost to the Owner.

F. Transporters shall submit proof of permit, license, or authorization to transport excavated material, when applicable, in all affected states.

3.08 REUSE, RECYCLING AND DISPOSAL:

A. Groups A, B, and C excavated material shall be reused, recycled or disposed of at an approved facility as specified in this Section and in accordance with all Federal, State and Local regulations.

END OF SECTION

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

1 November 2024

Mr. David Turcotte
Mount Vernon Group Architects, Inc.
178 Albion Street, Suite 240
Wakefield, Massachusetts 01880
dtrucotte@mvgarchitects.com

Re: **Precharacterization Data Transmittal**
Roosevelt School Parking Lot Improvement Project
1006 Grafton Road, Worcester, Massachusetts

Dear Mr. Turcotte:

This letter summarizes the results of precharacterization testing for the above-referenced project (the Project). The goal of sampling was to characterize excess soil to be generated during construction activities at the City of Worcester's Roosevelt School property at 1006 Grafton Road (the Site). Soil testing was also performed to further evaluate soil conditions within an on-Site soil stockpile that was tested during our recent Phase II Environmental Site Assessment (ESA). Figure 1 illustrates our sampling locations.

1.0 BACKGROUND

The Project includes the construction of a new paved parking lot and driveway along with stormwater and related infrastructure improvements. The limits of work consist of a portion of the Roosevelt School property presently occupied by a paved parking lot as well as three adjacent, City-owned parcels (Lots 6, 7, and 8). These parcels were formerly owned by a landscaping company and are mostly undeveloped, except for a gravel/unpaved entrance road that extends between the current school parking lot and Sunderland Road. The parcels contain two small soil stockpiles.

Between May and August 2024, Weston & Sampson conducted a Phase II ESA to investigate potential contamination associated with the former landscaping company's use of Lots 6, 7, and 8. The Phase II findings revealed that the soil stockpiles consisted mostly of fine to coarse sand and gravel that was largely free of debris except for occasional brick, concrete, and solid waste spread across the surface of the piles. Subsurface soil conditions were similar and consisted of fine to coarse silty sand with some gravel and cobbles. Laboratory sampling results of the stockpiles and subsurface soil identified no compounds above the Massachusetts Contingency Plan (MCP) Reportable Concentrations (RCS-1), except for an arsenic concentration in one sample (TP-1) from Stockpile-1 that slightly exceeded the MCP RCS-1 standard. The Phase II sampling results are summarized in Tables 1 and 2.

2.0 SAMPLING & ANALYSIS

In October 2024, Weston & Sampson conducted supplemental soil testing to further characterize Stockpile-1 along with excavated materials expected to be generated during the planned parking lot improvements. The supplemental soil testing locations are shown in Figure 1.

2.1 Stockpile Testing

On October 4, 2024, Weston & Sampson performed additional soil sampling of Stockpile-1. The sampling involved dividing the pile into three sections and collecting 6-to-9-point composite soil samples (DISP-1 through DISP-3) from each section for disposal characterization analysis according to the Massachusetts Department of Environmental Protection (MassDEP) COMM-97 policy with MCP-14 metals, herbicides, and pesticides. Additionally, four grab samples (S-1 through S-4) were collected for arsenic analysis to further evaluate the nature and extent of the arsenic detected at TP-1 during the Phase II ESA. Soil samples were submitted to ESS Laboratory in Cranston, Rhode Island. Copies of the laboratory data reports are provided in Attachment A.

Soil conditions encountered during the supplemental stockpile sampling were consistent with previous observations. The soil consisted of mostly fine to coarse loamy sand and gravel with occasional debris (plastic, concrete, brick, Styrofoam, and wood). No visual or olfactory evidence of contamination was observed. As shown in Table 1, the disposal characterization sampling results contained select metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), herbicides, and pesticides at concentrations less than the MCP RCS-1 standards. The four grab samples collected around TP-1 contained arsenic concentrations between 11.9 mg/kg and 20 mg/kg.

2.2 Soil Disposal Pre-Characterization

On October 11, 2024, Weston & Sampson oversaw the completion of three (3) soil borings (SB-101, SB-102 and SB-103) to evaluate subsurface soil conditions and collect samples for disposal characterization analysis. The borings were completed near the proposed subsurface infiltration system and other Project improvements up to 10 feet below grade using hydraulic-push (Geoprobe®) drilling techniques with continuous soil sampling. The boring locations are shown on Figure 1.

In general, soil conditions encountered at each boring included fine to coarse silty sand with some gravel, cobbles and occasional debris (wood, concrete, and brick). At one soil boring, SB-101, evidence of anthropogenic fill was also observed between approximately 1 and 4 feet below grade. The fill layer exhibited characteristics consistent with historic fill, including small amounts of brick, concrete and the presence of ash, coal, and combustion byproducts. No visual or olfactory evidence of contamination was encountered at any of the soil borings, and field screening results determined by photoionization detector (PID) were less than 2.7 parts per million by volume (ppmv).

Weston & Sampson collected one subsurface soil sample from each soil boring to precharacterize excavated materials within the Project area. The subsurface soil characterization results are summarized in Table 2. Soil analytical results for the October 2024 subsurface sampling event are similar to June 2024 Phase II ESA results. Detected compounds included select metals, PAHs, petroleum hydrocarbons, and pesticides. Where detected, the concentrations were less than the MCP RCS-1 standards, except for arsenic and lead at SB-101. The detection of metals in this location coincides with evidence of historic fill, extent of which is localized based on a series hand dug test pits (HA-1 through HA-5) completed on October 30, 2024.

3.0 DATA EVALUATION

Soil conditions within the Project area were evaluated through the completion of test pits, soil borings, and the sampling and analysis of subsurface and stockpiled soil samples. The soil stockpiling results indicate that both the northern and southern stockpiles contain arsenic at concentrations ranging from 11.9 mg/kg to 20.9 mg/kg. The source of the arsenic is believed to be naturally occurring, which is commonly encountered in the City and surrounding areas. This conclusion is supported by the following lines of evidence:

- No previously documented oil or hazardous material (OHM) releases have been identified at the Site. While the origin of the stockpiles is unknown, a Phase I ESA conducted in May 2024 found no evidence of the importing and dumping excavated materials by the former owner. Instead, the stockpiles appear to have originated from past clearing activities and the construction of the gravel access road in this part of the Site. This is supported by aerial photographs and observations during our sampling activities. Soil conditions within the stockpiles are generally consistent with shallow subsurface soils encountered across the rest of the Site, and sampling results from stockpiled and subsurface soil samples were also generally consistent.

The subsurface soil sampling results indicate that, except at SB-101, soil contains low concentrations of various compounds that do not exceed the MCP RCS-1 standards. The source of the arsenic and lead at SB-101 is believed to be the presence of Historic Fill, as defined in the MCP at 310 CMR 40.0006. The conclusion is supported by the following lines of evidence:

- Historical aerial photographs and topographic maps suggest there has been limited use of Lots 6, 7, and 8. Historical records indicate this portion of the was formerly contained residential buildings as early as

1938. These buildings were demolished by 1960, after which the area was overgrown until clearing and construction of the access road sometime between 1995 and 2006.

- Soil boring logs clearly indicate that the fill is predominantly soil and is buried below layers of vegetated topsoil. At SB-101, the fill is also underlain by native coarse sand and silt, which was encountered at other locations in this portion of the Site.
- In addition to arsenic and lead, soil samples at SB-101 identified various concentrations of other MCP-14 metals, select PAHs, and petroleum hydrocarbons. The compounds identified are consistent with pervasive uses in developed area, including wood and coal burning stoves or furnaces and motor vehicle emissions.
- The concentrations of metals detected were consistent with metals concentrations typically associated with pervasive use in developed areas according to MassDEP's *Historic Fill/Anthropogenic Background Draft Technical Update* (24 May 2016) and/or MassDEP's *Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil Technical Update* (23 May 2002).
- Based on our review of historical records, the Site had no known operations associated with the compounds detected nor are there records or evidence of former use of the area as a burn dump, waste lagoon, or landfill.

Based on the evaluation described above, the detection of arsenic in the northern stockpile and arsenic and lead coinciding with the presence of Historic Fill are exempt from notification under the MCP. The presence of naturally occurring arsenic is exempt according to the MCP, 310 CMR 40.3017(22); while the detection of arsenic and lead attributed to Historic Fill containing coal, coal ash, and wood ash is exempt from notification under 310 CMR 40.0317(9).

4.0 SOIL MANAGEMENT REQUIREMENTS

Although Site conditions do not represent a MCP notification condition, removal of the existing stockpiles and management of surplus excavated materials during the Project requires appropriate handling and disposal. Based on the concentrations detected, excavated materials meet the requirements for disposal at an in-state, non-hazardous landfill or recycling facility, except for the fill materials encountered around SB-101. Fill materials from this area (See Attachment B) will require out-of-state disposal at a non-hazardous waste landfill or other licensed recycling facility. Specifications outlining the requirements for handling and disposal of excavated materials are attached (Attachment C).

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Todd M. Bridgeo, PE, LSP
Team Leader

Attachments
Figure 1 - Sampling Locations Plan
Table 1 – Soil Stockpile Analtyical Results
Table 2 – Subsurface Soil Analytical Results
Attachment A – Laboratory Data Reports
Attachment B – Stockpile and Subsurface Precharacterization Plans
Attachment C – Soil Management Specifications

TABLE 1
SOIL SOCKPILE ANALYTICAL RESULTS

ROOSEVELT SCHOOL
WORCESTER, MASSACHUSETTS

Parameter	Units	MCP Reportable Concentration (RCS-1)	COMM-97 Reuse Levels		TCLP Toxicity Threshold	Northern Stockpile											Southern Stockpile		
			Lined Landfill	Unlined Landfill		TP-1	S-1	S-2	S-3	S-4	DISP-1	TP-2	DISP-2	TP-3	DISP-3	Comp-1 (Composite of TP 1, 2, 3)	TP-5	TP-6	Comp-2 (Composite of TP-5, 6)
						0-6 ft	0-2 ft	0-2 ft	0-2 ft	0-2 ft	0-2 ft	0-5 ft	0-2 ft	0-5 ft	0-2 ft	0-5 ft	0-6 ft	0-4 ft	0-6 ft
						6/27/24	10/4/24	10/4/24	10/4/24	10/4/24	10/4/24	6/27/24	10/4/24	6/27/24	10/4/24	6/27/24	6/28/24	6/28/24	6/28/24
Total Metals																			
Antimony	mg/kg	20	--	--	--	-	-	-	-	-	<5.89	-	<5.34	-	<5.12	-	-	-	-
Arsenic	mg/kg	20	40	40	--	**20.9**	**18.3**	**20.0**	**11.9**	**18.5**	**16.0**	**16.6**	**19.6**	**19.1**	**19.7**	-	**19.9**	**13.1**	-
Barium	mg/kg	1,000	--	--	--	**41**	-	-	-	-	**63.9**	**67.3**	**45.5**	**54.4**	**36.2**	-	**56.8**	**48.3**	-
Beryllium	mg/kg	100	--	--	--	-	-	-	-	-	**0.49**	-	**0.39**	-	**0.32**	-	-	-	-
Cadmium	mg/kg	80	80	30	--	<0.55	-	-	-	-	<0.59	<0.66	<0.53	<0.68	<0.51	-	<0.49	<0.50	-
Chromium	mg/kg	100	1,000	1,000	--	**20.8**	-	-	-	-	**21.1**	**23.1**	**19.8**	**24.9**	**14.9**	-	**23.8**	**19.1**	-
Lead	mg/kg	200	2,000	1,000	--	**67.2**	-	-	-	-	**139**	**106**	**77.7**	**79.8**	**40.7**	-	**84.3**	**25**	-
Mercury	mg/kg	20	10	10	--	**0.062**	-	-	-	-	**0.169**	**0.123**	**0.141**	**0.11**	**0.063**	-	**0.14**	**0.043**	-
Nickel	mg/kg	700	--	--	--	-	-	-	-	-	**14.4**	-	**13.7**	-	**13.2**	-	-	-	-
Selenium	mg/kg	400	--	--	--	<5.53	-	-	-	-	<5.89	<6.64	<5.34	<6.81	<5.12	-	<4.89	<2.02	-
Silver	mg/kg	100	--	--	--	<0.55	-	-	-	-	<0.59	<0.66	<0.53	<0.68	<0.51	-	<0.70	<0.56	-
Thallium	mg/kg	8	--	--	--	-	-	-	-	-	<5.89	-	<5.34	-	<5.12	-	-	-	-
Vanadium	mg/kg	500	--	--	--	-	-	-	-	-	**23.1**	-	**18.8**	-	**17.3**	-	-	-	-
Zinc	mg/kg	1,000	--	--	--	-	-	-	-	-	**90.7**	-	**72**	-	**61.2**	-	-	-	-
TCLP Metals																			
TCLP Lead	mg/L	--	--	--	5	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
VPH Volatile Petroleum Hydrocarbon																			
C5-C8 Aliphatics	mg/kg	100	--	--	--	<15.8	-	-	-	-	-	<17.1	-	<18.7	-	-	<17.2	<13	-
C9-C10 Aromatics	mg/kg	100	--	--	--	<15.1	-	-	-	-	-	<16.4	-	<17.9	-	-	<16.5	<12.4	-
C9-C12 Aliphatics	mg/kg	1,000	--	--	--	<31.4	-	-	-	-	-	<34	-	<37.1	-	-	<34.3	<25.8	-
Total VOCs	mg/kg	--	10	4	--	ND	-	-	-	-	-	ND	-	ND	-	-	ND	ND	-
Volatile Organic Compounds (VOCs) Low Level																			
Total VOCs	mg/kg	--	10	4	--	-	-	-	-	-	ND	-	ND	-	ND	ND	-	-	ND
EPH Extractable Petroleum Hydrocarbons and Semi-Volatile Organic Compounds (SVOCs)																			
C9-C18 Aliphatics	mg/kg	1,000	--	--	--	<20.4	-	-	-	-	-	<20.2	-	<21.3	-	-	<22.5	<19.4	-
C11-C22 Aromatics	mg/kg	1,000	--	--	--	<20.4	-	-	-	-	-	**22.7**	-	<21.3	-	-	<22.5	<19.4	-
C19-C36 Aliphatics	mg/kg	3,000	--	--	--	<20.4	-	-	-	-	-	<20.2	-	<21.3	-	-	<22.5	<19.4	-
Benzo(a)anthracene	mg/kg	20	--	--	--	<0.54	-	-	-	-	<0.305	<0.54	<0.288	<0.57	**0.326**	**0.416**	<0.60	**0.52**	**0.767**
Benzo(a)pyrene	mg/kg	2	--	--	--	<0.54	-	-	-	-	**0.347**	**0.59**	**0.294**	<0.57	**0.321**	**0.442**	<0.60	**0.67**	**0.819**
Benzo(b)fluoranthene	mg/kg	20	--	--	--	<0.54	-	-	-	-	**0.378**	<0.54	**0.317**	<0.57	<0.291	**0.479**	<0.60	**0.64**	**0.864**
Benzo(g,h,i)perylene	mg/kg	1,000	--	--	--	<0.54	-	-	-	-	<0.305	<0.54	<0.288	<0.57	<0.291	**0.374**	<0.60	<0.52	**0.538**
Benzo(k)fluoranthene	mg/kg	200	--	--	--	<0.54	-	-	-	-	**0.322**	<0.54	<0.288	<0.57	**0.307**	**0.375**	<0.60	**0.53**	**0.69**
Chrysene	mg/kg	200	--	--	--	<0.54	-	-	-	-	**0.395**	**0.58**	**0.339**	<0.57	**0.387**	**0.502**	<0.60	**0.71**	**0.923**
Fluoranthene	mg/kg	1,000	--	--	--	<0.54	-	-	-	-	**0.673**	**1.12**	**0.545**	<0.57	**0.638**	**0.944**	<0.60	**1.48**	**1.79**
Indeno(1,2,3-cd)Pyrene	mg/kg	20	--	--	--	<0.54	-	-	-	-	<0.305	<0.54	<0.288	<0.57	<0.291	**0.359**	<0.60	<0.52	**0.596**
Phenanthrene	mg/kg	10	--	--	--	<0.54	-	-	-	-	<0.305	<0.54	<0.288	<0.57	**0.429**	**0.395**	<0.60	**0.59**	**0.806**
Pyrene	mg/kg	1,000	--	--	--	<0.54	-	-	-	-	**0.638**	**1.02**	**0.516**	<0.57	**0.772**	**0.777**	<0.60	**1.18**	**1.82**
Total SVOCs	mg/kg	--	100	100	--	ND	-	-	-	-	**2.753**	**3.31**	**2.011**	ND	**3.18**	**5.063**	ND	**6.320**	**9.613**
Total Petroleum Hydrocarbons (TPH)																			
TPH	mg/kg	3,000	5,000	2,500		-	-	-	-	-	**86.2**	-	**61.1**	-	**44.0**	-	-	-	-
Polychlorinated Biphenyls (PCBs)																			
Total PCBs	mg/kg	1	<2	<2	--	-	-	-	-	-	<0.06	-	<0.06	-	<0.06	<0.07	-	-	<0.06
Chlorinated Herbicides			--	--															
Dicamba	mg/kg	500	--	--	--	-	-	-	-	-	<0.011	-	<0.010	-	<0.011	<0.012	-	-	**0.405**
Organochlorine Pesticides			--	--															
4,4´-DDE	mg/kg	7	--	--	--	-	-	-	-	-	**0.0088**	-	**0.0036**	-	**0.0153**	**0.0067**	-	-	**0.006**
4,4´-DDT	mg/kg	7	--	--	--	-	-	-	-	-	**0.0159**	-	**0.0051**	-	**0.0224**	**0.0063**	-	-	**0.0057**
alpha-Chlordane	mg/kg	--	--	--	--	-	-	-	-	-	**0.0102**	-	**0.0049**	-	**0.004**	**0.0092**	-	-	**0.0113**
Chlordane (Total)	mg/kg	6	--	--	--	-	-	-	-	-	**0.046**	-	**0.0264**	-	<0.0236	**0.0575**	-	-	**0.0796**
gamma-Chlordane	mg/kg	--	--	--	--	-	-	-	-	-	**0.0077**	-	**0.0052**	-	<0.003	**0.0076**	-	-	**0.0090**
Classical Chemistry																			
Conductivity	umhos/cm	--	8,000	4,000	--	-	-	-	-	-	**90**	-	**77**	-	**76**	**185**	-	-	**138**
Corrosivity (pH)	S.U.	--	--	--	--	-	-	-	-	-	**5.91**	-	**6.25**	-	**6.18**	**7.15**	-	-	**7.27**
Flashpoint	°F	--	--	--	--	-	-	-	-	-	>200	-	>200	-	>200	>200	-	-	>200
Reactive Cyanide	mg/kg	--	--	--	--	-	-	-	-	-	<2	-	<2	-	<2	<2	-	-	<2
Reactive Sulfide	mg/kg	--	--	--	--	-	-	-	-	-	<2	-	<2	-	<2	<2	-	-	<2

NOTES:

Bold	Detected above laboratory reporting limit
Bold	Detected at or above MCP Reportable Concentration (RCS-1)
--	No applicable regulatory standard or value, or not applicable
<	Not detected above laboratory reporting limit
MCP	Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
-	Not Analyzed

1. This table provides a summary of detections-only for SVOC, PAH, pesticide and herbicide results. Complete results can be found in the laboratory data report.

TABLE 2
SUBSURFACE SOIL SAMPLING RESULTS

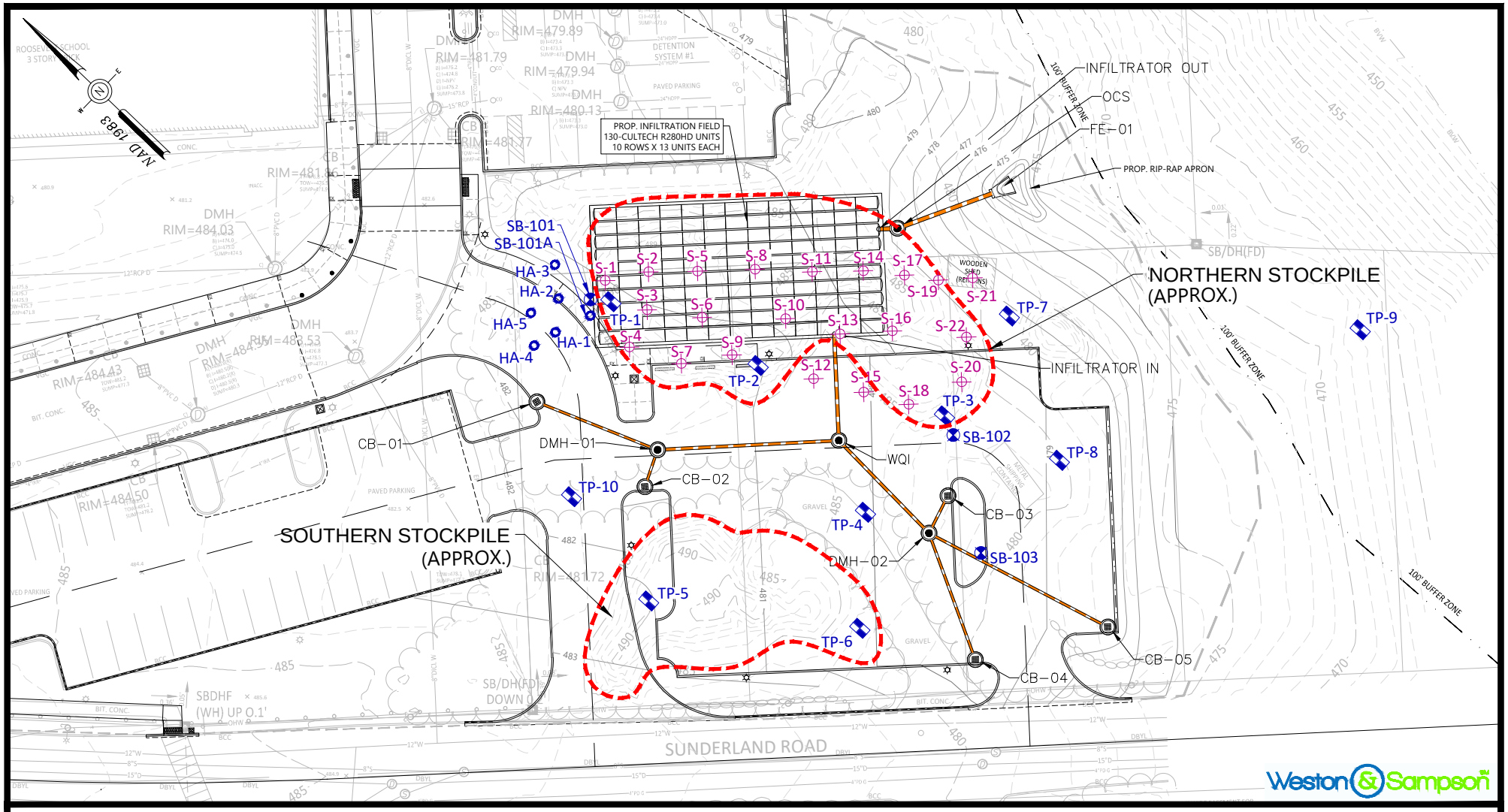
ROOSEVELT SCHOOL
WORCESTER, MASSACHUSETTS

Parameter	Units	MCP Reportable Concentration (RCS-1)	COMM-97 Reuse Levels		TCLP Toxicity Threshold	Lot Number, Location, Depth and Date						
						Lot 8		Lot 7	Lot 6			
			Lined Landfill	Unlined Landfill		TP-10 (Comp-3) 0-4.5 ft	SB-101 0-9 ft	TP-4 0-6 ft	TP-7 0-6 ft	TP-8 0-5 ft	SB-102 0-10 ft	SB-103 0-5 ft
						6/27/24	10/11/24	6/27/24	6/28/24	6/27/24	10/11/24	10/11/24
Total Metals												
Antimony	mg/kg	20	--	--	--	-	<5.5	-	-	-	<4.49	<4.65
Arsenic	mg/kg	20	40	40	--	-	**43**	**12.9**	**15.4**	**12.2**	**10.0**	**12.4**
Barium	mg/kg	1,000	--	--	--	-	**184**	**53.8**	**99.0**	**18.5**	**43.5**	**42.8**
Beryllium	mg/kg	100	--	--	--	-	**0.44**	-	-	-	**0.33**	**0.34**
Cadmium	mg/kg	80	80	30	--	-	<0.55	<0.54	<0.46	<0.52	<0.45	<0.46
Chromium	mg/kg	100	1000	1000	--	-	**23.1**	**20.0**	**15.7**	**9.71**	**22.7**	**20.8**
Lead	mg/kg	200	2000	1000	--	-	**275**	**43.2**	**99.1**	**8.79**	**25.6**	**20.5**
Mercury	mg/kg	20	10	10	--	-	**0.071**	**0.055**	**0.263**	<0.033	**0.138**	**0.059**
Nickel	mg/kg	700	--	--	--	-	**12.4**	-	-	-	**18.3**	**14.8**
Selenium	mg/kg	400	--	--	--	-	<5.5	<5.43	<4.58	<5.17	<4.49	<4.65
Silver	mg/kg	100	--	--	--	-	<0.55	<1.09	<0.6	<0.52	<0.45	<0.46
Thallium	mg/kg	8	--	--	--	-	<5.5	-	-	-	<4.49	<4.65
Vanadium	mg/kg	500	--	--	--	-	**19.5**	-	-	-	**26.6**	**22.3**
Zinc	mg/kg	1,000	--	--	--	-	**73.3**	-	-	-	**43.2**	**34.6**
TCLP Metals												
TCLP Lead	mg/L	--	--	--	5	-	**0.25**	-	-	-	-	-
MADEP-VPH Volatile Petroleum Hydrocarbon												
C5-C8 Aliphatics	mg/kg	100	--	--	--	-	-	<12.9	<11.1	<9.84	-	-
C9-C10 Aromatics	mg/kg	100	--	--	--	-	-	<12.3	<10.7	<9.41	-	-
C9-C12 Aliphatics	mg/kg	1,000	--	--	--	-	-	<25.6	<22.2	<19.6	-	-
Total VOCs	mg/kg	--	10	4	--	-	-	ND	ND	ND	-	-
Volatile Organic Compounds (VOCs) Low Level												
Total VOCs	mg/kg	--	10	4	--	ND	ND	-	-	-	ND	ND
EPH Extractable Petroleum Hydrocarbons and Semi-Volatile Organic Compounds (SVOCs)												
C9-C18 Aliphatics	mg/kg	1,000	--	--	--	-	-	<16.7	<18.5	<17.3	-	-
C11-C22 Aromatics	mg/kg	1,000	--	--	--	-	-	**33.5**	<18.5	<17.3	-	-
C19-C36 Aliphatics	mg/kg	3,000	--	--	--	-	-	<16.7	<18.5	<17.3	-	-
Acenaphthylene	mg/kg	1	--	--	--	<0.293	<0.305	**0.33**	<0.25	<0.23	<0.262	<0.245
Benzo(a)anthracene	mg/kg	20	--	--	--	<0.293	<0.305	**0.67**	<0.49	<0.46	<0.262	<0.245
Benzo(a)pyrene	mg/kg	2	--	--	--	<0.293	<0.305	**0.67**	<0.49	<0.46	<0.262	<0.245
Benzo(k)fluoranthene	mg/kg	200	--	--	--	<0.293	<0.305	**0.48**	<0.49	<0.46	<0.262	<0.245
Chrysene	mg/kg	200	--	--	--	<0.293	<0.305	**0.80**	<0.49	<0.46	<0.262	<0.245
Fluoranthene	mg/kg	1,000	--	--	--	<0.293	**0.415**	**0.97**	<0.49	<0.46	<0.262	<0.245
Phenanthrene	mg/kg	10	--	--	--	<0.293	<0.305	**0.50**	<0.49	<0.46	<0.262	<0.245
Pyrene	mg/kg	1,000	--	--	--	<0.293	**0.396**	**1.40**	<0.49	<0.46	<0.262	<0.245
Total SVOCs	mg/kg	--	100	100	--	ND	**0.811**	**5.82**	ND	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)												
TPH	mg/kg	3,000	5,000	2,500		-	**41.6**	-	-	-	**16.2**	**19.1**
Polychlorinated Biphenyls (PCBs)												
Total PCBs	mg/kg	1	<2	<2	--	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.05
Chlorinated Herbicides												
Chlorinated Herbicides	mg/kg	--	--	--	--	ND	ND	-	ND	ND	ND	ND
Organochlorine Pesticides												
4,4´-DDD	mg/kg	--	--	--	--	<0.0029	**0.0194**	-	-	-	<0.0027	<0.0025
4,4´-DDE	mg/kg	7	--	--	--	**0.0046**	**0.0047**	-	-	-	<0.0027	<0.0025
4,4´-DDT	mg/kg	7	--	--	--	**0.0047**	**0.0076**	-	-	-	<0.0027	<0.0025
alpha-Chlordane	mg/kg	--	--	--	--	**0.0045**	**0.0047**	-	-	-	<0.0027	<0.0025
Chlordane (Total)	mg/kg	6	--	--	--	**0.0282**	**0.0331**	-	-	-	<0.0216	<0.02
gamma-Chlordane	mg/kg	--	--	--	--	**0.0050**	**0.0053**	-	-	-	<0.0027	<0.0025
Classical Chemistry												
Conductivity	umhos/cm	--	8,000	4,000	--	**56**	**297**	-	-	-	**1,230**	**55**
Corrosivity (pH)	S.U.	--	--	--	--	**7.35**	**6.64**	-	-	-	**7.79**	**5.50**
Flashpoint	°F	--	--	--	--	>200	>200	-	-	-	>200	>200
Reactive Cyanide	mg/kg	--	--	--	--	<2	<2	-	-	-	<2	<2
Reactive Sulfide	mg/kg	--	--	--	--	<2	<2	-	-	-	<2	<2

NOTES:

Bold	Detected above laboratory reporting limit
Bold	Detected at or above MCP Reportable Concentration (RCS-1)
--	No applicable regulatory standard or value, or not applicable
<	Not detected above laboratory reporting limit
MCP	Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
-	Not Analyzed

1. This table provides a summary of detections-only for SVOC, PAH, pesticide and herbicide results. Complete results can be found in the laboratory data report.



LEGEND

- SOIL BORINGS
- TEST PITS
- HAND DUG TEST PITS
- STOCKPILE SAMPLES
- STOCKPILE LOCATIONS (APPROX.)

NOTES:

1. BASE MAP FROM PLAN PREPARED BY MOUNT VERNON GROUP ARCHITECTS TITLED, "GRADING & DRAINAGE PLAN 1", DATED OCTOBER 1, 2024 (DRAFT).
2. STOCKPILE DISPOSAL CHARACTERIZATION SAMPLES WERE COMPOSITED AS FOLLOWS:
   - DISP-1: S-1 THROUGH S-9
   - DISP-1: S-10 THROUGH S-16
   - DISP-1: S-17 THROUGH S-22

FIGURE 1
ROOSEVELT SCHOOL
WORCESTER, MASSACHUSETTS
SAMPLING PLAN
GRAPHIC SCALE:

0 30 60

P:\MA\Worcester MA\Roosevelt School Parking\Environmental\Phase II ESA Rpt\CAD\22269 Roosevelt-PR_11x17.dwg

Rev: 1.7 Date: 08/12/2019

ATTACHMENT A

LABORATORY DATA REPORTS

ESS Laboratory
DIVISION OF THE RISE GROUP
BAL Laboratory Analytical Balance

CERTIFICATE OF ANALYSIS

Annika Willis-Scanlon
Weston and Sampson Engineers, Inc.
5 Centennial Drive
Peabody, MA 01960

RE: Roosevelt School Phase II ESA (ENG24-0354)
ESS Laboratory Work Order Number: 24J0267

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 7:31 pm, Oct 15, 2024

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

SAMPLE RECEIPT

The following samples were received on October 07, 2024 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been performed and achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Limit Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Low Level VOA vials were frozen by client on 10/04/24 at 18:00.
Tetrahydrofuran is reported above the MA CAM reporting limit of 0.010 mg/kg.

Question I: All samples for EPH and samples 1-4 for Metals were analyzed for a subset of the required MCP list per the client's request.

Lab Number	Sample Name	Matrix	Analysis
24J0267-01	S-1	Soil	6010D
24J0267-02	S-2	Soil	6010D
24J0267-03	S-3	Soil	6010D
24J0267-04	S-4	Soil	6010D
24J0267-05	DISP-1	Soil	1010A, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A
24J0267-06	DISP-2	Soil	1010A, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A
24J0267-07	DISP-3	Soil	1010A, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

PROJECT NARRATIVE

8081B Organochlorine Pesticides

24J0267-05 **Lower value is used due to matrix interferences (LC).**
alpha-Chlordane [2C]

24J0267-05 **Percent difference between primary and confirmation results exceeds 40% (P).**
alpha-Chlordane [2C]

24J0267-06 **Lower value is used due to matrix interferences (LC).**
4,4´-DDT , alpha-Chlordane [2C]

24J0267-06 **Percent difference between primary and confirmation results exceeds 40% (P).**
4,4´-DDT , alpha-Chlordane [2C]

24J0267-07 **Lower value is used due to matrix interferences (LC).**
alpha-Chlordane [2C]

24J0267-07 **Percent difference between primary and confirmation results exceeds 40% (P).**
alpha-Chlordane [2C]

Semi-Volatile Organic Compounds

D4J0141-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (112% @ 40-160%)

D4J0141-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
2,4-Dimethylphenol (26% @ 20%), Aniline (44% @ 20%), Isophorone (21% @ 20%), Phenol-d6 (21% @ 20%)

D4J0180-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (90% @ 40-160%), Di-n-octylphthalate (121% @ 80-120%)

D4J0180-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
2,4-Dimethylphenol (33% @ 20%), Di-n-octylphthalate (21% @ 20%)

D4J0180-CCV1 **Continuing Calibration %Diff/Drift is below control limit (CD-).**
Pyridine (31% @ 20%)

Volatile Organics Low Level

24J0267-05 **Surrogate recovery(ies) above upper control limit (S+).**
1,2-Dichloroethane-d4 (137% @ 70-130%)

24J0267-07 **Surrogate recovery(ies) above upper control limit (S+).**
1,2-Dichloroethane-d4 (135% @ 70-130%)

D4J0174-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
1,2-Dibromo-3-Chloropropane (21% @ 20%), n-Butylbenzene (23% @ 20%), n-Propylbenzene (22% @ 20%)

DJ40817-BS1 **Blank Spike recovery is above upper control limit (B+).**
Isopropylbenzene (137% @ 70-130%)

DJ40817-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Bromodichloromethane (131% @ 70-130%), Isopropylbenzene (140% @ 70-130%), Xylene O (131% @ 70-130%)

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010D - ICP
6020B - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260D - VOA
8270E - SVOA
8270E SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 19-2.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

ESS Laboratory
DIVISION OF THE RISE GROUP
BAL Laboratory Analytical Balance

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **24J0267-01 through 24J0267-07**

Matrices: ( ) Ground Water/Surface Water (x) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(x) 8260 VOC CAM II A	(x) 7470/7471 Hg CAM III B	( ) MassDEP VPH (GC/PID/FID) CAM IV A	(x) 8082 PCB CAM V A	( ) 9014 Total Cyanide/PAC CAM VI A	( ) 6860 Perchlorate CAM VIII B
(x) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	( ) MassDEP VPH (GC/MS) CAM IV C	(x) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(x) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(x) MassDEP EPH CAM IV B	(x) 8151 Herbicides CAM V C	( ) Explosives CAM VIII A	( ) TO-15 VOC CAM IX B

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (x) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (x) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (x) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (x) No ( )
E	VPH, EPH, APH and TO-15 only: a. Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (x) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (x) No ( )

Responses to Questions G, H and I below are required for "'Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes ( ) No (x)*
	***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (x)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes ( ) No (x)*

****All negative responses must be addressed in an attached laboratory narrative.***

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: October 15, 2024

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: S-1
Date Sampled: 10/04/24 12:30
Percent Solids: 88

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Arsenic	**18.3** (2.59)	---	6010D	---	1	KJB	10/08/24 17:33	2.19 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: S-2
Date Sampled: 10/04/24 12:35
Percent Solids: 82

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Arsenic	**20.0** (2.76)	---	6010D	---	1	KJB	10/08/24 17:35	2.21 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: S-3
Date Sampled: 10/04/24 12:40
Percent Solids: 78

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Arsenic	**11.9** (2.63)	---	6010D	---	1	KJB	10/08/24 17:37	2.43 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: S-4
Date Sampled: 10/04/24 12:45
Percent Solids: 88

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-04
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Arsenic	**18.5** (2.34)	---	6010D	---	1	KJB	10/08/24 17:39	2.42 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (5.89)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Arsenic	**16.0** (2.94)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Barium	**63.9** (1.18)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Beryllium	**0.49** (0.12)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Cadmium	ND (0.59)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Chromium	**21.1** (1.18)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Lead	**139** (5.89)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Mercury	**0.169** (0.037)	---	7471B	---	1	AFV	10/08/24 16:19	0.64 40	DJ40806
Nickel	**14.4** (1.18)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Selenium	ND (5.89)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Silver	ND (0.59)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Thallium	ND (5.89)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Vanadium	**23.1** (1.18)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805
Zinc	**90.7** (2.94)	---	6010D	---	1	KJB	10/08/24 17:41	2.05 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 6.4g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1,1-Trichloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1,2,2-Tetrachloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1,2-Trichloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1-Dichloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1-Dichloroethene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,1-Dichloropropene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2,3-Trichlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2,3-Trichloropropane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2,4-Trichlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2,4-Trimethylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2-Dibromo-3-Chloropropane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2-Dibromoethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2-Dichlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2-Dichloroethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,2-Dichloropropane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,3,5-Trimethylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,3-Dichlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,3-Dichloropropane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,4-Dichlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
1,4-Dioxane	ND (0.0943)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
2,2-Dichloropropane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
2-Butanone	ND (0.0471)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
2-Chlorotoluene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
2-Hexanone	ND (0.0471)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
4-Chlorotoluene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
4-Isopropyltoluene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 6.4g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0471)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Acetone	ND (0.0471)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Benzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Bromobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Bromochloromethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Bromodichloromethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Bromoform	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Bromomethane	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Carbon Disulfide	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Carbon Tetrachloride	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Chlorobenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Chloroethane	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Chloroform	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Chloromethane	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
cis-1,2-Dichloroethene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
cis-1,3-Dichloropropene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Dibromochloromethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Dibromomethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Dichlorodifluoromethane	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Diethyl Ether	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Di-isopropyl ether	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Ethyl tertiary-butyl ether	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Ethylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Hexachlorobutadiene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Isopropylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Methyl tert-Butyl Ether	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Methylene Chloride	ND (0.0236)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 6.4g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
n-Butylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
n-Propylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
sec-Butylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Styrene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
tert-Butylbenzene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Tertiary-amyl methyl ether	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Tetrachloroethene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Tetrahydrofuran	ND (0.0189)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Toluene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
trans-1,2-Dichloroethene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
trans-1,3-Dichloropropene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Trichloroethene	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Trichlorofluoromethane	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Vinyl Chloride	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Xylene O	ND (0.0047)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Xylene P,M	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817
Xylenes (Total)	ND (0.0094)	---	8260D Low	---	1	MEK	10/08/24 17:42	D4J0174	DJ40817

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichloroethane-d4	*137 %*	*S+*	*70-130*
Surrogate: 4-Bromofluorobenzene	*93 %*		*70-130*
Surrogate: Dibromofluoromethane	*118 %*		*70-130*
Surrogate: Toluene-d8	*106 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.8g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.030)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
1,2,4-Trichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
1,2-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
1,3-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
1,4-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4,5-Trichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4,6-Trichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4-Dichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4-Dimethylphenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4-Dinitrophenol	ND (1.22)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,4-Dinitrotoluene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2,6-Dinitrotoluene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2-Chloronaphthalene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2-Chlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2-Methylnaphthalene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2-Methylphenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
2-Nitrophenol	ND (0.610)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
3,3′-Dichlorobenzidine	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
3+4-Methylphenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
4-Bromophenyl-phenylether	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
4-Chloroaniline	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
4-Nitrophenol	ND (1.22)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Acenaphthene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Acenaphthylene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Acetophenone	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Aniline	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Anthracene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.8g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Benzo(a)anthracene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Benzo(a)pyrene	**0.347** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Benzo(b)fluoranthene	**0.378** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Benzo(g,h,i)perylene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Benzo(k)fluoranthene	**0.322** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
bis(2-Chloroethoxy)methane	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
bis(2-Chloroethyl)ether	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
bis(2-chloroisopropyl)Ether	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
bis(2-Ethylhexyl)phthalate	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Butylbenzylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Chrysene	**0.395** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Dibenzo(a,h)Anthracene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Dibenzofuran	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Diethylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Dimethylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Di-n-butylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Di-n-octylphthalate	ND (0.610)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Fluoranthene	**0.673** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Fluorene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Hexachlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Hexachlorobutadiene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Hexachloroethane	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Indeno(1,2,3-cd)Pyrene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Isophorone	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Naphthalene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Nitrobenzene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.8g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Pentachlorophenol	ND (1.22)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Phenanthrene	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Phenol	ND (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710
Pyrene	**0.638** (0.305)	---	8270E	---	1	TJ	10/09/24 2:27	D4J0180	DJ40710

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*92 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*119 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*101 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*100 %*		*30-130*
Surrogate: 2-Fluorophenol	*100 %*		*30-130*
Surrogate: Nitrobenzene-d5	*100 %*		*30-130*
Surrogate: Phenol-d6	*100 %*		*30-130*
Surrogate: p-Terphenyl-d14	*113 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.2g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/7/24 17:46

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1221	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1232	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1242	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1248	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1254	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1260	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1262	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703
Aroclor 1268	ND (0.06)	---	8082A	---	1	10/09/24 14:22	---	DJ40703

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*70 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*78 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.4g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/7/24 17:59

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
4,4´-DDE [2C]	**0.0088** (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
4,4´-DDT [2C]	**0.0159** (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Aldrin	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
alpha-BHC	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
alpha-Chlordane [2C]	**P, LC 0.0102** (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
beta-BHC	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Chlordane (Total) [2C]	**0.0460** (0.0249)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
delta-BHC	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Dieldrin	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Endosulfan I	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Endosulfan II	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Endosulfan Sulfate	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Endrin	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Endrin Ketone	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
gamma-BHC (Lindane)	ND (0.0019)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
gamma-Chlordane	**0.0077** (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Heptachlor	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Heptachlor Epoxide	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Hexachlorobenzene	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708
Methoxychlor	ND (0.0031)	---	8081B	---	1	10/08/24 12:09	D4J0154	DJ40708

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl [2C]	*72 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*63 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 10.4g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/8/24 18:43

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.011)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
2,4-D	ND (0.055)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
2,4-DB	ND (0.055)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
Dalapon	ND (0.053)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
Dicamba	ND (0.011)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
Dichlorprop	ND (0.055)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
MCPA	ND (2.70)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835
MCPP	ND (2.73)	---	8151A	---	1	10/10/24 21:44	D4J0222	DJ40835

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*80 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83
Initial Volume: 19.3g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/7/24 17:59

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**86.2** (25.0)	---	8100M	---	2	10/08/24 18:13	---	DJ40709

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*94 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-1
Date Sampled: 10/04/24 12:30
Percent Solids: 83

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-05
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 90** (5)	---	9050A	---	1	JLK	10/08/24 20:10	umhos/cm	DJ40831
Corrosivity (pH)	**5.91** (N/A)	---	9045	---	1	CCP	10/07/24 18:48	S.U.	DJ40734
Corrosivity (pH) Sample Temp	**21.6**	---	2550B	---	1	CCP	10/07/24 18:48	°C	DJ40734
Flashpoint	**> 200** (N/A)	---	1010A	---	1	CCP	10/07/24 19:41	°F	DJ40749
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (5.34)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Arsenic	**19.6** (2.67)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Barium	**45.5** (1.07)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Beryllium	**0.39** (0.11)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Cadmium	ND (0.53)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Chromium	**19.8** (1.07)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Lead	**77.7** (5.34)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Mercury	**0.141** (0.033)	---	7471B	---	1	AFV	10/08/24 16:21	0.66 40	DJ40806
Nickel	**13.7** (1.07)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Selenium	ND (5.34)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Silver	ND (0.53)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Thallium	ND (5.34)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Vanadium	**18.8** (1.07)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805
Zinc	**72.0** (2.67)	---	6010D	---	1	KJB	10/08/24 17:43	2.06 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 4.3g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1,1-Trichloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1,2,2-Tetrachloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1,2-Trichloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1-Dichloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1-Dichloroethene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,1-Dichloropropene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2,3-Trichlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2,3-Trichloropropane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2,4-Trichlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2,4-Trimethylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2-Dibromo-3-Chloropropane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2-Dibromoethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2-Dichlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2-Dichloroethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,2-Dichloropropane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,3,5-Trimethylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,3-Dichlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,3-Dichloropropane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,4-Dichlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
1,4-Dioxane	ND (0.128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
2,2-Dichloropropane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
2-Butanone	ND (0.0640)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
2-Chlorotoluene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
2-Hexanone	ND (0.0640)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
4-Chlorotoluene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
4-Isopropyltoluene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 4.3g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0640)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Acetone	ND (0.0640)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Benzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Bromobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Bromochloromethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Bromodichloromethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Bromoform	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Bromomethane	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Carbon Disulfide	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Carbon Tetrachloride	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Chlorobenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Chloroethane	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Chloroform	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Chloromethane	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
cis-1,2-Dichloroethene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
cis-1,3-Dichloropropene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Dibromochloromethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Dibromomethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Dichlorodifluoromethane	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Diethyl Ether	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Di-isopropyl ether	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Ethyl tertiary-butyl ether	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Ethylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Hexachlorobutadiene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Isopropylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Methyl tert-Butyl Ether	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Methylene Chloride	ND (0.0320)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 4.3g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
n-Butylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
n-Propylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
sec-Butylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Styrene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
tert-Butylbenzene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Tertiary-amyl methyl ether	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Tetrachloroethene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Tetrahydrofuran	ND (0.0256)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Toluene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
trans-1,2-Dichloroethene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
trans-1,3-Dichloropropene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Trichloroethene	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Trichlorofluoromethane	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Vinyl Chloride	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Xylene O	ND (0.0064)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Xylene P,M	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817
Xylenes (Total)	ND (0.0128)	---	8260D Low	---	1	MEK	10/08/24 18:07	D4J0174	DJ40817

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichloroethane-d4	*130 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*93 %*		*70-130*
Surrogate: Dibromofluoromethane	*115 %*		*70-130*
Surrogate: Toluene-d8	*109 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 19.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.029)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
1,2,4-Trichlorobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
1,2-Dichlorobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
1,3-Dichlorobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
1,4-Dichlorobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4,5-Trichlorophenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4,6-Trichlorophenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4-Dichlorophenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4-Dimethylphenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4-Dinitrophenol	ND (1.15)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,4-Dinitrotoluene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2,6-Dinitrotoluene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2-Chloronaphthalene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2-Chlorophenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2-Methylnaphthalene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2-Methylphenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
2-Nitrophenol	ND (0.576)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
3,3´-Dichlorobenzidine	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
3+4-Methylphenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
4-Bromophenyl-phenylether	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
4-Chloroaniline	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
4-Nitrophenol	ND (1.15)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Acenaphthene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Acenaphthylene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Acetophenone	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Aniline	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Anthracene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 19.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Benzo(a)anthracene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Benzo(a)pyrene	**0.294** (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Benzo(b)fluoranthene	**0.317** (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Benzo(g,h,i)perylene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Benzo(k)fluoranthene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
bis(2-Chloroethoxy)methane	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
bis(2-Chloroethyl)ether	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
bis(2-chloroisopropyl)Ether	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
bis(2-Ethylhexyl)phthalate	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Butylbenzylphthalate	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Chrysene	**0.339** (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Dibenzo(a,h)Anthracene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Dibenzofuran	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Diethylphthalate	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Dimethylphthalate	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Di-n-butylphthalate	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Di-n-octylphthalate	ND (0.576)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Fluoranthene	**0.545** (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Fluorene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Hexachlorobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Hexachlorobutadiene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Hexachloroethane	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Indeno(1,2,3-cd)Pyrene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Isophorone	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Naphthalene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Nitrobenzene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 19.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Pentachlorophenol	ND (1.15)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Phenanthrene	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Phenol	ND (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710
Pyrene	**0.516** (0.288)	---	8270E	---	1	TJ	10/09/24 2:57	D4J0180	DJ40710

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*94 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*121 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*102 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*96 %*		*30-130*
Surrogate: 2-Fluorophenol	*101 %*		*30-130*
Surrogate: Nitrobenzene-d5	*100 %*		*30-130*
Surrogate: Phenol-d6	*101 %*		*30-130*
Surrogate: p-Terphenyl-d14	*116 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 19.8g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/7/24 17:46

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1221	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1232	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1242	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1248	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1254	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1260	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1262	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703
Aroclor 1268	ND (0.06)	---	8082A	---	1	10/09/24 14:42	---	DJ40703

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*73 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*82 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 19.4g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/7/24 17:59

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
4,4´-DDE	**0.0036** (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
4,4´-DDT	**P, LC 0.0051** (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Aldrin	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
alpha-BHC	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
alpha-Chlordane [2C]	**P, LC 0.0049** (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
beta-BHC	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Chlordane (Total)	**0.0264** (0.0227)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
delta-BHC	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Dieldrin	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Endosulfan I	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Endosulfan II	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Endosulfan Sulfate	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Endrin	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Endrin Ketone	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
gamma-BHC (Lindane)	ND (0.0017)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
gamma-Chlordane	**0.0052** (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Heptachlor	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Heptachlor Epoxide [2C]	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Hexachlorobenzene	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708
Methoxychlor	ND (0.0028)	---	8081B	---	1	10/08/24 12:37	D4J0154	DJ40708

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl [2C]	*72 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*64 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 10.1g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/8/24 18:43

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.010)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
2,4,5-TP (Silvex)	ND (0.010)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
2,4-D	ND (0.051)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
2,4-DB	ND (0.052)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
Dalapon	ND (0.050)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
Dicamba	ND (0.010)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
Dichlorprop	ND (0.051)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
MCPA	ND (2.53)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835
MCPP	ND (2.56)	---	8151A	---	1	10/10/24 22:11	D4J0222	DJ40835

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*77 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91
Initial Volume: 20.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/7/24 17:59

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**61.1** (10.9)	---	8100M	---	1	10/09/24 0:02	---	DJ40709

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*80 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-2
Date Sampled: 10/04/24 13:30
Percent Solids: 91

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-06
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 77** (5)	---	9050A	---	1	JLK	10/08/24 20:10	umhos/cm	DJ40831
Corrosivity (pH)	**6.25** (N/A)	---	9045	---	1	CCP	10/07/24 18:48	S.U.	DJ40734
Corrosivity (pH) Sample Temp	**21.5**	---	2550B	---	1	CCP	10/07/24 18:48	°C	DJ40734
Flashpoint	**> 200** (N/A)	---	1010A	---	1	CCP	10/07/24 19:41	°F	DJ40749
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (5.12)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Arsenic	**19.7** (2.56)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Barium	**36.2** (1.02)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Beryllium	**0.32** (0.10)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Cadmium	ND (0.51)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Chromium	**14.9** (1.02)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Lead	**40.7** (5.12)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Mercury	**0.063** (0.034)	---	7471B	---	1	AFV	10/08/24 16:23	0.65 40	DJ40806
Nickel	**13.2** (1.02)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Selenium	ND (5.12)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Silver	ND (0.51)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Thallium	ND (5.12)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Vanadium	**17.3** (1.02)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805
Zinc	**61.2** (2.56)	---	6010D	---	1	KJB	10/08/24 17:45	2.2 100	DJ40805

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1,1-Trichloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1,2,2-Tetrachloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1,2-Trichloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1-Dichloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,1-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2,3-Trichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2,3-Trichloropropane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2,4-Trichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2,4-Trimethylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2-Dibromo-3-Chloropropane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2-Dibromoethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2-Dichloroethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,2-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,3,5-Trimethylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,3-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,3-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,4-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
1,4-Dioxane	ND (0.101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
2,2-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
2-Butanone	ND (0.0503)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
2-Chlorotoluene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
2-Hexanone	ND (0.0503)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
4-Chlorotoluene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
4-Isopropyltoluene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0503)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Acetone	ND (0.0503)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Benzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Bromobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Bromochloromethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Bromodichloromethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Bromoform	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Bromomethane	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Carbon Disulfide	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Carbon Tetrachloride	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Chlorobenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Chloroethane	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Chloroform	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Chloromethane	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
cis-1,2-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
cis-1,3-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Dibromochloromethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Dibromomethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Dichlorodifluoromethane	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Diethyl Ether	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Di-isopropyl ether	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Ethyl tertiary-butyl ether	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Ethylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Hexachlorobutadiene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Isopropylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Methyl tert-Butyl Ether	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Methylene Chloride	ND (0.0252)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/8/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
n-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
n-Propylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
sec-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Styrene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
tert-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Tertiary-amyl methyl ether	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Tetrachloroethene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Tetrahydrofuran	ND (0.0201)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Toluene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
trans-1,2-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
trans-1,3-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Trichloroethene	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Trichlorofluoromethane	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Vinyl Chloride	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Xylene O	ND (0.0050)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Xylene P,M	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817
Xylenes (Total)	ND (0.0101)	---	8260D Low	---	1	MEK	10/08/24 18:33	D4J0174	DJ40817

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*135 %*	*S+*	*70-130*
Surrogate: 4-Bromofluorobenzene	*93 %*		*70-130*
Surrogate: Dibromofluoromethane	*118 %*		*70-130*
Surrogate: Toluene-d8	*108 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.4g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.029)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
1,2,4-Trichlorobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
1,2-Dichlorobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
1,3-Dichlorobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
1,4-Dichlorobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4,5-Trichlorophenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4,6-Trichlorophenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4-Dichlorophenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4-Dimethylphenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4-Dinitrophenol	ND (1.16)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,4-Dinitrotoluene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2,6-Dinitrotoluene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2-Chloronaphthalene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2-Chlorophenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2-Methylnaphthalene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2-Methylphenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
2-Nitrophenol	ND (0.581)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
3,3´-Dichlorobenzidine	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
3+4-Methylphenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
4-Bromophenyl-phenylether	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
4-Chloroaniline	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
4-Nitrophenol	ND (1.16)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Acenaphthene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Acenaphthylene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Acetophenone	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Aniline	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Anthracene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.4g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Benzo(a)anthracene	**0.326** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Benzo(a)pyrene	**0.321** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Benzo(b)fluoranthene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Benzo(g,h,i)perylene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Benzo(k)fluoranthene	**0.307** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
bis(2-Chloroethoxy)methane	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
bis(2-Chloroethyl)ether	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
bis(2-chloroisopropyl)Ether	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
bis(2-Ethylhexyl)phthalate	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Butylbenzylphthalate	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Chrysene	**0.387** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Dibenzo(a,h)Anthracene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Dibenzofuran	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Diethylphthalate	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Dimethylphthalate	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Di-n-butylphthalate	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Di-n-octylphthalate	ND (0.581)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Fluoranthene	**0.638** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Fluorene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Hexachlorobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Hexachlorobutadiene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Hexachloroethane	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Indeno(1,2,3-cd)Pyrene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Isophorone	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Naphthalene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Nitrobenzene	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.4g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/7/24 17:59

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Pentachlorophenol	ND (1.16)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Phenanthrene	**0.429** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Phenol	ND (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710
Pyrene	**0.772** (0.291)	---	8270E	---	1	TJ	10/09/24 3:28	D4J0180	DJ40710

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichlorobenzene-d4	*100 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*130 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*114 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*105 %*		*30-130*
Surrogate: 2-Fluorophenol	*107 %*		*30-130*
Surrogate: Nitrobenzene-d5	*108 %*		*30-130*
Surrogate: Phenol-d6	*116 %*		*30-130*
Surrogate: p-Terphenyl-d14	*140 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.3g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/7/24 17:46

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1221	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1232	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1242	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1248	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1254	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1260	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1262	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703
Aroclor 1268	ND (0.06)	---	8082A	---	1	10/08/24 16:18	---	DJ40703

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*97 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*104 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.1g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/7/24 17:59

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
4,4´-DDE [2C]	**0.0153** (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
4,4´-DDT [2C]	**0.0224** (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Aldrin	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
alpha-BHC	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
alpha-Chlordane [2C]	**P, LC 0.0040** (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
beta-BHC	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Chlordane (Total) [2C]	ND (0.0236)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
delta-BHC	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Dieldrin [2C]	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Endosulfan I	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Endosulfan II	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Endosulfan Sulfate	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Endrin	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Endrin Ketone	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
gamma-Chlordane [2C]	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Heptachlor	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Heptachlor Epoxide [2C]	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Hexachlorobenzene	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708
Methoxychlor	ND (0.0030)	---	8081B	---	1	10/08/24 13:05	D4J0154	DJ40708

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl [2C]	*95 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*90 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 10g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/8/24 18:43

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.011)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
2,4-D	ND (0.053)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
2,4-DB	ND (0.054)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
Dalapon	ND (0.051)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
Dicamba	ND (0.011)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
Dichlorprop	ND (0.053)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
MCPA	ND (2.62)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835
MCPP	ND (2.65)	---	8151A	---	1	10/10/24 22:37	D4J0222	DJ40835

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*87 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89
Initial Volume: 19.4g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/7/24 17:59

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**44.0** (11.6)	---	8100M	---	1	10/08/24 19:29	---	DJ40709

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*89 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: DISP-3
Date Sampled: 10/04/24 14:05
Percent Solids: 89

ESS Laboratory Work Order: 24J0267
ESS Laboratory Sample ID: 24J0267-07
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 76** (5)	---	9050A	---	1	JLK	10/08/24 20:10	umhos/cm	DJ40831
Corrosivity (pH)	**6.18** (N/A)	---	9045	---	1	CCP	10/07/24 18:48	S.U.	DJ40734
Corrosivity (pH) Sample Temp	**21.5**	---	2550B	---	1	CCP	10/07/24 18:48	°C	DJ40734
Flashpoint	**> 200** (N/A)	---	1010A	---	1	CCP	10/07/24 19:41	°F	DJ40749
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/08/24 15:02	mg/kg	DJ40750

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch DJ40805 - 3050B										
Blank										
Antimony	ND	4.15	mg/kg wet							
Arsenic	ND	2.07	mg/kg wet							
Barium	ND	0.83	mg/kg wet							
Beryllium	ND	0.08	mg/kg wet							
Cadmium	ND	0.41	mg/kg wet							
Chromium	ND	0.83	mg/kg wet							
Lead	ND	4.15	mg/kg wet							
Nickel	ND	0.83	mg/kg wet							
Selenium	ND	4.15	mg/kg wet							
Silver	ND	0.41	mg/kg wet							
Thallium	ND	4.15	mg/kg wet							
Vanadium	ND	0.83	mg/kg wet							
Zinc	ND	2.07	mg/kg wet							
LCS										
Antimony	71.2	15.6	mg/kg wet	245.0		29	10-110			
Arsenic	111	7.81	mg/kg wet	280.0		40	32-110			
Barium	280	3.12	mg/kg wet	688.0		41	33-110			
Beryllium	43.1	0.31	mg/kg wet	105.0		41	32-110			
Cadmium	80.4	1.56	mg/kg wet	210.0		38	33-110			
Chromium	122	3.12	mg/kg wet	225.0		54	50-110			
Lead	141	15.6	mg/kg wet	350.0		40	31-110			
Nickel	52.9	3.12	mg/kg wet	95.00		56	48-111			
Selenium	125	15.6	mg/kg wet	320.0		39	29-110			
Silver	35.7	1.56	mg/kg wet	95.00		38	30-111			
Thallium	99.0	15.6	mg/kg wet	250.0		40	28-110			
Vanadium	124	3.12	mg/kg wet	295.0		42	34-110			
Zinc	197	7.81	mg/kg wet	500.0		39	30-110			
LCS Dup										
Antimony	77.6	16.7	mg/kg wet	245.0		32	10-110	9	30	
Arsenic	119	8.33	mg/kg wet	280.0		42	32-110	7	30	
Barium	291	3.33	mg/kg wet	688.0		42	33-110	4	30	
Beryllium	46.0	0.33	mg/kg wet	105.0		44	32-110	7	30	
Cadmium	84.1	1.67	mg/kg wet	210.0		40	33-110	5	30	
Chromium	131	3.33	mg/kg wet	225.0		58	50-110	7	30	
Lead	149	16.7	mg/kg wet	350.0		42	31-110	5	30	
Nickel	54.5	3.33	mg/kg wet	95.00		57	48-111	3	30	
Selenium	134	16.7	mg/kg wet	320.0		42	29-110	7	30	
Silver	38.6	1.67	mg/kg wet	95.00		41	30-111	8	30	
Thallium	103	16.7	mg/kg wet	250.0		41	28-110	4	30	
Vanadium	135	3.33	mg/kg wet	295.0		46	34-110	9	30	
Zinc	210	8.33	mg/kg wet	500.0		42	30-110	6	30	
Reference										
Lead	3800	73.5	mg/kg wet	4490		85	81-120			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DJ40806 - 7471B										
Blank										
Mercury	ND	0.029	mg/kg wet							
LCS										
Mercury	10.5	2.91	mg/kg wet	14.40		73	55-109			
LCS Dup										
Mercury	12.2	3.25	mg/kg wet	14.40		85	55-109	15	30	
Volatile Organics Low Level										
Batch DJ40817 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ40817 - 5035										
Bromomethane	ND	0.0100	mg/kg wet							
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0050	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0250	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0200	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0645*		mg/kg wet	*0.05000*		*129*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0475*		mg/kg wet	*0.05000*		*95*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0568*		mg/kg wet	*0.05000*		*114*	*70-130*			
Surrogate: Toluene-d8	*0.0542*		mg/kg wet	*0.05000*		*108*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0604	0.0050	mg/kg wet	0.05000		121	70-130			
1,1,1-Trichloroethane	0.0574	0.0050	mg/kg wet	0.05000		115	70-130			
1,1,2,2-Tetrachloroethane	0.0642	0.0050	mg/kg wet	0.05000		128	40-160			

CERTIFICATE OF ANALYSIS

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Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ40817 - 5035										
1,1,2-Trichloroethane	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
1,1-Dichloroethane	0.0582	0.0050	mg/kg wet	0.05000		116	70-130			
1,1-Dichloroethene	0.0597	0.0050	mg/kg wet	0.05000		119	70-130			
1,1-Dichloropropene	0.0596	0.0050	mg/kg wet	0.05000		119	70-130			
1,2,3-Trichlorobenzene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130			
1,2,3-Trichloropropane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
1,2,4-Trichlorobenzene	0.0581	0.0050	mg/kg wet	0.05000		116	70-130			
1,2,4-Trimethylbenzene	0.0628	0.0050	mg/kg wet	0.05000		126	70-130			
1,2-Dibromo-3-Chloropropane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
1,2-Dibromoethane	0.0585	0.0050	mg/kg wet	0.05000		117	70-130			
1,2-Dichlorobenzene	0.0569	0.0050	mg/kg wet	0.05000		114	70-130			
1,2-Dichloroethane	0.0607	0.0050	mg/kg wet	0.05000		121	70-130			
1,2-Dichloropropane	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
1,3,5-Trimethylbenzene	0.0633	0.0050	mg/kg wet	0.05000		127	70-130			
1,3-Dichlorobenzene	0.0579	0.0050	mg/kg wet	0.05000		116	70-130			
1,3-Dichloropropane	0.0628	0.0050	mg/kg wet	0.05000		126	70-130			
1,4-Dichlorobenzene	0.0600	0.0050	mg/kg wet	0.05000		120	70-130			
1,4-Dioxane	0.950	0.100	mg/kg wet	1.000		95	70-130			
2,2-Dichloropropane	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
2-Butanone	0.312	0.0500	mg/kg wet	0.2500		125	40-160			
2-Chlorotoluene	0.0617	0.0050	mg/kg wet	0.05000		123	70-130			
2-Hexanone	0.314	0.0500	mg/kg wet	0.2500		125	40-160			
4-Chlorotoluene	0.0608	0.0050	mg/kg wet	0.05000		122	70-130			
4-Isopropyltoluene	0.0605	0.0050	mg/kg wet	0.05000		121	70-130			
4-Methyl-2-Pentanone	0.271	0.0500	mg/kg wet	0.2500		108	40-160			
Acetone	0.346	0.0500	mg/kg wet	0.2500		138	40-160			
Benzene	0.0580	0.0050	mg/kg wet	0.05000		116	70-130			
Bromobenzene	0.0606	0.0050	mg/kg wet	0.05000		121	70-130			
Bromochloromethane	0.0583	0.0050	mg/kg wet	0.05000		117	70-130			
Bromodichloromethane	0.0641	0.0050	mg/kg wet	0.05000		128	70-130			
Bromoform	0.0438	0.0050	mg/kg wet	0.05000		88	40-160			
Bromomethane	0.0682	0.0100	mg/kg wet	0.05000		136	40-160			
Carbon Disulfide	0.0625	0.0050	mg/kg wet	0.05000		125	70-130			
Carbon Tetrachloride	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
Chlorobenzene	0.0589	0.0050	mg/kg wet	0.05000		118	70-130			
Chloroethane	0.0587	0.0100	mg/kg wet	0.05000		117	40-160			
Chloroform	0.0584	0.0050	mg/kg wet	0.05000		117	70-130			
Chloromethane	0.0547	0.0100	mg/kg wet	0.05000		109	40-160			
cis-1,2-Dichloroethene	0.0592	0.0050	mg/kg wet	0.05000		118	70-130			
cis-1,3-Dichloropropene	0.0567	0.0050	mg/kg wet	0.05000		113	40-160			
Dibromochloromethane	0.0532	0.0050	mg/kg wet	0.05000		106	40-160			
Dibromomethane	0.0587	0.0050	mg/kg wet	0.05000		117	70-130			
Dichlorodifluoromethane	0.0417	0.0100	mg/kg wet	0.05000		83	40-160			
Diethyl Ether	0.0569	0.0050	mg/kg wet	0.05000		114	70-130			
Di-isopropyl ether	0.0585	0.0050	mg/kg wet	0.05000		117	70-130			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ40817 - 5035										
Ethyl tertiary-butyl ether	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
Ethylbenzene	0.0607	0.0050	mg/kg wet	0.05000		121	70-130			
Hexachlorobutadiene	0.0572	0.0050	mg/kg wet	0.05000		114	40-160			
Isopropylbenzene	0.0683	0.0050	mg/kg wet	0.05000		137	70-130			B+
Methyl tert-Butyl Ether	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
Methylene Chloride	0.0564	0.0250	mg/kg wet	0.05000		113	70-130			
Naphthalene	0.0507	0.0050	mg/kg wet	0.05000		101	40-160			
n-Butylbenzene	0.0634	0.0050	mg/kg wet	0.05000		127	70-130			
n-Propylbenzene	0.0626	0.0050	mg/kg wet	0.05000		125	70-130			
sec-Butylbenzene	0.0594	0.0050	mg/kg wet	0.05000		119	70-130			
Styrene	0.0616	0.0050	mg/kg wet	0.05000		123	40-160			
tert-Butylbenzene	0.0611	0.0050	mg/kg wet	0.05000		122	70-130			
Tertiary-amyl methyl ether	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
Tetrachloroethene	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
Tetrahydrofuran	0.0497	0.0200	mg/kg wet	0.05000		99	70-130			
Toluene	0.0569	0.0050	mg/kg wet	0.05000		114	70-130			
trans-1,2-Dichloroethene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130			
trans-1,3-Dichloropropene	0.0456	0.0050	mg/kg wet	0.05000		91	70-130			
Trichloroethene	0.0562	0.0050	mg/kg wet	0.05000		112	70-130			
Trichlorofluoromethane	0.0616	0.0050	mg/kg wet	0.05000		123	40-160			
Vinyl Chloride	0.0618	0.0100	mg/kg wet	0.05000		124	70-130			
Xylene O	0.0633	0.0050	mg/kg wet	0.05000		127	70-130			
Xylene P,M	0.127	0.0100	mg/kg wet	0.1000		127	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0575*		mg/kg wet	*0.05000*		*115*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0499*		mg/kg wet	*0.05000*		*100*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0541*		mg/kg wet	*0.05000*		*108*	*70-130*			
Surrogate: Toluene-d8	*0.0534*		mg/kg wet	*0.05000*		*107*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0611	0.0050	mg/kg wet	0.05000		122	70-130	1	20	
1,1,1-Trichloroethane	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	3	20	
1,1,2,2-Tetrachloroethane	0.0642	0.0050	mg/kg wet	0.05000		128	40-160	0.03	20	
1,1,2-Trichloroethane	0.0564	0.0050	mg/kg wet	0.05000		113	70-130	0.9	20	
1,1-Dichloroethane	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	2	20	
1,1-Dichloroethene	0.0619	0.0050	mg/kg wet	0.05000		124	70-130	4	20	
1,1-Dichloropropene	0.0608	0.0050	mg/kg wet	0.05000		122	70-130	2	20	
1,2,3-Trichlorobenzene	0.0583	0.0050	mg/kg wet	0.05000		117	70-130	1	20	
1,2,3-Trichloropropane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	0.7	20	
1,2,4-Trichlorobenzene	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	2	20	
1,2,4-Trimethylbenzene	0.0639	0.0050	mg/kg wet	0.05000		128	70-130	2	20	
1,2-Dibromo-3-Chloropropane	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	2	20	
1,2-Dibromoethane	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	0.3	20	
1,2-Dichlorobenzene	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	2	20	
1,2-Dichloroethane	0.0609	0.0050	mg/kg wet	0.05000		122	70-130	0.3	20	
1,2-Dichloropropane	0.0575	0.0050	mg/kg wet	0.05000		115	70-130	1	20	
1,3,5-Trimethylbenzene	0.0648	0.0050	mg/kg wet	0.05000		130	70-130	2	20	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ40817 - 5035										
1,3-Dichlorobenzene	0.0594	0.0050	mg/kg wet	0.05000		119	70-130	3	20	
1,3-Dichloropropane	0.0634	0.0050	mg/kg wet	0.05000		127	70-130	0.9	20	
1,4-Dichlorobenzene	0.0596	0.0050	mg/kg wet	0.05000		119	70-130	0.8	20	
1,4-Dioxane	0.884	0.100	mg/kg wet	1.000		88	70-130	7	20	
2,2-Dichloropropane	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	3	20	
2-Butanone	0.315	0.0500	mg/kg wet	0.2500		126	40-160	1	20	
2-Chlorotoluene	0.0628	0.0050	mg/kg wet	0.05000		126	70-130	2	20	
2-Hexanone	0.316	0.0500	mg/kg wet	0.2500		126	40-160	0.8	20	
4-Chlorotoluene	0.0619	0.0050	mg/kg wet	0.05000		124	70-130	2	20	
4-Isopropyltoluene	0.0622	0.0050	mg/kg wet	0.05000		124	70-130	3	20	
4-Methyl-2-Pentanone	0.269	0.0500	mg/kg wet	0.2500		108	40-160	0.6	20	
Acetone	0.355	0.0500	mg/kg wet	0.2500		142	40-160	3	20	
Benzene	0.0595	0.0050	mg/kg wet	0.05000		119	70-130	2	20	
Bromobenzene	0.0614	0.0050	mg/kg wet	0.05000		123	70-130	1	20	
Bromochloromethane	0.0595	0.0050	mg/kg wet	0.05000		119	70-130	2	20	
Bromodichloromethane	0.0657	0.0050	mg/kg wet	0.05000		131	70-130	2	20	B+
Bromoform	0.0437	0.0050	mg/kg wet	0.05000		87	40-160	0.2	20	
Bromomethane	0.0717	0.0100	mg/kg wet	0.05000		143	40-160	5	20	
Carbon Disulfide	0.0644	0.0050	mg/kg wet	0.05000		129	70-130	3	20	
Carbon Tetrachloride	0.0589	0.0050	mg/kg wet	0.05000		118	70-130	3	20	
Chlorobenzene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130	2	20	
Chloroethane	0.0607	0.0100	mg/kg wet	0.05000		121	40-160	3	20	
Chloroform	0.0596	0.0050	mg/kg wet	0.05000		119	70-130	2	20	
Chloromethane	0.0544	0.0100	mg/kg wet	0.05000		109	40-160	0.5	20	
cis-1,2-Dichloroethene	0.0607	0.0050	mg/kg wet	0.05000		121	70-130	2	20	
cis-1,3-Dichloropropene	0.0574	0.0050	mg/kg wet	0.05000		115	40-160	1	20	
Dibromochloromethane	0.0534	0.0050	mg/kg wet	0.05000		107	40-160	0.5	20	
Dibromomethane	0.0595	0.0050	mg/kg wet	0.05000		119	70-130	1	20	
Dichlorodifluoromethane	0.0417	0.0100	mg/kg wet	0.05000		83	40-160	0.1	20	
Diethyl Ether	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	1	20	
Di-isopropyl ether	0.0597	0.0050	mg/kg wet	0.05000		119	70-130	2	20	
Ethyl tertiary-butyl ether	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	2	20	
Ethylbenzene	0.0623	0.0050	mg/kg wet	0.05000		125	70-130	3	20	
Hexachlorobutadiene	0.0581	0.0050	mg/kg wet	0.05000		116	40-160	1	20	
Isopropylbenzene	0.0702	0.0050	mg/kg wet	0.05000		140	70-130	3	20	B+
Methyl tert-Butyl Ether	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	1	20	
Methylene Chloride	0.0573	0.0250	mg/kg wet	0.05000		115	70-130	2	20	
Naphthalene	0.0518	0.0050	mg/kg wet	0.05000		104	40-160	2	20	
n-Butylbenzene	0.0649	0.0050	mg/kg wet	0.05000		130	70-130	2	20	
n-Propylbenzene	0.0642	0.0050	mg/kg wet	0.05000		128	70-130	2	20	
sec-Butylbenzene	0.0607	0.0050	mg/kg wet	0.05000		121	70-130	2	20	
Styrene	0.0603	0.0050	mg/kg wet	0.05000		121	40-160	2	20	
tert-Butylbenzene	0.0626	0.0050	mg/kg wet	0.05000		125	70-130	2	20	
Tertiary-amyl methyl ether	0.0463	0.0050	mg/kg wet	0.05000		93	70-130	2	20	
Tetrachloroethene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	6	20	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ40817 - 5035										
Tetrahydrofuran	0.0498	0.0200	mg/kg wet	0.05000		100	70-130	0.08	20	
Toluene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	3	20	
trans-1,2-Dichloroethene	0.0601	0.0050	mg/kg wet	0.05000		120	70-130	3	20	
trans-1,3-Dichloropropene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130	1	20	
Trichloroethene	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	3	20	
Trichlorofluoromethane	0.0636	0.0050	mg/kg wet	0.05000		127	40-160	3	20	
Vinyl Chloride	0.0635	0.0100	mg/kg wet	0.05000		127	70-130	3	20	
Xylene O	0.0654	0.0050	mg/kg wet	0.05000		131	70-130	3	20	B+
Xylene P,M	0.130	0.0100	mg/kg wet	0.1000		130	70-130	2	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0566*		mg/kg wet	*0.05000*		*113*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0492*		mg/kg wet	*0.05000*		*98*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0538*		mg/kg wet	*0.05000*		*108*	*70-130*			
Surrogate: Toluene-d8	*0.0530*		mg/kg wet	*0.05000*		*106*	*70-130*			
Semi-Volatile Organic Compounds										
Batch DJ40710 - 3546										
Blank										
1,1-Biphenyl	ND	0.025	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet							
1,2-Dichlorobenzene	ND	0.250	mg/kg wet							
1,3-Dichlorobenzene	ND	0.250	mg/kg wet							
1,4-Dichlorobenzene	ND	0.250	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet							
2,4-Dichlorophenol	ND	0.250	mg/kg wet							
2,4-Dimethylphenol	ND	0.250	mg/kg wet							
2,4-Dinitrophenol	ND	1.00	mg/kg wet							
2,4-Dinitrotoluene	ND	0.250	mg/kg wet							
2,6-Dinitrotoluene	ND	0.250	mg/kg wet							
2-Chloronaphthalene	ND	0.250	mg/kg wet							
2-Chlorophenol	ND	0.250	mg/kg wet							
2-Methylnaphthalene	ND	0.250	mg/kg wet							
2-Methylphenol	ND	0.250	mg/kg wet							
2-Nitrophenol	ND	0.500	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.250	mg/kg wet							
3+4-Methylphenol	ND	0.250	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet							
4-Chloroaniline	ND	0.250	mg/kg wet							
4-Nitrophenol	ND	1.00	mg/kg wet							
Acenaphthene	ND	0.250	mg/kg wet							
Acenaphthylene	ND	0.250	mg/kg wet							
Acetophenone	ND	0.250	mg/kg wet							
Aniline	ND	0.250	mg/kg wet							
Anthracene	ND	0.250	mg/kg wet							
Azobenzene	ND	0.250	mg/kg wet							

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Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ40710 - 3546										
Benzo(a)anthracene	ND	0.250	mg/kg wet							
Benzo(a)pyrene	ND	0.250	mg/kg wet							
Benzo(b)fluoranthene	ND	0.250	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet							
Benzo(k)fluoranthene	ND	0.250	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet							
Butylbenzylphthalate	ND	0.250	mg/kg wet							
Chrysene	ND	0.250	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet							
Dibenzofuran	ND	0.250	mg/kg wet							
Diethylphthalate	ND	0.250	mg/kg wet							
Dimethylphthalate	ND	0.250	mg/kg wet							
Di-n-butylphthalate	ND	0.250	mg/kg wet							
Di-n-octylphthalate	ND	0.500	mg/kg wet							
Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.19*		mg/kg wet	*2.500*		*88*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.93*		mg/kg wet	*3.750*		*78*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.50*		mg/kg wet	*3.750*		*93*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.02*		mg/kg wet	*2.500*		*81*	*30-130*			
Surrogate: 2-Fluorophenol	*3.73*		mg/kg wet	*3.750*		*99*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.32*		mg/kg wet	*2.500*		*93*	*30-130*			
Surrogate: Phenol-d6	*3.95*		mg/kg wet	*3.750*		*105*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.24*		mg/kg wet	*2.500*		*90*	*30-130*			
LCS										
1,1-Biphenyl	2.03	0.025	mg/kg wet	2.500		81	40-140			
1,2,4-Trichlorobenzene	1.84	0.250	mg/kg wet	2.500		73	40-140			
1,2-Dichlorobenzene	2.05	0.250	mg/kg wet	2.500		82	40-140			
1,3-Dichlorobenzene	2.09	0.250	mg/kg wet	2.500		84	40-140			
1,4-Dichlorobenzene	2.10	0.250	mg/kg wet	2.500		84	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ40710 - 3546										
2,4,5-Trichlorophenol	2.12	0.250	mg/kg wet	2.500		85	30-130			
2,4,6-Trichlorophenol	2.07	0.250	mg/kg wet	2.500		83	30-130			
2,4-Dichlorophenol	1.91	0.250	mg/kg wet	2.500		76	30-130			
2,4-Dimethylphenol	2.36	0.250	mg/kg wet	2.500		95	30-130			
2,4-Dinitrophenol	2.83	1.00	mg/kg wet	2.500		113	15-140			
2,4-Dinitrotoluene	2.29	0.250	mg/kg wet	2.500		91	40-140			
2,6-Dinitrotoluene	2.23	0.250	mg/kg wet	2.500		89	40-140			
2-Chloronaphthalene	2.02	0.250	mg/kg wet	2.500		81	40-140			
2-Chlorophenol	2.20	0.250	mg/kg wet	2.500		88	30-130			
2-Methylnaphthalene	1.87	0.250	mg/kg wet	2.500		75	40-140			
2-Methylphenol	2.43	0.250	mg/kg wet	2.500		97	15-140			
2-Nitrophenol	1.96	0.500	mg/kg wet	2.500		78	30-130			
3,3´-Dichlorobenzidine	2.31	0.250	mg/kg wet	2.500		92	40-140			
3+4-Methylphenol	4.74	0.250	mg/kg wet	5.000		95	15-140			
4-Bromophenyl-phenylether	2.13	0.250	mg/kg wet	2.500		85	40-140			
4-Chloroaniline	1.81	0.250	mg/kg wet	2.500		72	15-140			
4-Nitrophenol	2.15	1.00	mg/kg wet	2.500		86	15-140			
Acenaphthene	2.15	0.250	mg/kg wet	2.500		86	40-140			
Acenaphthylene	2.34	0.250	mg/kg wet	2.500		94	40-140			
Acetophenone	2.25	0.250	mg/kg wet	2.500		90	40-140			
Aniline	2.04	0.250	mg/kg wet	2.500		82	40-140			
Anthracene	2.26	0.250	mg/kg wet	2.500		91	40-140			
Azobenzene	2.44	0.250	mg/kg wet	2.500		98	40-140			
Benzo(a)anthracene	2.28	0.250	mg/kg wet	2.500		91	40-140			
Benzo(a)pyrene	2.29	0.250	mg/kg wet	2.500		92	40-140			
Benzo(b)fluoranthene	2.10	0.250	mg/kg wet	2.500		84	40-140			
Benzo(g,h,i)perylene	2.37	0.250	mg/kg wet	2.500		95	40-140			
Benzo(k)fluoranthene	2.21	0.250	mg/kg wet	2.500		88	40-140			
bis(2-Chloroethoxy)methane	2.11	0.250	mg/kg wet	2.500		84	40-140			
bis(2-Chloroethyl)ether	2.33	0.250	mg/kg wet	2.500		93	40-140			
bis(2-chloroisopropyl)Ether	1.95	0.250	mg/kg wet	2.500		78	40-140			
bis(2-Ethylhexyl)phthalate	2.61	0.250	mg/kg wet	2.500		104	40-140			
Butylbenzylphthalate	2.74	0.250	mg/kg wet	2.500		110	40-140			
Chrysene	2.23	0.250	mg/kg wet	2.500		89	40-140			
Dibenzo(a,h)Anthracene	2.30	0.250	mg/kg wet	2.500		92	40-140			
Dibenzofuran	2.00	0.250	mg/kg wet	2.500		80	40-140			
Diethylphthalate	2.37	0.250	mg/kg wet	2.500		95	40-140			
Dimethylphthalate	2.35	0.250	mg/kg wet	2.500		94	15-140			
Di-n-butylphthalate	2.57	0.250	mg/kg wet	2.500		103	40-140			
Di-n-octylphthalate	2.69	0.500	mg/kg wet	2.500		108	40-140			
Fluoranthene	2.18	0.250	mg/kg wet	2.500		87	40-140			
Fluorene	2.12	0.250	mg/kg wet	2.500		85	40-140			
Hexachlorobenzene	1.85	0.250	mg/kg wet	2.500		74	40-140			
Hexachlorobutadiene	1.87	0.250	mg/kg wet	2.500		75	40-140			
Hexachloroethane	2.17	0.250	mg/kg wet	2.500		87	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ40710 - 3546										
Indeno(1,2,3-cd)Pyrene	2.28	0.250	mg/kg wet	2.500		91	40-140			
Isophorone	2.11	0.250	mg/kg wet	2.500		84	40-140			
Naphthalene	1.90	0.250	mg/kg wet	2.500		76	40-140			
Nitrobenzene	2.16	0.250	mg/kg wet	2.500		87	40-140			
N-Nitrosodimethylamine	2.09	0.250	mg/kg wet	2.500		84	40-140			
Pentachlorophenol	1.72	1.00	mg/kg wet	2.500		69	15-140			
Phenanthrene	2.15	0.250	mg/kg wet	2.500		86	40-140			
Phenol	2.41	0.250	mg/kg wet	2.500		97	15-140			
Pyrene	2.41	0.250	mg/kg wet	2.500		96	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.26*		mg/kg wet	*2.500*		*90*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.01*		mg/kg wet	*3.750*		*80*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.64*		mg/kg wet	*3.750*		*97*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.14*		mg/kg wet	*2.500*		*86*	*30-130*			
Surrogate: 2-Fluorophenol	*3.89*		mg/kg wet	*3.750*		*104*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.24*		mg/kg wet	*2.500*		*90*	*30-130*			
Surrogate: Phenol-d6	*4.15*		mg/kg wet	*3.750*		*111*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.30*		mg/kg wet	*2.500*		*92*	*30-130*			
LCS Dup										
1,1-Biphenyl	2.10	0.025	mg/kg wet	2.500		84	40-140	3	30	
1,2,4-Trichlorobenzene	1.85	0.250	mg/kg wet	2.500		74	40-140	0.9	30	
1,2-Dichlorobenzene	2.08	0.250	mg/kg wet	2.500		83	40-140	2	30	
1,3-Dichlorobenzene	2.13	0.250	mg/kg wet	2.500		85	40-140	2	30	
1,4-Dichlorobenzene	2.15	0.250	mg/kg wet	2.500		86	40-140	2	30	
2,4,5-Trichlorophenol	2.28	0.250	mg/kg wet	2.500		91	30-130	7	30	
2,4,6-Trichlorophenol	2.04	0.250	mg/kg wet	2.500		82	30-130	1	30	
2,4-Dichlorophenol	1.86	0.250	mg/kg wet	2.500		75	30-130	3	30	
2,4-Dimethylphenol	2.37	0.250	mg/kg wet	2.500		95	30-130	0.4	30	
2,4-Dinitrophenol	2.83	1.00	mg/kg wet	2.500		113	15-140	0.2	30	
2,4-Dinitrotoluene	2.33	0.250	mg/kg wet	2.500		93	40-140	2	30	
2,6-Dinitrotoluene	2.27	0.250	mg/kg wet	2.500		91	40-140	2	30	
2-Chloronaphthalene	2.12	0.250	mg/kg wet	2.500		85	40-140	5	30	
2-Chlorophenol	2.28	0.250	mg/kg wet	2.500		91	30-130	4	30	
2-Methylnaphthalene	1.87	0.250	mg/kg wet	2.500		75	40-140	0.2	30	
2-Methylphenol	2.45	0.250	mg/kg wet	2.500		98	15-140	0.7	30	
2-Nitrophenol	2.03	0.500	mg/kg wet	2.500		81	30-130	4	30	
3,3´-Dichlorobenzidine	2.30	0.250	mg/kg wet	2.500		92	40-140	0.3	30	
3+4-Methylphenol	4.82	0.250	mg/kg wet	5.000		96	15-140	2	30	
4-Bromophenyl-phenylether	2.18	0.250	mg/kg wet	2.500		87	40-140	2	30	
4-Chloroaniline	1.89	0.250	mg/kg wet	2.500		76	15-140	5	30	
4-Nitrophenol	2.21	1.00	mg/kg wet	2.500		89	15-140	3	30	
Acenaphthene	2.20	0.250	mg/kg wet	2.500		88	40-140	2	30	
Acenaphthylene	2.43	0.250	mg/kg wet	2.500		97	40-140	4	30	
Acetophenone	2.28	0.250	mg/kg wet	2.500		91	40-140	1	30	
Aniline	2.13	0.250	mg/kg wet	2.500		85	40-140	4	30	
Anthracene	2.30	0.250	mg/kg wet	2.500		92	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ40710 - 3546										
Azobenzene	2.52	0.250	mg/kg wet	2.500		101	40-140	3	30	
Benzo(a)anthracene	2.28	0.250	mg/kg wet	2.500		91	40-140	0.09	30	
Benzo(a)pyrene	2.32	0.250	mg/kg wet	2.500		93	40-140	1	30	
Benzo(b)fluoranthene	2.13	0.250	mg/kg wet	2.500		85	40-140	2	30	
Benzo(g,h,i)perylene	2.40	0.250	mg/kg wet	2.500		96	40-140	1	30	
Benzo(k)fluoranthene	2.26	0.250	mg/kg wet	2.500		90	40-140	2	30	
bis(2-Chloroethoxy)methane	2.14	0.250	mg/kg wet	2.500		86	40-140	2	30	
bis(2-Chloroethyl)ether	2.39	0.250	mg/kg wet	2.500		96	40-140	2	30	
bis(2-chloroisopropyl)Ether	1.95	0.250	mg/kg wet	2.500		78	40-140	0.3	30	
bis(2-Ethylhexyl)phthalate	2.66	0.250	mg/kg wet	2.500		106	40-140	2	30	
Butylbenzylphthalate	2.76	0.250	mg/kg wet	2.500		110	40-140	0.5	30	
Chrysene	2.23	0.250	mg/kg wet	2.500		89	40-140	0.2	30	
Dibenzo(a,h)Anthracene	2.32	0.250	mg/kg wet	2.500		93	40-140	1	30	
Dibenzofuran	2.08	0.250	mg/kg wet	2.500		83	40-140	4	30	
Diethylphthalate	2.46	0.250	mg/kg wet	2.500		98	40-140	4	30	
Dimethylphthalate	2.41	0.250	mg/kg wet	2.500		96	15-140	3	30	
Di-n-butylphthalate	2.64	0.250	mg/kg wet	2.500		106	40-140	3	30	
Di-n-octylphthalate	2.82	0.500	mg/kg wet	2.500		113	40-140	5	30	
Fluoranthene	2.20	0.250	mg/kg wet	2.500		88	40-140	1	30	
Fluorene	2.20	0.250	mg/kg wet	2.500		88	40-140	4	30	
Hexachlorobenzene	1.90	0.250	mg/kg wet	2.500		76	40-140	3	30	
Hexachlorobutadiene	1.85	0.250	mg/kg wet	2.500		74	40-140	1	30	
Hexachloroethane	2.18	0.250	mg/kg wet	2.500		87	40-140	0.4	30	
Indeno(1,2,3-cd)Pyrene	2.30	0.250	mg/kg wet	2.500		92	40-140	1	30	
Isophorone	2.14	0.250	mg/kg wet	2.500		86	40-140	2	30	
Naphthalene	1.92	0.250	mg/kg wet	2.500		77	40-140	1	30	
Nitrobenzene	2.23	0.250	mg/kg wet	2.500		89	40-140	3	30	
N-Nitrosodimethylamine	2.11	0.250	mg/kg wet	2.500		84	40-140	0.6	30	
Pentachlorophenol	1.73	1.00	mg/kg wet	2.500		69	15-140	0.6	30	
Phenanthrene	2.22	0.250	mg/kg wet	2.500		89	40-140	3	30	
Phenol	2.45	0.250	mg/kg wet	2.500		98	15-140	1	30	
Pyrene	2.44	0.250	mg/kg wet	2.500		98	40-140	1	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.19*		mg/kg wet	*2.500*		*88*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.94*		mg/kg wet	*3.750*		*78*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.65*		mg/kg wet	*3.750*		*97*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.12*		mg/kg wet	*2.500*		*85*	*30-130*			
Surrogate: 2-Fluorophenol	*3.86*		mg/kg wet	*3.750*		*103*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.22*		mg/kg wet	*2.500*		*89*	*30-130*			
Surrogate: Phenol-d6	*4.13*		mg/kg wet	*3.750*		*110*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.30*		mg/kg wet	*2.500*		*92*	*30-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch DJ40703 - 3540C										
Blank										
Aroclor 1016	ND	0.05	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch DJ40703 - 3540C										
Aroclor 1016 [2C]	ND	0.05	mg/kg wet							
Aroclor 1221	ND	0.05	mg/kg wet							
Aroclor 1221 [2C]	ND	0.05	mg/kg wet							
Aroclor 1232	ND	0.05	mg/kg wet							
Aroclor 1232 [2C]	ND	0.05	mg/kg wet							
Aroclor 1242	ND	0.05	mg/kg wet							
Aroclor 1242 [2C]	ND	0.05	mg/kg wet							
Aroclor 1248	ND	0.05	mg/kg wet							
Aroclor 1248 [2C]	ND	0.05	mg/kg wet							
Aroclor 1254	ND	0.05	mg/kg wet							
Aroclor 1254 [2C]	ND	0.05	mg/kg wet							
Aroclor 1260	ND	0.05	mg/kg wet							
Aroclor 1260 [2C]	ND	0.05	mg/kg wet							
Aroclor 1262	ND	0.05	mg/kg wet							
Aroclor 1262 [2C]	ND	0.05	mg/kg wet							
Aroclor 1268	ND	0.05	mg/kg wet							
Aroclor 1268 [2C]	ND	0.05	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0196*		mg/kg wet	*0.02500*		*78*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0193*		mg/kg wet	*0.02500*		*77*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0178*		mg/kg wet	*0.02500*		*71*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0192*		mg/kg wet	*0.02500*		*77*	*30-150*			
LCS										
Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		82	40-140			
Aroclor 1016 [2C]	0.4	0.05	mg/kg wet	0.5000		85	40-140			
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		85	40-140			
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		90	40-140			
Surrogate: Decachlorobiphenyl	*0.0209*		mg/kg wet	*0.02500*		*84*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0207*		mg/kg wet	*0.02500*		*83*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0202*		mg/kg wet	*0.02500*		*81*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0208*		mg/kg wet	*0.02500*		*83*	*30-150*			
LCS Dup										
Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		85	40-140	3	30	
Aroclor 1016 [2C]	0.4	0.05	mg/kg wet	0.5000		89	40-140	4	30	
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		88	40-140	4	30	
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		94	40-140	4	30	
Surrogate: Decachlorobiphenyl	*0.0219*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0215*		mg/kg wet	*0.02500*		*86*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0210*		mg/kg wet	*0.02500*		*84*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0217*		mg/kg wet	*0.02500*		*87*	*30-150*			
8081B Organochlorine Pesticides										
Batch DJ40708 - 3546										
Blank										
4,4´-DDD	ND	0.0025	mg/kg wet							
4,4´-DDD [2C]	ND	0.0025	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ40708 - 3546										
4,4´-DDE	ND	0.0025	mg/kg wet							
4,4´-DDE [2C]	ND	0.0025	mg/kg wet							
4,4´-DDT	ND	0.0025	mg/kg wet							
4,4´-DDT [2C]	ND	0.0025	mg/kg wet							
Aldrin	ND	0.0025	mg/kg wet							
Aldrin [2C]	ND	0.0025	mg/kg wet							
alpha-BHC	ND	0.0025	mg/kg wet							
alpha-BHC [2C]	ND	0.0025	mg/kg wet							
alpha-Chlordane	ND	0.0025	mg/kg wet							
alpha-Chlordane [2C]	ND	0.0025	mg/kg wet							
beta-BHC	ND	0.0025	mg/kg wet							
beta-BHC [2C]	ND	0.0025	mg/kg wet							
Chlordane (Total)	ND	0.0200	mg/kg wet							
Chlordane (Total) [2C]	ND	0.0200	mg/kg wet							
delta-BHC	ND	0.0025	mg/kg wet							
delta-BHC [2C]	ND	0.0025	mg/kg wet							
Dieldrin	ND	0.0025	mg/kg wet							
Dieldrin [2C]	ND	0.0025	mg/kg wet							
Endosulfan I	ND	0.0025	mg/kg wet							
Endosulfan I [2C]	ND	0.0025	mg/kg wet							
Endosulfan II	ND	0.0025	mg/kg wet							
Endosulfan II [2C]	ND	0.0025	mg/kg wet							
Endosulfan Sulfate	ND	0.0025	mg/kg wet							
Endosulfan Sulfate [2C]	ND	0.0025	mg/kg wet							
Endrin	ND	0.0025	mg/kg wet							
Endrin [2C]	ND	0.0025	mg/kg wet							
Endrin Ketone	ND	0.0025	mg/kg wet							
Endrin Ketone [2C]	ND	0.0025	mg/kg wet							
gamma-BHC (Lindane)	ND	0.0015	mg/kg wet							
gamma-BHC (Lindane) [2C]	ND	0.0015	mg/kg wet							
gamma-Chlordane	ND	0.0025	mg/kg wet							
gamma-Chlordane [2C]	ND	0.0025	mg/kg wet							
Heptachlor	ND	0.0025	mg/kg wet							
Heptachlor [2C]	ND	0.0025	mg/kg wet							
Heptachlor Epoxide	ND	0.0025	mg/kg wet							
Heptachlor Epoxide [2C]	ND	0.0025	mg/kg wet							
Hexachlorobenzene	ND	0.0025	mg/kg wet							
Hexachlorobenzene [2C]	ND	0.0025	mg/kg wet							
Methoxychlor	ND	0.0025	mg/kg wet							
Methoxychlor [2C]	ND	0.0025	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0111*		mg/kg wet	*0.01250*		*89*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0122*		mg/kg wet	*0.01250*		*98*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0105*		mg/kg wet	*0.01250*		*84*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00987*		mg/kg wet	*0.01250*		*79*	*30-150*			
LCS										

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ40708 - 3546										
4,4´-DDD	0.0119	0.0025	mg/kg wet	0.01250		95	40-140			
4,4´-DDD [2C]	0.0130	0.0025	mg/kg wet	0.01250		104	40-140			
4,4´-DDE	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
4,4´-DDE [2C]	0.0120	0.0025	mg/kg wet	0.01250		96	40-140			
4,4´-DDT	0.0123	0.0025	mg/kg wet	0.01250		98	40-140			
4,4´-DDT [2C]	0.0132	0.0025	mg/kg wet	0.01250		106	40-140			
Aldrin	0.0098	0.0025	mg/kg wet	0.01250		79	40-140			
Aldrin [2C]	0.0105	0.0025	mg/kg wet	0.01250		84	40-140			
alpha-BHC	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
alpha-BHC [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
alpha-Chlordane	0.0103	0.0025	mg/kg wet	0.01250		83	40-140			
alpha-Chlordane [2C]	0.0114	0.0025	mg/kg wet	0.01250		91	40-140			
beta-BHC	0.0099	0.0025	mg/kg wet	0.01250		80	40-140			
beta-BHC [2C]	0.0096	0.0025	mg/kg wet	0.01250		77	40-140			
delta-BHC	0.0115	0.0025	mg/kg wet	0.01250		92	40-140			
delta-BHC [2C]	0.0116	0.0025	mg/kg wet	0.01250		93	40-140			
Dieldrin	0.0122	0.0025	mg/kg wet	0.01250		97	40-140			
Dieldrin [2C]	0.0130	0.0025	mg/kg wet	0.01250		104	40-140			
Endosulfan I	0.0110	0.0025	mg/kg wet	0.01250		88	40-140			
Endosulfan I [2C]	0.0116	0.0025	mg/kg wet	0.01250		93	40-140			
Endosulfan II	0.0117	0.0025	mg/kg wet	0.01250		94	40-140			
Endosulfan II [2C]	0.0124	0.0025	mg/kg wet	0.01250		99	40-140			
Endosulfan Sulfate	0.0117	0.0025	mg/kg wet	0.01250		94	40-140			
Endosulfan Sulfate [2C]	0.0127	0.0025	mg/kg wet	0.01250		102	40-140			
Endrin	0.0117	0.0025	mg/kg wet	0.01250		93	40-140			
Endrin [2C]	0.0125	0.0025	mg/kg wet	0.01250		100	40-140			
Endrin Ketone	0.0125	0.0025	mg/kg wet	0.01250		100	40-140			
Endrin Ketone [2C]	0.0132	0.0025	mg/kg wet	0.01250		106	40-140			
gamma-BHC (Lindane)	0.0101	0.0015	mg/kg wet	0.01250		81	40-140			
gamma-BHC (Lindane) [2C]	0.0105	0.0015	mg/kg wet	0.01250		84	40-140			
gamma-Chlordane	0.0124	0.0025	mg/kg wet	0.01250		100	40-140			
gamma-Chlordane [2C]	0.0132	0.0025	mg/kg wet	0.01250		105	40-140			
Heptachlor	0.0102	0.0025	mg/kg wet	0.01250		81	40-140			
Heptachlor [2C]	0.0101	0.0025	mg/kg wet	0.01250		81	40-140			
Heptachlor Epoxide	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
Heptachlor Epoxide [2C]	0.0116	0.0025	mg/kg wet	0.01250		93	40-140			
Hexachlorobenzene	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
Hexachlorobenzene [2C]	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
Methoxychlor	0.0115	0.0025	mg/kg wet	0.01250		92	40-140			
Methoxychlor [2C]	0.0129	0.0025	mg/kg wet	0.01250		103	40-140			
Surrogate: Decachlorobiphenyl	*0.0115*		mg/kg wet	*0.01250*		*92*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0126*		mg/kg wet	*0.01250*		*101*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.00954*		mg/kg wet	*0.01250*		*76*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00879*		mg/kg wet	*0.01250*		*70*	*30-150*			
LCS Dup										

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ40708 - 3546										
4,4´-DDD	0.0117	0.0025	mg/kg wet	0.01250		94	40-140	1	30	
4,4´-DDD [2C]	0.0127	0.0025	mg/kg wet	0.01250		101	40-140	2	30	
4,4´-DDE	0.0104	0.0025	mg/kg wet	0.01250		83	40-140	2	30	
4,4´-DDE [2C]	0.0116	0.0025	mg/kg wet	0.01250		93	40-140	3	30	
4,4´-DDT	0.0116	0.0025	mg/kg wet	0.01250		93	40-140	5	30	
4,4´-DDT [2C]	0.0129	0.0025	mg/kg wet	0.01250		104	40-140	2	30	
Aldrin	0.0093	0.0025	mg/kg wet	0.01250		75	40-140	5	30	
Aldrin [2C]	0.0098	0.0025	mg/kg wet	0.01250		78	40-140	7	30	
alpha-BHC	0.0093	0.0025	mg/kg wet	0.01250		75	40-140	4	30	
alpha-BHC [2C]	0.0092	0.0025	mg/kg wet	0.01250		74	40-140	8	30	
alpha-Chlordane	0.0099	0.0025	mg/kg wet	0.01250		79	40-140	4	30	
alpha-Chlordane [2C]	0.0108	0.0025	mg/kg wet	0.01250		87	40-140	5	30	
beta-BHC	0.0096	0.0025	mg/kg wet	0.01250		77	40-140	4	30	
beta-BHC [2C]	0.0089	0.0025	mg/kg wet	0.01250		71	40-140	7	30	
delta-BHC	0.0137	0.0025	mg/kg wet	0.01250		110	40-140	18	30	
delta-BHC [2C]	0.0117	0.0025	mg/kg wet	0.01250		93	40-140	0.2	30	
Dieldrin	0.0117	0.0025	mg/kg wet	0.01250		94	40-140	4	30	
Dieldrin [2C]	0.0125	0.0025	mg/kg wet	0.01250		100	40-140	4	30	
Endosulfan I	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	7	30	
Endosulfan I [2C]	0.0111	0.0025	mg/kg wet	0.01250		89	40-140	4	30	
Endosulfan II	0.0115	0.0025	mg/kg wet	0.01250		92	40-140	2	30	
Endosulfan II [2C]	0.0121	0.0025	mg/kg wet	0.01250		97	40-140	3	30	
Endosulfan Sulfate	0.0113	0.0025	mg/kg wet	0.01250		91	40-140	3	30	
Endosulfan Sulfate [2C]	0.0124	0.0025	mg/kg wet	0.01250		99	40-140	3	30	
Endrin	0.0114	0.0025	mg/kg wet	0.01250		91	40-140	2	30	
Endrin [2C]	0.0121	0.0025	mg/kg wet	0.01250		97	40-140	3	30	
Endrin Ketone	0.0119	0.0025	mg/kg wet	0.01250		96	40-140	5	30	
Endrin Ketone [2C]	0.0129	0.0025	mg/kg wet	0.01250		103	40-140	3	30	
gamma-BHC (Lindane)	0.0094	0.0015	mg/kg wet	0.01250		75	40-140	7	30	
gamma-BHC (Lindane) [2C]	0.0097	0.0015	mg/kg wet	0.01250		78	40-140	8	30	
gamma-Chlordane	0.0120	0.0025	mg/kg wet	0.01250		96	40-140	3	30	
gamma-Chlordane [2C]	0.0127	0.0025	mg/kg wet	0.01250		101	40-140	4	30	
Heptachlor	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	0.7	30	
Heptachlor [2C]	0.0095	0.0025	mg/kg wet	0.01250		76	40-140	7	30	
Heptachlor Epoxide	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	4	30	
Heptachlor Epoxide [2C]	0.0110	0.0025	mg/kg wet	0.01250		88	40-140	5	30	
Hexachlorobenzene	0.0086	0.0025	mg/kg wet	0.01250		69	40-140	4	30	
Hexachlorobenzene [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140	6	30	
Methoxychlor	0.0113	0.0025	mg/kg wet	0.01250		90	40-140	1	30	
Methoxychlor [2C]	0.0129	0.0025	mg/kg wet	0.01250		103	40-140	0.2	30	
Surrogate: Decachlorobiphenyl	*0.0107*		mg/kg wet	*0.01250*		*85*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0117*		mg/kg wet	*0.01250*		*94*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.00858*		mg/kg wet	*0.01250*		*69*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00802*		mg/kg wet	*0.01250*		*64*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8151A Chlorinated Herbicides										
Batch DJ40835 - 3546										
Blank										
2,4,5-T	ND	0.010	mg/kg wet							
2,4,5-T [2C]	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex)	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	0.010	mg/kg wet							
2,4-D	ND	0.047	mg/kg wet							
2,4-D [2C]	ND	0.047	mg/kg wet							
2,4-DB	ND	0.048	mg/kg wet							
2,4-DB [2C]	ND	0.048	mg/kg wet							
Dalapon	ND	0.046	mg/kg wet							
Dalapon [2C]	ND	0.046	mg/kg wet							
Dicamba	ND	0.009	mg/kg wet							
Dicamba [2C]	ND	0.009	mg/kg wet							
Dichlorprop	ND	0.047	mg/kg wet							
Dichlorprop [2C]	ND	0.047	mg/kg wet							
MCPA	ND	2.32	mg/kg wet							
MCPA [2C]	ND	2.32	mg/kg wet							
MCPP	ND	2.35	mg/kg wet							
MCPP [2C]	ND	2.35	mg/kg wet							
Surrogate: DCAA	*0.176*		mg/kg wet	*0.2000*		*88*	*30-150*			
Surrogate: DCAA [2C]	*0.169*		mg/kg wet	*0.2000*		*85*	*30-150*			
LCS										
2,4,5-T	0.012	0.010	mg/kg wet	0.01900		62	40-140			
2,4,5-T [2C]	0.010	0.010	mg/kg wet	0.01900		52	40-140			
2,4,5-TP (Silvex)	0.013	0.010	mg/kg wet	0.01900		66	40-140			
2,4,5-TP (Silvex) [2C]	0.011	0.010	mg/kg wet	0.01900		60	40-140			
2,4-D	0.111	0.047	mg/kg wet	0.1880		59	40-140			
2,4-D [2C]	0.126	0.047	mg/kg wet	0.1880		67	40-140			
2,4-DB	0.132	0.048	mg/kg wet	0.1900		70	40-140			
2,4-DB [2C]	0.120	0.048	mg/kg wet	0.1900		63	40-140			
Dalapon	0.290	0.046	mg/kg wet	0.4550		64	40-140			
Dalapon [2C]	0.281	0.046	mg/kg wet	0.4550		62	40-140			
Dicamba	0.012	0.009	mg/kg wet	0.01880		64	40-140			
Dicamba [2C]	0.012	0.009	mg/kg wet	0.01880		64	40-140			
Dichlorprop	0.151	0.047	mg/kg wet	0.1880		80	40-140			
Dichlorprop [2C]	0.127	0.047	mg/kg wet	0.1880		68	40-140			
MCPA	15.4	2.32	mg/kg wet	18.60		83	40-140			
MCPA [2C]	13.2	2.32	mg/kg wet	18.60		71	40-140			
MCPP	13.4	2.35	mg/kg wet	18.80		71	40-140			
MCPP [2C]	12.9	2.35	mg/kg wet	18.80		69	40-140			
Surrogate: DCAA	*0.189*		mg/kg wet	*0.2000*		*94*	*30-150*			
Surrogate: DCAA [2C]	*0.173*		mg/kg wet	*0.2000*		*87*	*30-150*			
LCS Dup										
2,4,5-T	0.013	0.010	mg/kg wet	0.01900		68	40-140	9	30	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8151A Chlorinated Herbicides										
Batch DJ40835 - 3546										
2,4,5-T [2C]	0.011	0.010	mg/kg wet	0.01900		56	40-140	7	30	
2,4,5-TP (Silvex)	0.013	0.010	mg/kg wet	0.01900		70	40-140	6	30	
2,4,5-TP (Silvex) [2C]	0.013	0.010	mg/kg wet	0.01900		66	40-140	10	30	
2,4-D	0.123	0.047	mg/kg wet	0.1880		66	40-140	11	30	
2,4-D [2C]	0.131	0.047	mg/kg wet	0.1880		70	40-140	4	30	
2,4-DB	0.146	0.048	mg/kg wet	0.1900		77	40-140	10	30	
2,4-DB [2C]	0.128	0.048	mg/kg wet	0.1900		68	40-140	7	30	
Dalapon	0.302	0.046	mg/kg wet	0.4550		66	40-140	4	30	
Dalapon [2C]	0.292	0.046	mg/kg wet	0.4550		64	40-140	4	30	
Dicamba	0.012	0.009	mg/kg wet	0.01880		66	40-140	3	30	
Dicamba [2C]	0.013	0.009	mg/kg wet	0.01880		68	40-140	6	30	
Dichlorprop	0.165	0.047	mg/kg wet	0.1880		88	40-140	9	30	
Dichlorprop [2C]	0.133	0.047	mg/kg wet	0.1880		71	40-140	5	30	
MCPA	14.7	2.32	mg/kg wet	18.60		79	40-140	4	30	
MCPA [2C]	14.1	2.32	mg/kg wet	18.60		76	40-140	7	30	
MCPP	14.2	2.35	mg/kg wet	18.80		75	40-140	6	30	
MCPP [2C]	13.8	2.35	mg/kg wet	18.80		74	40-140	7	30	
Surrogate: DCAA	*0.181*		mg/kg wet	*0.2000*		*90*	*30-150*			
Surrogate: DCAA [2C]	*0.166*		mg/kg wet	*0.2000*		*83*	*30-150*			
8100M Total Petroleum Hydrocarbons										
Batch DJ40709 - 3546										
Blank										
Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Hexatriacontane (C36)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons (C9-C36)	ND	10.0	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							
Surrogate: O-Terphenyl	*3.93*		mg/kg wet	*5.000*		*79*	*40-140*			
LCS										
Decane (C10)	1.7	0.2	mg/kg wet	2.500		67	40-140			
Docosane (C22)	2.0	0.2	mg/kg wet	2.500		78	40-140			
Dodecane (C12)	1.8	0.2	mg/kg wet	2.500		70	40-140			
Eicosane (C20)	1.9	0.2	mg/kg wet	2.500		76	40-140			
Hexacosane (C26)	2.1	0.2	mg/kg wet	2.500		82	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8100M Total Petroleum Hydrocarbons										
Batch DJ40709 - 3546										
Hexadecane (C16)	1.8	0.2	mg/kg wet	2.500		74	40-140			
Hexatriacontane (C36)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Nonadecane (C19)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Nonane (C9)	1.5	0.2	mg/kg wet	2.500		60	30-140			
Octacosane (C28)	2.1	0.2	mg/kg wet	2.500		83	40-140			
Octadecane (C18)	1.8	0.2	mg/kg wet	2.500		73	40-140			
Tetracosane (C24)	1.9	0.2	mg/kg wet	2.500		75	40-140			
Tetradecane (C14)	1.8	0.2	mg/kg wet	2.500		72	40-140			
Total Petroleum Hydrocarbons (C9-C36)	28.2	10.0	mg/kg wet	35.00		81	40-140			
Triacontane (C30)	2.1	0.2	mg/kg wet	2.500		85	40-140			
Surrogate: O-Terphenyl	*3.79*		mg/kg wet	*5.000*		*76*	*40-140*			
LCS Dup										
Decane (C10)	1.7	0.2	mg/kg wet	2.500		67	40-140	1	25	
Docosane (C22)	2.1	0.2	mg/kg wet	2.500		82	40-140	5	25	
Dodecane (C12)	1.8	0.2	mg/kg wet	2.500		72	40-140	3	25	
Eicosane (C20)	2.0	0.2	mg/kg wet	2.500		80	40-140	5	25	
Hexacosane (C26)	2.2	0.2	mg/kg wet	2.500		86	40-140	5	25	
Hexadecane (C16)	1.9	0.2	mg/kg wet	2.500		77	40-140	5	25	
Hexatriacontane (C36)	2.4	0.2	mg/kg wet	2.500		96	40-140	1	25	
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		96	40-140	9	25	
Nonane (C9)	1.5	0.2	mg/kg wet	2.500		60	30-140	0.07	25	
Octacosane (C28)	2.2	0.2	mg/kg wet	2.500		86	40-140	4	25	
Octadecane (C18)	1.9	0.2	mg/kg wet	2.500		76	40-140	4	25	
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		79	40-140	4	25	
Tetradecane (C14)	1.9	0.2	mg/kg wet	2.500		75	40-140	4	25	
Total Petroleum Hydrocarbons (C9-C36)	29.3	10.0	mg/kg wet	35.00		84	40-140	4	25	
Triacontane (C30)	2.2	0.2	mg/kg wet	2.500		88	40-140	3	25	
Surrogate: O-Terphenyl	*3.83*		mg/kg wet	*5.000*		*77*	*40-140*			
Classical Chemistry										
Batch DJ40749 - General Preparation										
Reference										
Flashpoint	80		°F	81.00		99	97.9-102.1			
Batch DJ40750 - General Preparation										
Blank										
Reactive Cyanide	ND	2.0	mg/kg							
Reactive Sulfide	ND	2.0	mg/kg							
LCS										
Reactive Cyanide	4.1	2.0	mg/kg	100.3		4	0.68-5.41			
Reactive Sulfide	2.2	2.0	mg/kg	10.00		22	0-44			
Batch DJ40831 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DJ40831 - General Preparation										
LCS										
Conductivity	1400		umhos/cm	1410		99	90-110			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

Notes and Definitions

WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
Q	Calibration required quadratic regression (Q).
P	Percent difference between primary and confirmation results exceeds 40% (P).
LC	Lower value is used due to matrix interferences (LC).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
CD-	Continuing Calibration %Diff/Drift is below control limit (CD-).
B+	Blank Spike recovery is above upper control limit (B+).
>	Greater than.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0267

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Weston and Sampson Engineers, Inc - TB

Shipped/Delivered Via: ESS Courier

ESS Project ID: 24J0267
Date Received: 10/7/2024
Project Due Date: 10/15/2024
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 1 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** (Yes) / No / NA
10. Were any analyses received outside of hold time? (Yes) / No
    ph

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? (Yes) / No
    a. Air bubbles in aqueous VOAs? Yes / (No)
    b. Does methanol cover soil completely? (Yes) / No / NA
13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By/Acid Lot#:
    b. If dissolved metals are requested, are they: Yes / No Field Filtered — Yes / No To Be Lab Filtered
    c. Low Level VOA vials frozen: Date: 10/7/24 Time: 1820 By: Client

Sample Receiving Notes:

Recieved 18 4oz jars labeled "5-5-5-22" for Arsenic testing. did not Recieve any paperwork with them. Held in SR

14. Was there a need to contact Project Manager? (Yes) / No
    a. Was there a need to contact the client? (Yes) / No
    Who was contacted? Isabelle DolCino Date: 10/8/2024 Time: By: JA

Resolution:

Samples returned to Weston and Sampson per client request

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	598978	Yes	N/A	Yes	4 oz. Jar	NP	
2	598979	Yes	N/A	Yes	4 oz. Jar	NP	
3	598980	Yes	N/A	Yes	4 oz. Jar	NP	
4	598981	Yes	N/A	Yes	4 oz. Jar	NP	
5	598982	Yes	N/A	Yes	4 oz. Jar	NP	
5	598985	Yes	N/A	Yes	8 oz jar	NP	
5	598986	Yes	N/A	Yes	8 oz jar	NP	
5	598991	Yes	N/A	Yes	VOA Vial	MeOH	
5	598994	Yes	N/A	Yes	VOA Vial	DI Water	
5	598995	Yes	N/A	Yes	VOA Vial	DI Water	
6	598983	Yes	N/A	Yes	4 oz. Jar	NP	
6	598987	Yes	N/A	Yes	8 oz jar	NP	
6	598988	Yes	N/A	Yes	8 oz jar	NP	
6	598992	Yes	N/A	Yes	VOA Vial	MeOH	
6	598996	Yes	N/A	Yes	VOA Vial	DI Water	
6	598997	Yes	N/A	Yes	VOA Vial	DI Water	
7	598984	Yes	N/A	Yes	4 oz. Jar	NP	
7	598989	Yes	N/A	Yes	8 oz jar	NP	
7	598990	Yes	N/A	Yes	8 oz jar	NP	
7	598993	Yes	N/A	Yes	VOA Vial	MeOH	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Weston and Sampson Engineers, Inc - TB

ESS Project ID: 24J0267

Date Received: 10/7/2024

7	598998	Yes	N/A	Yes	VOA Vial	DI Water
7	598999	Yes	N/A	Yes	VOA Vial	DI Water

2nd Review

Were all containers scanned into storage/lab? Initials BB

Are barcode labels on correct containers? Yes / No

Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA

Are all Hex Chrome stickers attached? Yes / No / NA

Are all QC stickers attached? Yes / No / NA

Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: [signature] Date & Time: 10/7/24 16:48

Reviewed By: [signature] Date & Time: 10/7/24 1721e.

ESS LABORATORY
185 Frances Avenue
Cranston, RI 02910
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 24J0267 | Page 1 of 1

Turn Time (Days): ☑ > 5 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ Same Day

Regulatory State: MA Criteria: RCS-1

Is this project for any of the following?:

☐ CT RCP ☑ MA MCP ☐ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)

☐ Limit Checker ☐ State Forms ☐ EQuIS
☑ Excel ☐ Hard Copy ☒ Enviro Data
☐ CLP-Like Package ☐ Other (Specify) →

CLIENT INFORMATION

Client: Weston & Sampson
Address: 55 Walkers Brook Drive
Reading, MA 01867
Phone: 1-800-SAMPSON

Email Distribution List: scanlon.annika@wseinc.com, bridgeot@wseinc.com, dolcino.isabelle@wsein.com

PROJECT INFORMATION

Project Name: Roosevelt School
Project Location: Worcester, MA
Project Number: ENG24-0354
Project Manager: Annika Scanlon
Bill to: invoices@wseinc.com
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Arsenic	VOC 8260	SVOC 8270	MCP 14 metals	PCBs 8082	Pesticides 8081	Herbicides 8151	TPH	Flashpoint	Corrosivity/pH	Reactive sulfide	Reactive cyanide	conductivity					Total Number of Bottles
1	10/4/24	12:30	Composite	Soil	S-1	X																	
2	10/4/24	12:35	Composite	Soil	S-2	X																	
3	10/4/24	12:40	Composite	Soil	S-3	X																	
4	10/4/24	12:45	Composite	Soil	S-4	X																	
5	10/4/24	12:30	Composite	Soil	DISP-1		X	X	X	X	X	X	X	X	X	X	X	X					
6	10/4/24	13:30	Composite	Soil	DISP-2		X	X	X	X	X	X	X	X	X	X	X	X					
7	10/4/24	14:05	Composite	Soil	DISP-3		X	X	X	X	X	X	X	X	X	X	X	X					
Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial						AG	V	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG					
Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*							7																
Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*						1		1	1	1	1	1	1	1	1	1	1	1					

Sampled by : IRD

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only

Cooler Temperature (°C): 1.0
OM ICE

Comments: * Please specify "Other" preservative and containers types in this space

VOCs frozen 10/4 18:00

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration
☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	10/4/24	1815	[signature] 10/7/24 1231	[signature]	10/7/24	1602	[signature]

ESS Laboratory
DIVISION OF THE RISE GROUP
BAL Laboratory Analytical Balance

CERTIFICATE OF ANALYSIS

Annika Willis-Scanlon
Weston and Sampson Engineers, Inc.
5 Centennial Drive
Peabody, MA 01960

RE: Roosevelt School Phase II ESA (ENG24-0354)
ESS Laboratory Work Order Number: 24J0561

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 12:52 pm, Oct 25, 2024

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

SAMPLE RECEIPT

The following samples were received on October 11, 2024 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been performed and achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Limit Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Question I: All samples for EPH were analyzed for a subset of the required MCP list per the client's request.

Low Level VOA vials were frozen by ESS Laboratory on Oct. 11, 2024 at 16:52 .
Tetrahydrofuran is reported above the MA CAM reporting limit of 0.010 mg/kg.

Revision 1 October 25, 2024: This report has been revised to include TCLP lead on 24J0561-01.

Lab Number	Sample Name	Matrix	Analysis
24J0561-01	SB-101 0-9ft	Soil	1010A, 1311, 1311/6010D, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A
24J0561-02	SB-102 0-10ft	Soil	1010A, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A
24J0561-03	SB-103 0-5ft	Soil	1010A, 2550B, 6010D, 7.3.3.2, 7.3.4.1, 7471B, 8081B, 8082A, 8100M, 8151A, 8260D Low, 8270E, 9045, 9050A

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

PROJECT NARRATIVE

8081B Organochlorine Pesticides

24J0561-01 **Lower value is used due to matrix interferences (LC).**
alpha-Chlordane [2C]

24J0561-01 **Percent difference between primary and confirmation results exceeds 40% (P).**
alpha-Chlordane [2C]

Semi-Volatile Organic Compounds

D4J0390-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (61% @ 40-160%), 4-Nitrophenol (112% @ 40-160%), Di-n-octylphthalate (103% @ 80-120%)

D4J0390-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
2,4,6-Tribromophenol (22% @ 20%), 2,4-Dimethylphenol (41% @ 20%), Aniline (24% @ 20%)

D4J0390-CCV1 **Initial Calibration Verification recovery is above upper control limit (ICV+).**
4-Nitrophenol

Volatile Organics Low Level

24J0561-01 **Surrogate recovery(ies) above upper control limit (S+).**
1,2-Dichloroethane-d4 (132% @ 70-130%)

24J0561-03 **Surrogate recovery(ies) above upper control limit (S+).**
1,2-Dichloroethane-d4 (136% @ 70-130%)

D4J0301-CCV1 **Calibration required quadratic regression (Q).**
1,4-Dioxane (116% @ 80-120%), Naphthalene (101% @ 40-160%)

DJ41538-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Isopropylbenzene (132% @ 70-130%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010D - ICP
6020B - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260D - VOA
8270E - SVOA
8270E SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 19-2.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **24J0561-01 through 24J0561-03**

Matrices: ( ) Ground Water/Surface Water (x) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(x) 8260 VOC CAM II A	(x) 7470/7471 Hg CAM III B	( ) MassDEP VPH (GC/PID/FID) CAM IV A	(x) 8082 PCB CAM V A	( ) 9014 Total Cyanide/PAC CAM VI A	( ) 6860 Perchlorate CAM VIII B
(x) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	( ) MassDEP VPH (GC/MS) CAM IV C	(x) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(x) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(x) MassDEP EPH CAM IV B	(x) 8151 Herbicides CAM V C	( ) Explosives CAM VIII A	( ) TO-15 VOC CAM IX B

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (x) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (x) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (x) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (x) No ( )
E	VPH, EPH, APH and TO-15 only: a. Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (x) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (x) No ( )

Responses to Questions G, H and I below are required for '"Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes ( ) No (x)*
	***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (x)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes ( ) No (x)*

****All negative responses must be addressed in an attached laboratory narrative.***

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: October 21, 2024

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (5.50)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Arsenic	**43.0** (2.75)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Barium	**184** (1.10)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Beryllium	**0.44** (0.11)	---	6010D	---	1	KJB	10/17/24 15:38	2.11 100	DJ41512
Cadmium	ND (0.55)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Chromium	**23.1** (1.10)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Lead	**275** (5.50)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Mercury	**0.071** (0.037)	---	7471B	---	1	AFV	10/15/24 19:39	0.62 40	DJ41516
Nickel	**12.4** (1.10)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Selenium	ND (5.50)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Silver	ND (0.55)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Thallium	ND (5.50)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Vanadium	**19.5** (1.10)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512
Zinc	**73.3** (2.75)	---	6010D	---	1	KJB	10/16/24 15:13	2.11 100	DJ41512

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/L

Extraction Method: 3005A TCLP

1311 TCLP Metals

Analyte	Results (MRL)	MDL	Method	TCLP Limit	DF	Analyst	Analyzed	IV / FV	Batch
Lead	**0.25** (0.05)	---	1311/6010D	5	1	KJB	10/23/24 20:38	50 50	DJ42328

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 8.5g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1,1-Trichloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1,2,2-Tetrachloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1,2-Trichloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1-Dichloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1-Dichloroethene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,1-Dichloropropene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2,3-Trichlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2,3-Trichloropropane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2,4-Trichlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2,4-Trimethylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2-Dibromo-3-Chloropropane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2-Dibromoethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2-Dichlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2-Dichloroethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,2-Dichloropropane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,3,5-Trimethylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,3-Dichlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,3-Dichloropropane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,4-Dichlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
1,4-Dioxane	ND (0.0683)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
2,2-Dichloropropane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
2-Butanone	ND (0.0341)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
2-Chlorotoluene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
2-Hexanone	ND (0.0341)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
4-Chlorotoluene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
4-Isopropyltoluene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 8.5g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0341)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Acetone	ND (0.0341)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Benzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Bromobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Bromochloromethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Bromodichloromethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Bromoform	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Bromomethane	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Carbon Disulfide	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Carbon Tetrachloride	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Chlorobenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Chloroethane	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Chloroform	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Chloromethane	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
cis-1,2-Dichloroethene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
cis-1,3-Dichloropropene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Dibromochloromethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Dibromomethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Dichlorodifluoromethane	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Diethyl Ether	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Di-isopropyl ether	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Ethyl tertiary-butyl ether	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Ethylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Hexachlorobutadiene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Isopropylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Methyl tert-Butyl Ether	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Methylene Chloride	ND (0.0171)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 8.5g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
n-Butylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
n-Propylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
sec-Butylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Styrene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
tert-Butylbenzene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Tertiary-amyl methyl ether	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Tetrachloroethene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Tetrahydrofuran	ND (0.0137)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Toluene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
trans-1,2-Dichloroethene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
trans-1,3-Dichloropropene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Trichloroethene	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Trichlorofluoromethane	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Vinyl Chloride	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Xylene O	ND (0.0034)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Xylene P,M	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538
Xylenes (Total)	ND (0.0068)	---	8260D Low	---	1	MEK	10/15/24 13:11	D4J0301	DJ41538

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*132 %*	*S+*	*70-130*
Surrogate: 4-Bromofluorobenzene	*85 %*		*70-130*
Surrogate: Dibromofluoromethane	*121 %*		*70-130*
Surrogate: Toluene-d8	*102 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.031)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
1,2,4-Trichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
1,2-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
1,3-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
1,4-Dichlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4,5-Trichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4,6-Trichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4-Dichlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4-Dimethylphenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4-Dinitrophenol	ND (1.22)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,4-Dinitrotoluene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2,6-Dinitrotoluene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2-Chloronaphthalene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2-Chlorophenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2-Methylnaphthalene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2-Methylphenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
2-Nitrophenol	ND (0.611)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
3,3′-Dichlorobenzidine	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
3+4-Methylphenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
4-Bromophenyl-phenylether	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
4-Chloroaniline	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
4-Nitrophenol	ND (1.22)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Acenaphthene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Acenaphthylene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Acetophenone	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Aniline	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Anthracene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Benzo(a)anthracene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Benzo(a)pyrene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Benzo(b)fluoranthene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Benzo(g,h,i)perylene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Benzo(k)fluoranthene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
bis(2-Chloroethoxy)methane	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
bis(2-Chloroethyl)ether	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
bis(2-chloroisopropyl)Ether	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
bis(2-Ethylhexyl)phthalate	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Butylbenzylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Chrysene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Dibenzo(a,h)Anthracene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Dibenzofuran	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Diethylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Dimethylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Di-n-butylphthalate	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Di-n-octylphthalate	ND (0.611)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Fluoranthene	**0.415** (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Fluorene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Hexachlorobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Hexachlorobutadiene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Hexachloroethane	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Indeno(1,2,3-cd)Pyrene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Isophorone	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Naphthalene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Nitrobenzene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Pentachlorophenol	ND (1.22)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Phenanthrene	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Phenol	ND (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527
Pyrene	**0.396** (0.305)	---	8270E	---	1	TJ	10/15/24 23:40	D4J0390	DJ41527

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*85 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*110 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*101 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*86 %*		*30-130*
Surrogate: 2-Fluorophenol	*92 %*		*30-130*
Surrogate: Nitrobenzene-d5	*92 %*		*30-130*
Surrogate: Phenol-d6	*103 %*		*30-130*
Surrogate: p-Terphenyl-d14	*110 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19.5g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/11/24 17:48

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1221	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1232	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1242	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1248	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1254	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1260	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1262	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154
Aroclor 1268	ND (0.06)	---	8082A	---	1	10/15/24 15:06	---	DJ41154

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*78 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*82 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19.9g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/11/24 20:27

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	**0.0194** (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
4,4´-DDE [2C]	**0.0047** (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
4,4´-DDT [2C]	**0.0076** (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Aldrin	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
alpha-BHC	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
alpha-Chlordane [2C]	**P, LC 0.0047** (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
beta-BHC	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Chlordane (Total) [2C]	**0.0331** (0.0233)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
delta-BHC	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Dieldrin	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Endosulfan I	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Endosulfan II	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Endrin	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Endrin Ketone	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
gamma-BHC (Lindane)	ND (0.0017)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
gamma-Chlordane	**0.0053** (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Heptachlor	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Heptachlor Epoxide [2C]	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105
Methoxychlor	ND (0.0029)	---	8081B	---	1	10/16/24 15:00	D4J0281	DJ41105

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl [2C]	*76 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*60 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 10.4g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/16/24 17:36

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.011)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
2,4-D	ND (0.052)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
2,4-DB	ND (0.053)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
Dalapon	ND (0.051)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
Dicamba	ND (0.010)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
Dichlorprop	ND (0.052)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
MCPA	ND (2.59)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669
MCPP	ND (2.62)	---	8151A	---	1	10/18/24 12:16	D4J0377	DJ41669

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*96 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86
Initial Volume: 19.9g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/11/24 20:22

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**41.6** (11.7)	---	8100M	---	1	10/15/24 22:03	---	DJ41156

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*83 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 297** (5)	---	9050A	---	1	EAM	10/15/24 15:10	umhos/cm	DJ41539
Corrosivity (pH)	**6.64** (N/A)	---	9045	---	1	CCP	10/11/24 20:02	S.U.	DJ41151
Corrosivity (pH) Sample Temp	**21.3**	---	2550B	---	1	CCP	10/11/24 20:02	°C	DJ41151
Flashpoint	**> 200** (N/A)	---	1010A	---	1	EEM	10/16/24 11:15	°F	DJ41624
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-101 0-9ft
Date Sampled: 10/11/24 09:00
Percent Solids: 86

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-01
Sample Matrix: Soil
Units: °C

Extraction Method: 1311

TCLP Extraction by 1311 - Metals

Analyte	Results (MRL)	MDL	Method	TCLP Limit	DF	Analyst	Analyzed	IV / FV	Batch
Temperature (Min C)	**20.4** (N/A)	---	1311	---	1	RAP	10/23/24 9:08		DJ42231
Temperature (Max C)	**22.1** (N/A)	---	1311	---	1	RAP	10/23/24 9:08		DJ42231
Temperature (Range)	**Temperature is not within 23 +/-2 °C.** (N/A)								

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (4.49)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Arsenic	**10.0** (2.25)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Barium	**43.5** (0.90)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Beryllium	**0.33** (0.09)	---	6010D	---	1	KJB	10/17/24 15:40	2.34 100	DJ41512
Cadmium	ND (0.45)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Chromium	**22.7** (0.90)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Lead	**25.6** (4.49)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Mercury	**0.138** (0.034)	---	7471B	---	1	AFV	10/15/24 19:41	0.61 40	DJ41516
Nickel	**18.3** (0.90)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Selenium	ND (4.49)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Silver	ND (0.45)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Thallium	ND (4.49)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Vanadium	**26.6** (0.90)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512
Zinc	**43.2** (2.25)	---	6010D	---	1	KJB	10/16/24 15:15	2.34 100	DJ41512

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 10g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1,1-Trichloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1,2,2-Tetrachloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1,2-Trichloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1-Dichloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1-Dichloroethene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,1-Dichloropropene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2,3-Trichlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2,3-Trichloropropane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2,4-Trichlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2,4-Trimethylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2-Dibromo-3-Chloropropane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2-Dibromoethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2-Dichlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2-Dichloroethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,2-Dichloropropane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,3,5-Trimethylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,3-Dichlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,3-Dichloropropane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,4-Dichlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
1,4-Dioxane	ND (0.0526)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
2,2-Dichloropropane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
2-Butanone	ND (0.0263)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
2-Chlorotoluene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
2-Hexanone	ND (0.0263)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
4-Chlorotoluene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
4-Isopropyltoluene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 10g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0263)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Acetone	ND (0.0263)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Benzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Bromobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Bromochloromethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Bromodichloromethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Bromoform	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Bromomethane	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Carbon Disulfide	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Carbon Tetrachloride	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Chlorobenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Chloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Chloroform	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Chloromethane	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
cis-1,2-Dichloroethene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
cis-1,3-Dichloropropene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Dibromochloromethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Dibromomethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Dichlorodifluoromethane	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Diethyl Ether	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Di-isopropyl ether	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Ethyl tertiary-butyl ether	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Ethylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Hexachlorobutadiene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Isopropylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Methyl tert-Butyl Ether	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Methylene Chloride	ND (0.0131)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 10g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
n-Butylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
n-Propylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
sec-Butylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Styrene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
tert-Butylbenzene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Tertiary-amyl methyl ether	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Tetrachloroethene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Tetrahydrofuran	ND (0.0105)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Toluene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
trans-1,2-Dichloroethene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
trans-1,3-Dichloropropene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Trichloroethene	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Trichlorofluoromethane	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Vinyl Chloride	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Xylene O	ND (0.0026)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Xylene P,M	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538
Xylenes (Total)	ND (0.0053)	---	8260D Low	---	1	MEK	10/15/24 13:36	D4J0301	DJ41538

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*124 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*85 %*		*70-130*
Surrogate: Dibromofluoromethane	*116 %*		*70-130*
Surrogate: Toluene-d8	*102 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 20.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.026)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
1,2,4-Trichlorobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
1,2-Dichlorobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
1,3-Dichlorobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
1,4-Dichlorobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4,5-Trichlorophenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4,6-Trichlorophenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4-Dichlorophenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4-Dimethylphenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4-Dinitrophenol	ND (1.05)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,4-Dinitrotoluene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2,6-Dinitrotoluene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2-Chloronaphthalene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2-Chlorophenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2-Methylnaphthalene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2-Methylphenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
2-Nitrophenol	ND (0.523)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
3,3´-Dichlorobenzidine	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
3+4-Methylphenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
4-Bromophenyl-phenylether	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
4-Chloroaniline	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
4-Nitrophenol	ND (1.05)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Acenaphthene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Acenaphthylene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Acetophenone	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Aniline	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Anthracene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 20.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Benzo(a)anthracene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Benzo(a)pyrene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Benzo(b)fluoranthene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Benzo(g,h,i)perylene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Benzo(k)fluoranthene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
bis(2-Chloroethoxy)methane	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
bis(2-Chloroethyl)ether	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
bis(2-chloroisopropyl)Ether	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
bis(2-Ethylhexyl)phthalate	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Butylbenzylphthalate	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Chrysene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Dibenzo(a,h)Anthracene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Dibenzofuran	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Diethylphthalate	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Dimethylphthalate	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Di-n-butylphthalate	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Di-n-octylphthalate	ND (0.523)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Fluoranthene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Fluorene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Hexachlorobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Hexachlorobutadiene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Hexachloroethane	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Indeno(1,2,3-cd)Pyrene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Isophorone	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Naphthalene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Nitrobenzene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 20.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Pentachlorophenol	ND (1.05)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Phenanthrene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Phenol	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527
Pyrene	ND (0.262)	---	8270E	---	1	TJ	10/16/24 0:11	D4J0390	DJ41527

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*83 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*83 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*94 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*86 %*		*30-130*
Surrogate: 2-Fluorophenol	*89 %*		*30-130*
Surrogate: Nitrobenzene-d5	*91 %*		*30-130*
Surrogate: Phenol-d6	*98 %*		*30-130*
Surrogate: p-Terphenyl-d14	*111 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 19.4g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/11/24 17:48

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1221	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1232	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1242	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1248	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1254	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1260	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1262	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154
Aroclor 1268	ND (0.05)	---	8082A	---	1	10/15/24 15:26	---	DJ41154

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*82 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*85 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 19.5g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/11/24 20:27

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
4,4´-DDE	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
4,4´-DDT [2C]	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Aldrin	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
alpha-BHC	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
alpha-Chlordane	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
beta-BHC	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Chlordane (Total)	ND (0.0216)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
delta-BHC	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Dieldrin	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Endosulfan I	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Endosulfan II	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Endosulfan Sulfate	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Endrin	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Endrin Ketone	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
gamma-BHC (Lindane)	ND (0.0016)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
gamma-Chlordane	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Heptachlor	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Heptachlor Epoxide	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Hexachlorobenzene	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105
Methoxychlor	ND (0.0027)	---	8081B	---	1	10/16/24 9:28	D4J0281	DJ41105

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*82 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*68 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 10.2g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/16/24 17:36

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.010)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
2,4,5-TP (Silvex)	ND (0.010)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
2,4-D	ND (0.048)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
2,4-DB	ND (0.049)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
Dalapon	ND (0.047)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
Dicamba	ND (0.010)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
Dichlorprop	ND (0.048)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
MCPA	ND (2.40)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669
MCPP	ND (2.42)	---	8151A	---	1	10/18/24 12:42	D4J0377	DJ41669

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*93 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95
Initial Volume: 19.8g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/11/24 20:22

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**16.2** (10.6)	---	8100M	---	1	10/15/24 22:44	---	DJ41156

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*82 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-102 0-10ft
Date Sampled: 10/11/24 08:40
Percent Solids: 95

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1230** (5)	---	9050A	---	1	EAM	10/15/24 15:10	umhos/cm	DJ41539
Corrosivity (pH)	**7.79** (N/A)	---	9045	---	1	CCP	10/11/24 20:02	S.U.	DJ41151
Corrosivity (pH) Sample Temp	**21.3**	---	2550B	---	1	CCP	10/11/24 20:02	°C	DJ41151
Flashpoint	**> 200** (N/A)	---	1010A	---	1	EEM	10/16/24 11:15	°F	DJ41624
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	IV / FV	Batch
Antimony	ND (4.65)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Arsenic	**12.4** (2.32)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Barium	**42.8** (0.93)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Beryllium	**0.34** (0.09)	---	6010D	---	1	KJB	10/17/24 15:42	2.2 100	DJ41512
Cadmium	ND (0.46)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Chromium	**20.8** (0.93)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Lead	**20.5** (4.65)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Mercury	**0.059** (0.027)	---	7471B	---	1	AFV	10/15/24 21:10	0.76 40	DJ41516
Nickel	**14.8** (0.93)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Selenium	ND (4.65)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Silver	ND (0.46)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Thallium	ND (4.65)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Vanadium	**22.3** (0.93)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512
Zinc	**34.6** (2.32)	---	6010D	---	1	KJB	10/16/24 15:17	2.2 100	DJ41512

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1,1-Trichloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1,2,2-Tetrachloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1,2-Trichloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1-Dichloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,1-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2,3-Trichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2,3-Trichloropropane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2,4-Trichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2,4-Trimethylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2-Dibromo-3-Chloropropane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2-Dibromoethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2-Dichloroethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,2-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,3,5-Trimethylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,3-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,3-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,4-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
1,4-Dioxane	ND (0.0913)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
2,2-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
2-Butanone	ND (0.0456)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
2-Chlorotoluene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
2-Hexanone	ND (0.0456)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
4-Chlorotoluene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
4-Isopropyltoluene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
4-Methyl-2-Pentanone	ND (0.0456)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Acetone	ND (0.0456)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Benzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Bromobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Bromochloromethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Bromodichloromethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Bromoform	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Bromomethane	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Carbon Disulfide	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Carbon Tetrachloride	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Chlorobenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Chloroethane	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Chloroform	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Chloromethane	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
cis-1,2-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
cis-1,3-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Dibromochloromethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Dibromomethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Dichlorodifluoromethane	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Diethyl Ether	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Di-isopropyl ether	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Ethyl tertiary-butyl ether	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Ethylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Hexachlorobutadiene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Isopropylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Methyl tert-Butyl Ether	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Methylene Chloride	ND (0.0228)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 5.6g
Final Volume: 10ml
Extraction Method: 5035

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK
Prepared: 10/15/24 8:00

Volatile Organics Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Naphthalene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
n-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
n-Propylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
sec-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Styrene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
tert-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Tertiary-amyl methyl ether	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Tetrachloroethene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Tetrahydrofuran	ND (0.0183)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Toluene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
trans-1,2-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
trans-1,3-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Trichloroethene	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Trichlorofluoromethane	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Vinyl Chloride	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Xylene O	ND (0.0046)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Xylene P,M	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538
Xylenes (Total)	ND (0.0091)	---	8260D Low	---	1	MEK	10/15/24 14:02	D4J0301	DJ41538

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*136 %*	*S+*	*70-130*
Surrogate: 4-Bromofluorobenzene	*81 %*		*70-130*
Surrogate: Dibromofluoromethane	*124 %*		*70-130*
Surrogate: Toluene-d8	*99 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 20.9g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
1,1-Biphenyl	ND (0.024)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
1,2,4-Trichlorobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
1,2-Dichlorobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
1,3-Dichlorobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
1,4-Dichlorobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4,5-Trichlorophenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4,6-Trichlorophenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4-Dichlorophenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4-Dimethylphenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4-Dinitrophenol	ND (0.978)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,4-Dinitrotoluene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2,6-Dinitrotoluene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2-Chloronaphthalene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2-Chlorophenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2-Methylnaphthalene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2-Methylphenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
2-Nitrophenol	ND (0.489)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
3,3´-Dichlorobenzidine	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
3+4-Methylphenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
4-Bromophenyl-phenylether	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
4-Chloroaniline	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
4-Nitrophenol	ND (0.978)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Acenaphthene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Acenaphthylene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Acetophenone	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Aniline	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Anthracene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 20.9g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Azobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Benzo(a)anthracene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Benzo(a)pyrene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Benzo(b)fluoranthene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Benzo(g,h,i)perylene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Benzo(k)fluoranthene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
bis(2-Chloroethoxy)methane	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
bis(2-Chloroethyl)ether	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
bis(2-chloroisopropyl)Ether	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
bis(2-Ethylhexyl)phthalate	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Butylbenzylphthalate	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Chrysene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Dibenzo(a,h)Anthracene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Dibenzofuran	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Diethylphthalate	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Dimethylphthalate	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Di-n-butylphthalate	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Di-n-octylphthalate	ND (0.489)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Fluoranthene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Fluorene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Hexachlorobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Hexachlorobutadiene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Hexachloroethane	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Indeno(1,2,3-cd)Pyrene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Isophorone	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Naphthalene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Nitrobenzene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 20.9g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 10/15/24 12:10

Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
N-Nitrosodimethylamine	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Pentachlorophenol	ND (0.978)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Phenanthrene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Phenol	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527
Pyrene	ND (0.245)	---	8270E	---	1	TJ	10/16/24 0:41	D4J0390	DJ41527

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichlorobenzene-d4	*81 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*103 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*95 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*80 %*		*30-130*
Surrogate: 2-Fluorophenol	*87 %*		*30-130*
Surrogate: Nitrobenzene-d5	*87 %*		*30-130*
Surrogate: Phenol-d6	*97 %*		*30-130*
Surrogate: p-Terphenyl-d14	*100 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 19.4g
Final Volume: 10ml
Extraction Method: 3540C

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JLG
Prepared: 10/11/24 17:48

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1221	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1232	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1242	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1248	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1254	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1260	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1262	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154
Aroclor 1268	ND (0.05)	---	8082A	---	1	10/15/24 15:45	---	DJ41154

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*80 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*78 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 20.4g
Final Volume: 5ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/11/24 20:27

8081B Organochlorine Pesticides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
4,4´-DDD	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
4,4´-DDE	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
4,4´-DDT [2C]	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Aldrin	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
alpha-BHC	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
alpha-Chlordane	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
beta-BHC	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Chlordane (Total)	ND (0.0200)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
delta-BHC	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Dieldrin	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Endosulfan I	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Endosulfan II	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Endosulfan Sulfate	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Endrin	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Endrin Ketone	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
gamma-BHC (Lindane)	ND (0.0015)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
gamma-Chlordane	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Heptachlor	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Heptachlor Epoxide	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Hexachlorobenzene	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105
Methoxychlor	ND (0.0025)	---	8081B	---	1	10/16/24 9:55	D4J0281	DJ41105

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*67 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*49 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 10.5g
Final Volume: 4ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: DMC
Prepared: 10/16/24 17:36

8151A Chlorinated Herbicides

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2,4,5-T	ND (0.009)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
2,4,5-TP (Silvex)	ND (0.009)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
2,4-D	ND (0.046)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
2,4-DB	ND (0.046)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
Dalapon	ND (0.044)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
Dicamba	ND (0.009)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
Dichlorprop	ND (0.046)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
MCPA	ND (2.26)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669
MCPP	ND (2.29)	---	8151A	---	1	10/18/24 13:09	D4J0377	DJ41669

	%Recovery	*Qualifier*	*Limits*
Surrogate: DCAA	*97 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98
Initial Volume: 20.1g
Final Volume: 1ml
Extraction Method: 3546

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JDN
Prepared: 10/11/24 20:22

8100M Total Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Total Petroleum Hydrocarbons (C9-C36)	**19.1** (10.2)	---	8100M	---	1	10/15/24 23:26	---	DJ41156

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	*83 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA
Client Sample ID: SB-103 0-5ft
Date Sampled: 10/11/24 09:20
Percent Solids: 98

ESS Laboratory Work Order: 24J0561
ESS Laboratory Sample ID: 24J0561-03
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 55** (5)	---	9050A	---	1	EAM	10/15/24 15:10	umhos/cm	DJ41539
Corrosivity (pH)	**5.50** (N/A)	---	9045	---	1	CCP	10/11/24 20:02	S.U.	DJ41151
Corrosivity (pH) Sample Temp	**21.1**	---	2550B	---	1	CCP	10/11/24 20:02	°C	DJ41151
Flashpoint	**> 200** (N/A)	---	1010A	---	1	EEM	10/16/24 11:15	°F	DJ41624
Reactive Cyanide	ND (2.0)	---	7.3.3.2	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644
Reactive Sulfide	ND (2.0)	---	7.3.4.1	---	1	EAM	10/16/24 17:00	mg/kg	DJ41644

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DJ41512 - 3050B										
Blank										
Antimony	ND	4.37	mg/kg wet							
Arsenic	ND	2.18	mg/kg wet							
Barium	ND	0.87	mg/kg wet							
Beryllium	ND	0.09	mg/kg wet							
Cadmium	ND	0.44	mg/kg wet							
Chromium	ND	0.87	mg/kg wet							
Lead	ND	4.37	mg/kg wet							
Nickel	ND	0.87	mg/kg wet							
Selenium	ND	4.37	mg/kg wet							
Silver	ND	0.44	mg/kg wet							
Thallium	ND	4.37	mg/kg wet							
Vanadium	ND	0.87	mg/kg wet							
Zinc	ND	2.18	mg/kg wet							
LCS										
Antimony	73.7	14.5	mg/kg wet	245.0		30	10-110			
Arsenic	113	7.25	mg/kg wet	280.0		40	32-110			
Barium	290	2.90	mg/kg wet	688.0		42	33-110			
Beryllium	45.5	0.29	mg/kg wet	105.0		43	32-110			
Cadmium	83.7	1.45	mg/kg wet	210.0		40	33-110			
Chromium	126	2.90	mg/kg wet	225.0		56	50-110			
Lead	145	14.5	mg/kg wet	350.0		41	31-110			
Nickel	53.9	2.90	mg/kg wet	95.00		57	48-111			
Selenium	126	14.5	mg/kg wet	320.0		39	29-110			
Silver	36.3	1.45	mg/kg wet	95.00		38	30-111			
Thallium	102	14.5	mg/kg wet	250.0		41	28-110			
Vanadium	128	2.90	mg/kg wet	295.0		43	34-110			
Zinc	207	7.25	mg/kg wet	500.0		41	30-110			
LCS Dup										
Antimony	99.1	16.4	mg/kg wet	245.0		40	10-110	29	30	
Arsenic	147	8.20	mg/kg wet	280.0		52	32-110	26	30	
Barium	374	3.28	mg/kg wet	688.0		54	33-110	25	30	
Beryllium	55.5	0.33	mg/kg wet	105.0		53	32-110	20	30	
Cadmium	101	1.64	mg/kg wet	210.0		48	33-110	18	30	
Chromium	149	3.28	mg/kg wet	225.0		66	50-110	17	30	
Lead	179	16.4	mg/kg wet	350.0		51	31-110	21	30	
Nickel	63.6	3.28	mg/kg wet	95.00		67	48-111	17	30	
Selenium	163	16.4	mg/kg wet	320.0		51	29-110	26	30	
Silver	47.3	1.64	mg/kg wet	95.00		50	30-111	26	30	
Thallium	125	16.4	mg/kg wet	250.0		50	28-110	21	30	
Vanadium	165	3.28	mg/kg wet	295.0		56	34-110	25	30	
Zinc	246	8.20	mg/kg wet	500.0		49	30-110	17	30	
Batch DJ41516 - 7471B										

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DJ41516 - 7471B										
Blank										
Mercury	ND	0.031	mg/kg wet							
LCS										
Mercury	13.0	3.00	mg/kg wet	14.40		91	80-120			
LCS Dup										
Mercury	13.1	3.00	mg/kg wet	14.40		91	80-120	0.8	30	
1311 TCLP Metals										
Batch DJ42328 - 3005A_TCLP										
Blank										
Lead	ND	0.05	mg/L							
LCS										
Lead	0.46	0.05	mg/L	0.5000		92	80-120			
LCS Dup										
Lead	0.46	0.05	mg/L	0.5000		93	80-120	1	20	
Volatile Organics Low Level										
Batch DJ41538 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ41538 - 5035										
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							
Bromomethane	ND	0.0100	mg/kg wet							
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0050	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0250	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0200	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ41538 - 5035										
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0607*		mg/kg wet	*0.05000*		*121*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0460*		mg/kg wet	*0.05000*		*92*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0586*		mg/kg wet	*0.05000*		*117*	*70-130*			
Surrogate: Toluene-d8	*0.0508*		mg/kg wet	*0.05000*		*102*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,1-Trichloroethane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,1,2,2-Tetrachloroethane	0.0529	0.0050	mg/kg wet	0.05000		106	40-160			
1,1,2-Trichloroethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
1,1-Dichloroethane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130			
1,1-Dichloroethene	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
1,1-Dichloropropene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
1,2,3-Trichlorobenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
1,2,3-Trichloropropane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,4-Trichlorobenzene	0.0558	0.0050	mg/kg wet	0.05000		112	70-130			
1,2,4-Trimethylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
1,2-Dibromo-3-Chloropropane	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dibromoethane	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dichlorobenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
1,2-Dichloroethane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,2-Dichloropropane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
1,3,5-Trimethylbenzene	0.0588	0.0050	mg/kg wet	0.05000		118	70-130			
1,3-Dichlorobenzene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
1,3-Dichloropropane	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
1,4-Dichlorobenzene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
1,4-Dioxane	1.20	0.100	mg/kg wet	1.000		120	70-130			
2,2-Dichloropropane	0.0567	0.0050	mg/kg wet	0.05000		113	70-130			
2-Butanone	0.327	0.0500	mg/kg wet	0.2500		131	40-160			
2-Chlorotoluene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130			
2-Hexanone	0.247	0.0500	mg/kg wet	0.2500		99	40-160			
4-Chlorotoluene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
4-Isopropyltoluene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
4-Methyl-2-Pentanone	0.246	0.0500	mg/kg wet	0.2500		98	40-160			
Acetone	0.349	0.0500	mg/kg wet	0.2500		139	40-160			
Benzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
Bromobenzene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130			
Bromochloromethane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
Bromodichloromethane	0.0579	0.0050	mg/kg wet	0.05000		116	70-130			
Bromoform	0.0403	0.0050	mg/kg wet	0.05000		81	40-160			
Bromomethane	0.0538	0.0100	mg/kg wet	0.05000		108	40-160			
Carbon Disulfide	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			
Carbon Tetrachloride	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Chlorobenzene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
Chloroethane	0.0594	0.0100	mg/kg wet	0.05000		119	40-160			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ41538 - 5035										
Chloroform	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Chloromethane	0.0541	0.0100	mg/kg wet	0.05000		108	40-160			
cis-1,2-Dichloroethene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130			
cis-1,3-Dichloropropene	0.0509	0.0050	mg/kg wet	0.05000		102	40-160			
Dibromochloromethane	0.0533	0.0050	mg/kg wet	0.05000		107	40-160			
Dibromomethane	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
Dichlorodifluoromethane	0.0354	0.0100	mg/kg wet	0.05000		71	40-160			
Diethyl Ether	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
Di-isopropyl ether	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
Ethyl tertiary-butyl ether	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
Ethylbenzene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
Hexachlorobutadiene	0.0520	0.0050	mg/kg wet	0.05000		104	40-160			
Isopropylbenzene	0.0648	0.0050	mg/kg wet	0.05000		130	70-130			
Methyl tert-Butyl Ether	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Methylene Chloride	0.0547	0.0250	mg/kg wet	0.05000		109	70-130			
Naphthalene	0.0528	0.0050	mg/kg wet	0.05000		106	40-160			
n-Butylbenzene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130			
n-Propylbenzene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130			
sec-Butylbenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
Styrene	0.0459	0.0050	mg/kg wet	0.05000		92	40-160			
tert-Butylbenzene	0.0581	0.0050	mg/kg wet	0.05000		116	70-130			
Tertiary-amyl methyl ether	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
Tetrachloroethene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
Tetrahydrofuran	0.0480	0.0200	mg/kg wet	0.05000		96	70-130			
Toluene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130			
trans-1,2-Dichloroethene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130			
trans-1,3-Dichloropropene	0.0466	0.0050	mg/kg wet	0.05000		93	70-130			
Trichloroethene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
Trichlorofluoromethane	0.0536	0.0050	mg/kg wet	0.05000		107	40-160			
Vinyl Chloride	0.0532	0.0100	mg/kg wet	0.05000		106	70-130			
Xylene O	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
Xylene P,M	0.0958	0.0100	mg/kg wet	0.1000		96	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0511*		mg/kg wet	*0.05000*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0482*		mg/kg wet	*0.05000*		*96*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0524*		mg/kg wet	*0.05000*		*105*	*70-130*			
Surrogate: Toluene-d8	*0.0467*		mg/kg wet	*0.05000*		*93*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	12	20	
1,1,1-Trichloroethane	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	4	20	
1,1,2,2-Tetrachloroethane	0.0524	0.0050	mg/kg wet	0.05000		105	40-160	1	20	
1,1,2-Trichloroethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	0.1	20	
1,1-Dichloroethane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	4	20	
1,1-Dichloroethene	0.0606	0.0050	mg/kg wet	0.05000		121	70-130	6	20	
1,1-Dichloropropene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	3	20	
1,2,3-Trichlorobenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	0.3	20	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ41538 - 5035										
1,2,3-Trichloropropane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.4	20	
1,2,4-Trichlorobenzene	0.0564	0.0050	mg/kg wet	0.05000		113	70-130	1	20	
1,2,4-Trimethylbenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	0.9	20	
1,2-Dibromo-3-Chloropropane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	2	20	
1,2-Dibromoethane	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	12	20	
1,2-Dichlorobenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	0.6	20	
1,2-Dichloroethane	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	0.8	20	
1,2-Dichloropropane	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	2	20	
1,3,5-Trimethylbenzene	0.0593	0.0050	mg/kg wet	0.05000		119	70-130	0.7	20	
1,3-Dichlorobenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	3	20	
1,3-Dichloropropane	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	10	20	
1,4-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	2	20	
1,4-Dioxane	1.19	0.100	mg/kg wet	1.000		119	70-130	0.9	20	
2,2-Dichloropropane	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	3	20	
2-Butanone	0.327	0.0500	mg/kg wet	0.2500		131	40-160	0.02	20	
2-Chlorotoluene	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	2	20	
2-Hexanone	0.272	0.0500	mg/kg wet	0.2500		109	40-160	10	20	
4-Chlorotoluene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130	0.9	20	
4-Isopropyltoluene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	0.1	20	
4-Methyl-2-Pentanone	0.245	0.0500	mg/kg wet	0.2500		98	40-160	0.3	20	
Acetone	0.353	0.0500	mg/kg wet	0.2500		141	40-160	1	20	
Benzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	3	20	
Bromobenzene	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	3	20	
Bromochloromethane	0.0588	0.0050	mg/kg wet	0.05000		118	70-130	3	20	
Bromodichloromethane	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	1	20	
Bromoform	0.0442	0.0050	mg/kg wet	0.05000		88	40-160	9	20	
Bromomethane	0.0570	0.0100	mg/kg wet	0.05000		114	40-160	6	20	
Carbon Disulfide	0.0597	0.0050	mg/kg wet	0.05000		119	70-130	5	20	
Carbon Tetrachloride	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	3	20	
Chlorobenzene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	10	20	
Chloroethane	0.0621	0.0100	mg/kg wet	0.05000		124	40-160	4	20	
Chloroform	0.0548	0.0050	mg/kg wet	0.05000		110	70-130	3	20	
Chloromethane	0.0575	0.0100	mg/kg wet	0.05000		115	40-160	6	20	
cis-1,2-Dichloroethene	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	3	20	
cis-1,3-Dichloropropene	0.0528	0.0050	mg/kg wet	0.05000		106	40-160	4	20	
Dibromochloromethane	0.0591	0.0050	mg/kg wet	0.05000		118	40-160	10	20	
Dibromomethane	0.0581	0.0050	mg/kg wet	0.05000		116	70-130	2	20	
Dichlorodifluoromethane	0.0373	0.0100	mg/kg wet	0.05000		75	40-160	5	20	
Diethyl Ether	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	3	20	
Di-isopropyl ether	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	4	20	
Ethyl tertiary-butyl ether	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	3	20	
Ethylbenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	11	20	
Hexachlorobutadiene	0.0523	0.0050	mg/kg wet	0.05000		105	40-160	0.5	20	
Isopropylbenzene	0.0659	0.0050	mg/kg wet	0.05000		132	70-130	2	20	B+
Methyl tert-Butyl Ether	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	5	20	

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Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Volatile Organics Low Level										
Batch DJ41538 - 5035										
Methylene Chloride	0.0570	0.0250	mg/kg wet	0.05000		114	70-130	4	20	
Naphthalene	0.0533	0.0050	mg/kg wet	0.05000		107	40-160	1	20	
n-Butylbenzene	0.0581	0.0050	mg/kg wet	0.05000		116	70-130	0.5	20	
n-Propylbenzene	0.0575	0.0050	mg/kg wet	0.05000		115	70-130	0.1	20	
sec-Butylbenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	0.3	20	
Styrene	0.0506	0.0050	mg/kg wet	0.05000		101	40-160	10	20	
tert-Butylbenzene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	0.6	20	
Tertiary-amyl methyl ether	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	3	20	
Tetrachloroethene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	14	20	
Tetrahydrofuran	0.0487	0.0200	mg/kg wet	0.05000		97	70-130	1	20	
Toluene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130	3	20	
trans-1,2-Dichloroethene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	5	20	
trans-1,3-Dichloropropene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	3	20	
Trichloroethene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	2	20	
Trichlorofluoromethane	0.0561	0.0050	mg/kg wet	0.05000		112	40-160	5	20	
Vinyl Chloride	0.0558	0.0100	mg/kg wet	0.05000		112	70-130	5	20	
Xylene O	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	11	20	
Xylene P,M	0.106	0.0100	mg/kg wet	0.1000		106	70-130	10	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0503*		mg/kg wet	*0.05000*		*101*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0507*		mg/kg wet	*0.05000*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0516*		mg/kg wet	*0.05000*		*103*	*70-130*			
Surrogate: Toluene-d8	*0.0508*		mg/kg wet	*0.05000*		*102*	*70-130*			
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
Blank										
1,1-Biphenyl	ND	0.025	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet							
1,2-Dichlorobenzene	ND	0.250	mg/kg wet							
1,3-Dichlorobenzene	ND	0.250	mg/kg wet							
1,4-Dichlorobenzene	ND	0.250	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet							
2,4-Dichlorophenol	ND	0.250	mg/kg wet							
2,4-Dimethylphenol	ND	0.250	mg/kg wet							
2,4-Dinitrophenol	ND	1.00	mg/kg wet							
2,4-Dinitrotoluene	ND	0.250	mg/kg wet							
2,6-Dinitrotoluene	ND	0.250	mg/kg wet							
2-Chloronaphthalene	ND	0.250	mg/kg wet							
2-Chlorophenol	ND	0.250	mg/kg wet							
2-Methylnaphthalene	ND	0.250	mg/kg wet							
2-Methylphenol	ND	0.250	mg/kg wet							
2-Nitrophenol	ND	0.500	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.250	mg/kg wet							
3+4-Methylphenol	ND	0.250	mg/kg wet							

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Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet							
4-Chloroaniline	ND	0.250	mg/kg wet							
4-Nitrophenol	ND	1.00	mg/kg wet							
Acenaphthene	ND	0.250	mg/kg wet							
Acenaphthylene	ND	0.250	mg/kg wet							
Acetophenone	ND	0.250	mg/kg wet							
Aniline	ND	0.250	mg/kg wet							
Anthracene	ND	0.250	mg/kg wet							
Azobenzene	ND	0.250	mg/kg wet							
Benzo(a)anthracene	ND	0.250	mg/kg wet							
Benzo(a)pyrene	ND	0.250	mg/kg wet							
Benzo(b)fluoranthene	ND	0.250	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet							
Benzo(k)fluoranthene	ND	0.250	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet							
Butylbenzylphthalate	ND	0.250	mg/kg wet							
Chrysene	ND	0.250	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet							
Dibenzofuran	ND	0.250	mg/kg wet							
Diethylphthalate	ND	0.250	mg/kg wet							
Dimethylphthalate	ND	0.250	mg/kg wet							
Di-n-butylphthalate	ND	0.250	mg/kg wet							
Di-n-octylphthalate	ND	0.500	mg/kg wet							
Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.23*		mg/kg wet	*2.500*		*89*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.68*		mg/kg wet	*3.750*		*98*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.74*		mg/kg wet	*3.750*		*100*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.25*		mg/kg wet	*2.500*		*90*	*30-130*			
Surrogate: 2-Fluorophenol	*3.49*		mg/kg wet	*3.750*		*93*	*30-130*			

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
Surrogate: Nitrobenzene-d5	*2.43*		mg/kg wet	*2.500*		*97*	*30-130*			
Surrogate: Phenol-d6	*3.86*		mg/kg wet	*3.750*		*103*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.76*		mg/kg wet	*2.500*		*111*	*30-130*			
LCS										
1,1-Biphenyl	2.07	0.025	mg/kg wet	2.500		83	40-140			
1,2,4-Trichlorobenzene	1.89	0.250	mg/kg wet	2.500		76	40-140			
1,2-Dichlorobenzene	2.09	0.250	mg/kg wet	2.500		84	40-140			
1,3-Dichlorobenzene	1.98	0.250	mg/kg wet	2.500		79	40-140			
1,4-Dichlorobenzene	2.05	0.250	mg/kg wet	2.500		82	40-140			
2,4,5-Trichlorophenol	2.27	0.250	mg/kg wet	2.500		91	30-130			
2,4,6-Trichlorophenol	2.24	0.250	mg/kg wet	2.500		89	30-130			
2,4-Dichlorophenol	1.97	0.250	mg/kg wet	2.500		79	30-130			
2,4-Dimethylphenol	2.48	0.250	mg/kg wet	2.500		99	30-130			
2,4-Dinitrophenol	1.34	1.00	mg/kg wet	2.500		53	15-140			
2,4-Dinitrotoluene	2.47	0.250	mg/kg wet	2.500		99	40-140			
2,6-Dinitrotoluene	2.33	0.250	mg/kg wet	2.500		93	40-140			
2-Chloronaphthalene	2.19	0.250	mg/kg wet	2.500		88	40-140			
2-Chlorophenol	2.18	0.250	mg/kg wet	2.500		87	30-130			
2-Methylnaphthalene	1.86	0.250	mg/kg wet	2.500		75	40-140			
2-Methylphenol	2.25	0.250	mg/kg wet	2.500		90	15-140			
2-Nitrophenol	2.05	0.500	mg/kg wet	2.500		82	30-130			
3,3´-Dichlorobenzidine	2.40	0.250	mg/kg wet	2.500		96	40-140			
3+4-Methylphenol	4.60	0.250	mg/kg wet	5.000		92	15-140			
4-Bromophenyl-phenylether	2.52	0.250	mg/kg wet	2.500		101	40-140			
4-Chloroaniline	1.71	0.250	mg/kg wet	2.500		68	15-140			
4-Nitrophenol	2.56	1.00	mg/kg wet	2.500		102	15-140			
Acenaphthene	2.24	0.250	mg/kg wet	2.500		90	40-140			
Acenaphthylene	2.36	0.250	mg/kg wet	2.500		94	40-140			
Acetophenone	2.06	0.250	mg/kg wet	2.500		82	40-140			
Aniline	1.40	0.250	mg/kg wet	2.500		56	40-140			
Anthracene	2.50	0.250	mg/kg wet	2.500		100	40-140			
Azobenzene	2.12	0.250	mg/kg wet	2.500		85	40-140			
Benzo(a)anthracene	2.38	0.250	mg/kg wet	2.500		95	40-140			
Benzo(a)pyrene	2.42	0.250	mg/kg wet	2.500		97	40-140			
Benzo(b)fluoranthene	2.21	0.250	mg/kg wet	2.500		88	40-140			
Benzo(g,h,i)perylene	2.79	0.250	mg/kg wet	2.500		112	40-140			
Benzo(k)fluoranthene	2.55	0.250	mg/kg wet	2.500		102	40-140			
bis(2-Chloroethoxy)methane	1.89	0.250	mg/kg wet	2.500		75	40-140			
bis(2-Chloroethyl)ether	2.18	0.250	mg/kg wet	2.500		87	40-140			
bis(2-chloroisopropyl)Ether	1.84	0.250	mg/kg wet	2.500		74	40-140			
bis(2-Ethylhexyl)phthalate	2.41	0.250	mg/kg wet	2.500		96	40-140			
Butylbenzylphthalate	2.37	0.250	mg/kg wet	2.500		95	40-140			
Chrysene	2.40	0.250	mg/kg wet	2.500		96	40-140			
Dibenzo(a,h)Anthracene	2.75	0.250	mg/kg wet	2.500		110	40-140			
Dibenzofuran	2.16	0.250	mg/kg wet	2.500		86	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
Diethylphthalate	2.57	0.250	mg/kg wet	2.500		103	40-140			
Dimethylphthalate	2.46	0.250	mg/kg wet	2.500		98	15-140			
Di-n-butylphthalate	2.83	0.250	mg/kg wet	2.500		113	40-140			
Di-n-octylphthalate	2.65	0.500	mg/kg wet	2.500		106	40-140			
Fluoranthene	2.60	0.250	mg/kg wet	2.500		104	40-140			
Fluorene	2.29	0.250	mg/kg wet	2.500		92	40-140			
Hexachlorobenzene	2.52	0.250	mg/kg wet	2.500		101	40-140			
Hexachlorobutadiene	1.83	0.250	mg/kg wet	2.500		73	40-140			
Hexachloroethane	2.05	0.250	mg/kg wet	2.500		82	40-140			
Indeno(1,2,3-cd)Pyrene	2.35	0.250	mg/kg wet	2.500		94	40-140			
Isophorone	1.87	0.250	mg/kg wet	2.500		75	40-140			
Naphthalene	1.79	0.250	mg/kg wet	2.500		71	40-140			
Nitrobenzene	1.92	0.250	mg/kg wet	2.500		77	40-140			
N-Nitrosodimethylamine	1.85	0.250	mg/kg wet	2.500		74	40-140			
Pentachlorophenol	1.69	1.00	mg/kg wet	2.500		68	15-140			
Phenanthrene	2.26	0.250	mg/kg wet	2.500		90	40-140			
Phenol	2.37	0.250	mg/kg wet	2.500		95	15-140			
Pyrene	2.32	0.250	mg/kg wet	2.500		93	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.18*		mg/kg wet	*2.500*		*87*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.48*		mg/kg wet	*3.750*		*120*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.74*		mg/kg wet	*3.750*		*100*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.20*		mg/kg wet	*2.500*		*88*	*30-130*			
Surrogate: 2-Fluorophenol	*3.41*		mg/kg wet	*3.750*		*91*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.09*		mg/kg wet	*2.500*		*84*	*30-130*			
Surrogate: Phenol-d6	*3.91*		mg/kg wet	*3.750*		*104*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.53*		mg/kg wet	*2.500*		*101*	*30-130*			
LCS Dup										
1,1-Biphenyl	2.00	0.025	mg/kg wet	2.500		80	40-140	3	30	
1,2,4-Trichlorobenzene	1.86	0.250	mg/kg wet	2.500		74	40-140	2	30	
1,2-Dichlorobenzene	2.08	0.250	mg/kg wet	2.500		83	40-140	0.3	30	
1,3-Dichlorobenzene	1.91	0.250	mg/kg wet	2.500		76	40-140	3	30	
1,4-Dichlorobenzene	2.10	0.250	mg/kg wet	2.500		84	40-140	3	30	
2,4,5-Trichlorophenol	2.25	0.250	mg/kg wet	2.500		90	30-130	0.9	30	
2,4,6-Trichlorophenol	2.25	0.250	mg/kg wet	2.500		90	30-130	0.8	30	
2,4-Dichlorophenol	1.94	0.250	mg/kg wet	2.500		78	30-130	2	30	
2,4-Dimethylphenol	2.50	0.250	mg/kg wet	2.500		100	30-130	0.9	30	
2,4-Dinitrophenol	1.57	1.00	mg/kg wet	2.500		63	15-140	16	30	
2,4-Dinitrotoluene	2.49	0.250	mg/kg wet	2.500		99	40-140	0.5	30	
2,6-Dinitrotoluene	2.36	0.250	mg/kg wet	2.500		94	40-140	1	30	
2-Chloronaphthalene	2.16	0.250	mg/kg wet	2.500		86	40-140	2	30	
2-Chlorophenol	2.13	0.250	mg/kg wet	2.500		85	30-130	3	30	
2-Methylnaphthalene	1.83	0.250	mg/kg wet	2.500		73	40-140	2	30	
2-Methylphenol	2.17	0.250	mg/kg wet	2.500		87	15-140	4	30	
2-Nitrophenol	1.98	0.500	mg/kg wet	2.500		79	30-130	3	30	
3,3´-Dichlorobenzidine	2.37	0.250	mg/kg wet	2.500		95	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
3+4-Methylphenol	4.48	0.250	mg/kg wet	5.000		90	15-140	3	30	
4-Bromophenyl-phenylether	2.49	0.250	mg/kg wet	2.500		100	40-140	1	30	
4-Chloroaniline	1.60	0.250	mg/kg wet	2.500		64	15-140	7	30	
4-Nitrophenol	2.64	1.00	mg/kg wet	2.500		106	15-140	3	30	
Acenaphthene	2.23	0.250	mg/kg wet	2.500		89	40-140	0.5	30	
Acenaphthylene	2.37	0.250	mg/kg wet	2.500		95	40-140	0.4	30	
Acetophenone	2.00	0.250	mg/kg wet	2.500		80	40-140	3	30	
Aniline	1.29	0.250	mg/kg wet	2.500		52	40-140	8	30	
Anthracene	2.47	0.250	mg/kg wet	2.500		99	40-140	1	30	
Azobenzene	2.08	0.250	mg/kg wet	2.500		83	40-140	2	30	
Benzo(a)anthracene	2.40	0.250	mg/kg wet	2.500		96	40-140	0.5	30	
Benzo(a)pyrene	2.44	0.250	mg/kg wet	2.500		97	40-140	0.8	30	
Benzo(b)fluoranthene	2.20	0.250	mg/kg wet	2.500		88	40-140	0.3	30	
Benzo(g,h,i)perylene	2.71	0.250	mg/kg wet	2.500		109	40-140	3	30	
Benzo(k)fluoranthene	2.55	0.250	mg/kg wet	2.500		102	40-140	0.03	30	
bis(2-Chloroethoxy)methane	1.83	0.250	mg/kg wet	2.500		73	40-140	3	30	
bis(2-Chloroethyl)ether	2.10	0.250	mg/kg wet	2.500		84	40-140	4	30	
bis(2-chloroisopropyl)Ether	1.77	0.250	mg/kg wet	2.500		71	40-140	4	30	
bis(2-Ethylhexyl)phthalate	2.38	0.250	mg/kg wet	2.500		95	40-140	0.9	30	
Butylbenzylphthalate	2.37	0.250	mg/kg wet	2.500		95	40-140	0.02	30	
Chrysene	2.41	0.250	mg/kg wet	2.500		96	40-140	0.3	30	
Dibenzo(a,h)Anthracene	2.72	0.250	mg/kg wet	2.500		109	40-140	1	30	
Dibenzofuran	2.15	0.250	mg/kg wet	2.500		86	40-140	0.4	30	
Diethylphthalate	2.60	0.250	mg/kg wet	2.500		104	40-140	1	30	
Dimethylphthalate	2.47	0.250	mg/kg wet	2.500		99	15-140	0.4	30	
Di-n-butylphthalate	2.83	0.250	mg/kg wet	2.500		113	40-140	0.1	30	
Di-n-octylphthalate	2.64	0.500	mg/kg wet	2.500		106	40-140	0.09	30	
Fluoranthene	2.62	0.250	mg/kg wet	2.500		105	40-140	0.7	30	
Fluorene	2.27	0.250	mg/kg wet	2.500		91	40-140	0.8	30	
Hexachlorobenzene	2.50	0.250	mg/kg wet	2.500		100	40-140	0.6	30	
Hexachlorobutadiene	1.80	0.250	mg/kg wet	2.500		72	40-140	1	30	
Hexachloroethane	1.99	0.250	mg/kg wet	2.500		79	40-140	3	30	
Indeno(1,2,3-cd)Pyrene	2.32	0.250	mg/kg wet	2.500		93	40-140	2	30	
Isophorone	1.83	0.250	mg/kg wet	2.500		73	40-140	2	30	
Naphthalene	1.75	0.250	mg/kg wet	2.500		70	40-140	2	30	
Nitrobenzene	1.85	0.250	mg/kg wet	2.500		74	40-140	4	30	
N-Nitrosodimethylamine	1.86	0.250	mg/kg wet	2.500		74	40-140	0.09	30	
Pentachlorophenol	1.77	1.00	mg/kg wet	2.500		71	15-140	4	30	
Phenanthrene	2.24	0.250	mg/kg wet	2.500		89	40-140	1	30	
Phenol	2.30	0.250	mg/kg wet	2.500		92	15-140	3	30	
Pyrene	2.34	0.250	mg/kg wet	2.500		94	40-140	1	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.09*		mg/kg wet	*2.500*		*84*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.32*		mg/kg wet	*3.750*		*115*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.54*		mg/kg wet	*3.750*		*94*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.08*		mg/kg wet	*2.500*		*83*	*30-130*			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Semi-Volatile Organic Compounds										
Batch DJ41527 - 3546										
Surrogate: 2-Fluorophenol	*3.28*		mg/kg wet	*3.750*		*87*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.92*		mg/kg wet	*2.500*		*77*	*30-130*			
Surrogate: Phenol-d6	*3.73*		mg/kg wet	*3.750*		*99*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.45*		mg/kg wet	*2.500*		*98*	*30-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch DJ41154 - 3540C										
Blank										
Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0233*		mg/kg wet	*0.02500*		*93*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0240*		mg/kg wet	*0.02500*		*96*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0223*		mg/kg wet	*0.02500*		*89*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0227*		mg/kg wet	*0.02500*		*91*	*30-150*			
LCS										
Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		90	40-140			
Aroclor 1016 [2C]	0.5	0.02	mg/kg wet	0.5000		92	40-140			
Aroclor 1260	0.5	0.02	mg/kg wet	0.5000		93	40-140			
Aroclor 1260 [2C]	0.5	0.02	mg/kg wet	0.5000		95	40-140			
Surrogate: Decachlorobiphenyl	*0.0238*		mg/kg wet	*0.02500*		*95*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0244*		mg/kg wet	*0.02500*		*98*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0236*		mg/kg wet	*0.02500*		*95*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0231*		mg/kg wet	*0.02500*		*92*	*30-150*			
LCS Dup										
Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		90	40-140	0.1	30	
Aroclor 1016 [2C]	0.5	0.02	mg/kg wet	0.5000		91	40-140	0.6	30	
Aroclor 1260	0.5	0.02	mg/kg wet	0.5000		93	40-140	0.2	30	
Aroclor 1260 [2C]	0.5	0.02	mg/kg wet	0.5000		94	40-140	0.4	30	
Surrogate: Decachlorobiphenyl	*0.0233*		mg/kg wet	*0.02500*		*93*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch DJ41154 - 3540C										
Surrogate: Decachlorobiphenyl [2C]	*0.0242*		mg/kg wet	*0.02500*		*97*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0232*		mg/kg wet	*0.02500*		*93*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0225*		mg/kg wet	*0.02500*		*90*	*30-150*			
8081B Organochlorine Pesticides										
Batch DJ41105 - 3546										
Blank										
4,4´-DDD	ND	0.0025	mg/kg wet							
4,4´-DDD [2C]	ND	0.0025	mg/kg wet							
4,4´-DDE	ND	0.0025	mg/kg wet							
4,4´-DDE [2C]	ND	0.0025	mg/kg wet							
4,4´-DDT	ND	0.0025	mg/kg wet							
4,4´-DDT [2C]	ND	0.0025	mg/kg wet							
Aldrin	ND	0.0025	mg/kg wet							
Aldrin [2C]	ND	0.0025	mg/kg wet							
alpha-BHC	ND	0.0025	mg/kg wet							
alpha-BHC [2C]	ND	0.0025	mg/kg wet							
alpha-Chlordane	ND	0.0025	mg/kg wet							
alpha-Chlordane [2C]	ND	0.0025	mg/kg wet							
beta-BHC	ND	0.0025	mg/kg wet							
beta-BHC [2C]	ND	0.0025	mg/kg wet							
Chlordane (Total)	ND	0.0200	mg/kg wet							
Chlordane (Total) [2C]	ND	0.0200	mg/kg wet							
delta-BHC	ND	0.0025	mg/kg wet							
delta-BHC [2C]	ND	0.0025	mg/kg wet							
Dieldrin	ND	0.0025	mg/kg wet							
Dieldrin [2C]	ND	0.0025	mg/kg wet							
Endosulfan I	ND	0.0025	mg/kg wet							
Endosulfan I [2C]	ND	0.0025	mg/kg wet							
Endosulfan II	ND	0.0025	mg/kg wet							
Endosulfan II [2C]	ND	0.0025	mg/kg wet							
Endosulfan Sulfate	ND	0.0025	mg/kg wet							
Endosulfan Sulfate [2C]	ND	0.0025	mg/kg wet							
Endrin	ND	0.0025	mg/kg wet							
Endrin [2C]	ND	0.0025	mg/kg wet							
Endrin Ketone	ND	0.0025	mg/kg wet							
Endrin Ketone [2C]	ND	0.0025	mg/kg wet							
gamma-BHC (Lindane)	ND	0.0015	mg/kg wet							
gamma-BHC (Lindane) [2C]	ND	0.0015	mg/kg wet							
gamma-Chlordane	ND	0.0025	mg/kg wet							
gamma-Chlordane [2C]	ND	0.0025	mg/kg wet							
Heptachlor	ND	0.0025	mg/kg wet							
Heptachlor [2C]	ND	0.0025	mg/kg wet							
Heptachlor Epoxide	ND	0.0025	mg/kg wet							
Heptachlor Epoxide [2C]	ND	0.0025	mg/kg wet							

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ41105 - 3546										
Hexachlorobenzene	ND	0.0025	mg/kg wet							
Hexachlorobenzene [2C]	ND	0.0025	mg/kg wet							
Methoxychlor	ND	0.0025	mg/kg wet							
Methoxychlor [2C]	ND	0.0025	mg/kg wet							
Toxaphene	ND	0.125	mg/kg wet							
Toxaphene [2C]	ND	0.125	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0106*		mg/kg wet	*0.01250*		*85*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0103*		mg/kg wet	*0.01250*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.00795*		mg/kg wet	*0.01250*		*64*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00743*		mg/kg wet	*0.01250*		*59*	*30-150*			
LCS										
4,4´-DDD	0.0113	0.0025	mg/kg wet	0.01250		90	40-140			
4,4´-DDD [2C]	0.0114	0.0025	mg/kg wet	0.01250		91	40-140			
4,4´-DDE	0.0102	0.0025	mg/kg wet	0.01250		81	40-140			
4,4´-DDE [2C]	0.0106	0.0025	mg/kg wet	0.01250		85	40-140			
4,4´-DDT	0.0113	0.0025	mg/kg wet	0.01250		90	40-140			
4,4´-DDT [2C]	0.0109	0.0025	mg/kg wet	0.01250		87	40-140			
Aldrin	0.0088	0.0025	mg/kg wet	0.01250		71	40-140			
Aldrin [2C]	0.0092	0.0025	mg/kg wet	0.01250		73	40-140			
alpha-BHC	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
alpha-BHC [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
alpha-Chlordane	0.0093	0.0025	mg/kg wet	0.01250		74	40-140			
alpha-Chlordane [2C]	0.0097	0.0025	mg/kg wet	0.01250		77	40-140			
beta-BHC	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
beta-BHC [2C]	0.0089	0.0025	mg/kg wet	0.01250		71	40-140			
delta-BHC	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
delta-BHC [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Dieldrin	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
Dieldrin [2C]	0.0106	0.0025	mg/kg wet	0.01250		85	40-140			
Endosulfan I	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
Endosulfan I [2C]	0.0096	0.0025	mg/kg wet	0.01250		77	40-140			
Endosulfan II	0.0108	0.0025	mg/kg wet	0.01250		87	40-140			
Endosulfan II [2C]	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
Endosulfan Sulfate	0.0117	0.0025	mg/kg wet	0.01250		93	40-140			
Endosulfan Sulfate [2C]	0.0109	0.0025	mg/kg wet	0.01250		88	40-140			
Endrin	0.0103	0.0025	mg/kg wet	0.01250		82	40-140			
Endrin [2C]	0.0104	0.0025	mg/kg wet	0.01250		83	40-140			
Endrin Ketone	0.0124	0.0025	mg/kg wet	0.01250		99	40-140			
Endrin Ketone [2C]	0.0113	0.0025	mg/kg wet	0.01250		91	40-140			
gamma-BHC (Lindane)	0.0088	0.0015	mg/kg wet	0.01250		70	40-140			
gamma-BHC (Lindane) [2C]	0.0092	0.0015	mg/kg wet	0.01250		74	40-140			
gamma-Chlordane	0.0113	0.0025	mg/kg wet	0.01250		90	40-140			
gamma-Chlordane [2C]	0.0112	0.0025	mg/kg wet	0.01250		89	40-140			
Heptachlor	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
Heptachlor [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ41105 - 3546										
Heptachlor Epoxide	0.0093	0.0025	mg/kg wet	0.01250		75	40-140			
Heptachlor Epoxide [2C]	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
Hexachlorobenzene	0.0080	0.0025	mg/kg wet	0.01250		64	40-140			
Hexachlorobenzene [2C]	0.0083	0.0025	mg/kg wet	0.01250		66	40-140			
Methoxychlor	0.0115	0.0025	mg/kg wet	0.01250		92	40-140			
Methoxychlor [2C]	0.0112	0.0025	mg/kg wet	0.01250		89	40-140			
Surrogate: Decachlorobiphenyl	*0.0114*		mg/kg wet	*0.01250*		*91*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0112*		mg/kg wet	*0.01250*		*90*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.00811*		mg/kg wet	*0.01250*		*65*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00833*		mg/kg wet	*0.01250*		*67*	*30-150*			
LCS Dup										
4,4´-DDD	0.0105	0.0025	mg/kg wet	0.01250		84	40-140	7	30	
4,4´-DDD [2C]	0.0107	0.0025	mg/kg wet	0.01250		86	40-140	6	30	
4,4´-DDE	0.0090	0.0025	mg/kg wet	0.01250		72	40-140	12	30	
4,4´-DDE [2C]	0.0097	0.0025	mg/kg wet	0.01250		77	40-140	9	30	
4,4´-DDT	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	9	30	
4,4´-DDT [2C]	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	6	30	
Aldrin	0.0076	0.0025	mg/kg wet	0.01250		60	40-140	15	30	
Aldrin [2C]	0.0080	0.0025	mg/kg wet	0.01250		64	40-140	13	30	
alpha-BHC	0.0074	0.0025	mg/kg wet	0.01250		59	40-140	13	30	
alpha-BHC [2C]	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	13	30	
alpha-Chlordane	0.0084	0.0025	mg/kg wet	0.01250		67	40-140	11	30	
alpha-Chlordane [2C]	0.0089	0.0025	mg/kg wet	0.01250		71	40-140	9	30	
beta-BHC	0.0086	0.0025	mg/kg wet	0.01250		69	40-140	9	30	
beta-BHC [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140	9	30	
delta-BHC	0.0090	0.0025	mg/kg wet	0.01250		72	40-140	5	30	
delta-BHC [2C]	0.0094	0.0025	mg/kg wet	0.01250		75	40-140	7	30	
Dieldrin	0.0096	0.0025	mg/kg wet	0.01250		77	40-140	10	30	
Dieldrin [2C]	0.0098	0.0025	mg/kg wet	0.01250		79	40-140	8	30	
Endosulfan I	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	10	30	
Endosulfan I [2C]	0.0089	0.0025	mg/kg wet	0.01250		71	40-140	7	30	
Endosulfan II	0.0101	0.0025	mg/kg wet	0.01250		80	40-140	7	30	
Endosulfan II [2C]	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	4	30	
Endosulfan Sulfate	0.0107	0.0025	mg/kg wet	0.01250		86	40-140	9	30	
Endosulfan Sulfate [2C]	0.0104	0.0025	mg/kg wet	0.01250		83	40-140	5	30	
Endrin	0.0095	0.0025	mg/kg wet	0.01250		76	40-140	8	30	
Endrin [2C]	0.0097	0.0025	mg/kg wet	0.01250		78	40-140	7	30	
Endrin Ketone	0.0115	0.0025	mg/kg wet	0.01250		92	40-140	8	30	
Endrin Ketone [2C]	0.0107	0.0025	mg/kg wet	0.01250		86	40-140	5	30	
gamma-BHC (Lindane)	0.0082	0.0015	mg/kg wet	0.01250		65	40-140	7	30	
gamma-BHC (Lindane) [2C]	0.0086	0.0015	mg/kg wet	0.01250		69	40-140	7	30	
gamma-Chlordane	0.0103	0.0025	mg/kg wet	0.01250		82	40-140	10	30	
gamma-Chlordane [2C]	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	8	30	
Heptachlor	0.0075	0.0025	mg/kg wet	0.01250		60	40-140	12	30	
Heptachlor [2C]	0.0080	0.0025	mg/kg wet	0.01250		64	40-140	13	30	

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Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8081B Organochlorine Pesticides										
Batch DJ41105 - 3546										
Heptachlor Epoxide	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	10	30	
Heptachlor Epoxide [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140	8	30	
Hexachlorobenzene	0.0071	0.0025	mg/kg wet	0.01250		57	40-140	12	30	
Hexachlorobenzene [2C]	0.0073	0.0025	mg/kg wet	0.01250		58	40-140	13	30	
Methoxychlor	0.0107	0.0025	mg/kg wet	0.01250		86	40-140	7	30	
Methoxychlor [2C]	0.0108	0.0025	mg/kg wet	0.01250		87	40-140	3	30	
Surrogate: Decachlorobiphenyl	*0.0101*		mg/kg wet	*0.01250*		*81*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0101*		mg/kg wet	*0.01250*		*81*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.00700*		mg/kg wet	*0.01250*		*56*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.00699*		mg/kg wet	*0.01250*		*56*	*30-150*			
8151A Chlorinated Herbicides										
Batch DJ41669 - 3546										
Blank										
2,4,5-T	ND	0.010	mg/kg wet							
2,4,5-T [2C]	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex)	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	0.010	mg/kg wet							
2,4-D	ND	0.047	mg/kg wet							
2,4-D [2C]	ND	0.047	mg/kg wet							
2,4-DB	ND	0.048	mg/kg wet							
2,4-DB [2C]	ND	0.048	mg/kg wet							
Dalapon	ND	0.046	mg/kg wet							
Dalapon [2C]	ND	0.046	mg/kg wet							
Dicamba	ND	0.009	mg/kg wet							
Dicamba [2C]	ND	0.009	mg/kg wet							
Dichlorprop	ND	0.047	mg/kg wet							
Dichlorprop [2C]	ND	0.047	mg/kg wet							
MCPA	ND	2.32	mg/kg wet							
MCPA [2C]	ND	2.32	mg/kg wet							
MCPP	ND	2.35	mg/kg wet							
MCPP [2C]	ND	2.35	mg/kg wet							
Surrogate: DCAA	*0.226*		mg/kg wet	*0.2000*		*113*	*30-150*			
Surrogate: DCAA [2C]	*0.195*		mg/kg wet	*0.2000*		*97*	*30-150*			
LCS										
2,4,5-T	0.015	0.010	mg/kg wet	0.01900		80	40-140			
2,4,5-T [2C]	0.013	0.010	mg/kg wet	0.01900		66	40-140			
2,4,5-TP (Silvex)	0.016	0.010	mg/kg wet	0.01900		84	40-140			
2,4,5-TP (Silvex) [2C]	0.015	0.010	mg/kg wet	0.01900		78	40-140			
2,4-D	0.144	0.047	mg/kg wet	0.1880		77	40-140			
2,4-D [2C]	0.156	0.047	mg/kg wet	0.1880		83	40-140			
2,4-DB	0.169	0.048	mg/kg wet	0.1900		89	40-140			
2,4-DB [2C]	0.141	0.048	mg/kg wet	0.1900		74	40-140			
Dalapon	0.328	0.046	mg/kg wet	0.4550		72	40-140			
Dalapon [2C]	0.371	0.046	mg/kg wet	0.4550		82	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8151A Chlorinated Herbicides										
Batch DJ41669 - 3546										
Dicamba	0.015	0.009	mg/kg wet	0.01880		80	40-140			
Dicamba [2C]	0.015	0.009	mg/kg wet	0.01880		80	40-140			
Dichlorprop	0.198	0.047	mg/kg wet	0.1880		105	40-140			
Dichlorprop [2C]	0.163	0.047	mg/kg wet	0.1880		87	40-140			
MCPA	19.2	2.32	mg/kg wet	18.60		103	40-140			
MCPA [2C]	16.7	2.32	mg/kg wet	18.60		90	40-140			
MCPP	17.7	2.35	mg/kg wet	18.80		94	40-140			
MCPP [2C]	16.9	2.35	mg/kg wet	18.80		90	40-140			
Surrogate: DCAA	*0.233*		mg/kg wet	*0.2000*		*116*	*30-150*			
Surrogate: DCAA [2C]	*0.204*		mg/kg wet	*0.2000*		*102*	*30-150*			
LCS Dup										
2,4,5-T	0.015	0.010	mg/kg wet	0.01900		80	40-140	0	30	
2,4,5-T [2C]	0.013	0.010	mg/kg wet	0.01900		68	40-140	3	30	
2,4,5-TP (Silvex)	0.015	0.010	mg/kg wet	0.01900		80	40-140	5	30	
2,4,5-TP (Silvex) [2C]	0.015	0.010	mg/kg wet	0.01900		78	40-140	0	30	
2,4-D	0.140	0.047	mg/kg wet	0.1880		75	40-140	3	30	
2,4-D [2C]	0.157	0.047	mg/kg wet	0.1880		83	40-140	0.2	30	
2,4-DB	0.167	0.048	mg/kg wet	0.1900		88	40-140	1	30	
2,4-DB [2C]	0.136	0.048	mg/kg wet	0.1900		72	40-140	4	30	
Dalapon	0.331	0.046	mg/kg wet	0.4550		73	40-140	0.9	30	
Dalapon [2C]	0.371	0.046	mg/kg wet	0.4550		81	40-140	0.1	30	
Dicamba	0.015	0.009	mg/kg wet	0.01880		80	40-140	0	30	
Dicamba [2C]	0.015	0.009	mg/kg wet	0.01880		78	40-140	3	30	
Dichlorprop	0.194	0.047	mg/kg wet	0.1880		103	40-140	2	30	
Dichlorprop [2C]	0.161	0.047	mg/kg wet	0.1880		85	40-140	1	30	
MCPA	19.1	2.32	mg/kg wet	18.60		103	40-140	0.2	30	
MCPA [2C]	16.4	2.32	mg/kg wet	18.60		88	40-140	2	30	
MCPP	17.6	2.35	mg/kg wet	18.80		94	40-140	0.6	30	
MCPP [2C]	16.8	2.35	mg/kg wet	18.80		89	40-140	0.4	30	
Surrogate: DCAA	*0.218*		mg/kg wet	*0.2000*		*109*	*30-150*			
Surrogate: DCAA [2C]	*0.190*		mg/kg wet	*0.2000*		*95*	*30-150*			
8100M Total Petroleum Hydrocarbons										
Batch DJ41156 - 3546										
Blank										
Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Hexatriacontane (C36)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							

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Client Name: Weston and Sampson Engineers, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8100M Total Petroleum Hydrocarbons										
Batch DJ41156 - 3546										
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons (C9-C36)	ND	10.0	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							
Surrogate: O-Terphenyl	*3.24*		mg/kg wet	*5.000*		*65*	*40-140*			
LCS										
Decane (C10)	1.6	0.2	mg/kg wet	2.500		65	40-140			
Docosane (C22)	1.8	0.2	mg/kg wet	2.500		74	40-140			
Dodecane (C12)	1.7	0.2	mg/kg wet	2.500		69	40-140			
Eicosane (C20)	1.8	0.2	mg/kg wet	2.500		73	40-140			
Hexacosane (C26)	1.9	0.2	mg/kg wet	2.500		75	40-140			
Hexadecane (C16)	1.8	0.2	mg/kg wet	2.500		72	40-140			
Hexatriacontane (C36)	2.2	0.2	mg/kg wet	2.500		86	40-140			
Nonadecane (C19)	2.1	0.2	mg/kg wet	2.500		82	40-140			
Nonane (C9)	1.5	0.2	mg/kg wet	2.500		58	30-140			
Octacosane (C28)	1.8	0.2	mg/kg wet	2.500		73	40-140			
Octadecane (C18)	1.8	0.2	mg/kg wet	2.500		71	40-140			
Tetracosane (C24)	1.7	0.2	mg/kg wet	2.500		70	40-140			
Tetradecane (C14)	1.8	0.2	mg/kg wet	2.500		71	40-140			
Total Petroleum Hydrocarbons (C9-C36)	26.1	10.0	mg/kg wet	35.00		75	40-140			
Triacontane (C30)	1.8	0.2	mg/kg wet	2.500		72	40-140			
Surrogate: O-Terphenyl	*3.52*		mg/kg wet	*5.000*		*70*	*40-140*			
LCS Dup										
Decane (C10)	1.8	0.2	mg/kg wet	2.500		71	40-140	8	25	
Docosane (C22)	2.0	0.2	mg/kg wet	2.500		79	40-140	6	25	
Dodecane (C12)	1.9	0.2	mg/kg wet	2.500		74	40-140	8	25	
Eicosane (C20)	1.9	0.2	mg/kg wet	2.500		77	40-140	6	25	
Hexacosane (C26)	2.0	0.2	mg/kg wet	2.500		81	40-140	7	25	
Hexadecane (C16)	1.9	0.2	mg/kg wet	2.500		78	40-140	8	25	
Hexatriacontane (C36)	2.4	0.2	mg/kg wet	2.500		94	40-140	9	25	
Nonadecane (C19)	2.2	0.2	mg/kg wet	2.500		89	40-140	8	25	
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		63	30-140	8	25	
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		78	40-140	8	25	
Octadecane (C18)	1.9	0.2	mg/kg wet	2.500		77	40-140	8	25	
Tetracosane (C24)	1.9	0.2	mg/kg wet	2.500		75	40-140	7	25	
Tetradecane (C14)	1.9	0.2	mg/kg wet	2.500		77	40-140	8	25	
Total Petroleum Hydrocarbons (C9-C36)	28.3	10.0	mg/kg wet	35.00		81	40-140	8	25	
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		79	40-140	8	25	
Surrogate: O-Terphenyl	*3.72*		mg/kg wet	*5.000*		*74*	*40-140*			
Classical Chemistry										
Batch DJ41539 - General Preparation										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DJ41539 - General Preparation										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1280		umhos/cm	1410		91	90-110			
Batch DJ41624 - General Preparation										
Reference										
Flashpoint	80		°F	81.00		99	97.9-102.1			
Batch DJ41644 - General Preparation										
Blank										
Reactive Cyanide	ND	2.0	mg/kg							
Reactive Sulfide	ND	2.0	mg/kg							
LCS										
Reactive Cyanide	4.1	2.0	mg/kg	100.3		4	0.68-5.41			
Reactive Sulfide	2.2	2.0	mg/kg	10.00		22	0-44			

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Notes and Definitions

Z18	Temperature is not within 23 +/-2 ºC.
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
Q	Calibration required quadratic regression (Q).
P	Percent difference between primary and confirmation results exceeds 40% (P).
LC	Lower value is used due to matrix interferences (LC).
ICV+	Initial Calibration Verification recovery is above upper control limit (ICV+).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
B+	Blank Spike recovery is above upper control limit (B+).
>	Greater than.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Weston and Sampson Engineers, Inc.
Client Project ID: Roosevelt School Phase II ESA ESS Laboratory Work Order: 24J0561

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Weston and Sampson Engineers, Inc - TB

Shipped/Delivered Via: ESS Courier

ESS Project ID: 24J0561
Date Received: 10/11/2024
Project Due Date: 10/21/2024
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 2.9 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** (Yes) / No / NA
10. Were any analyses received outside of hold time? Yes (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? (Yes) / No
    a. Air bubbles in aqueous VOAs? Yes / (No)
    b. Does methanol cover soil completely? (Yes) / No / NA
13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By/Acid Lot#:
    b. If dissolved metals are requested, are they: Yes / No Field Filtered — Yes / No To Be Lab Filtered
    c. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / (No)
    Who was contacted? Date: Time: By:

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	601821	Yes	N/A	Yes	VOA Vial	DI Water	
1	601822	Yes	N/A	Yes	VOA Vial	DI Water	
1	601827	Yes	N/A	Yes	VOA Vial	MeOH	
1	601867	Yes	N/A	Yes	4 oz. Jar	NP	
1	601870	Yes	N/A	Yes	8 oz jar	NP	
1	601871	Yes	N/A	Yes	8 oz jar	NP	
1	601901	Yes	N/A	Yes	4 oz. Jar	NP	
2	601823	Yes	N/A	Yes	VOA Vial	DI Water	
2	601824	Yes	N/A	Yes	VOA Vial	DI Water	
2	601828	Yes	N/A	Yes	VOA Vial	MeOH	
2	601868	Yes	N/A	Yes	4 oz. Jar	NP	
2	601872	Yes	N/A	Yes	8 oz jar	NP	
2	601873	Yes	N/A	Yes	8 oz jar	NP	
2	601902	Yes	N/A	Yes	4 oz. Jar	NP	
3	601825	Yes	N/A	Yes	VOA Vial	DI Water	
3	601826	Yes	N/A	Yes	VOA Vial	DI Water	
3	601829	Yes	N/A	Yes	VOA Vial	MeOH	
3	601869	Yes	N/A	Yes	4 oz. Jar	NP	
3	601874	Yes	N/A	Yes	8 oz jar	NP	
3	601875	Yes	N/A	Yes	8 oz jar	NP	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Weston and Sampson Engineers, Inc - TB

ESS Project ID: 24J0561

Date Received: 10/11/2024

3	601903	Yes	N/A	Yes	4 oz. Jar	NP

2nd Review

Were all containers scanned into storage/lab? Initials BB

Are barcode labels on correct containers? (Yes) / No

Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA

Are all Hex Chrome stickers attached? Yes / No / NA

Are all QC stickers attached? Yes / No / NA

Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: [signature] Date & Time: 10/11/24 1691

Reviewed By: [signature] Date & Time: 10/11/24 1652

ESS LABORATORY
185 Frances Avenue
Cranston, RI 02910
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 24J0561 | Page 1 of 1

Turn Time (Days): ☑ > 5 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ Same Day

Regulatory State: MA Criteria: RCS-1

Is this project for any of the following?: ☐ CT RCP ☑ MA MCP ☐ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)

☐ Limit Checker ☐ State Forms ☐ EQuIS
☒ Excel ☐ Hard Copy ☒ Enviro Data
☐ CLP-Like Package ☐ Other (Specify) →

CLIENT INFORMATION

Client: Weston & Sampson
Address: 55 Walkers Brook Drive
Reading, MA 01867
Phone: 1-800-SAMPSON

Email Distribution List: scanlon.annika@wseinc.com, bridgeot@wseinc.com, dolcino.isabelle@wsein.com

PROJECT INFORMATION

Project Name: Roosevelt School
Project Location: Worcester, MA
Project Number: ENG24-0354
Project Manager: Annika Scanlon
Bill to: invoices@wseinc.com
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOC 8260	SVOC 8270	MCP 14 metals	PCBs 8082	Pesticides 8081	Herbicides 8151	TPH	Flashpoint	Corrosivity/pH	Reactive sulfide	Reactive cyanide	conductivity	% solids	TCLP Lead				Total Number of Bottles
1	10/11/24	0900	Composite	Soil	SB-101 (0-9')	X	X	X	X	X	X	X	X	X	X	X	X	X	X				7
2	10/11/24	0840	Composite	Soil	SB-102 (0-10')	X	X	X	X	X	X	X	X	X	X	X	X	X					7
3	10/11/24	0920	Composite	Soil	SB-103 (0-5')	X	X	X	X	X	X	X	X	X	X	X	X	X					7
			[redacted]																				

Container Type:	AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial																						
						V	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG					
Container Volume:	1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*																						
Preservation Code:	1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*						1	1	1	1	1	1	1	1	1	1	1	1					

Sampled by : IRD

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only

Cooler Temperature (°C): 2.9 on ice

Comments: * Please specify "Other" preservative and containers types in this space

Request additional TCLP Lead analysis. 10/22/24 AMWS

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration

☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	10/11/24	1433	[signature] 10/11/24 1433	[signature]	10/11/24	1602	
Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)

CHAIN OF CUSTODY

ESS LABORATORY
185 Frances Avenue
Cranston, RI 02910
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

ESS Lab # 24J0561 | Page 1 of 1

Turn Time (Days): ☑ > 5 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ Same Day

Regulatory State: MA **Criteria:** RCS-1

Is this project for any of the following?:
☐ CT RCP ☑ MA MCP ☐ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)
☐ Limit Checker ☐ State Forms ☐ EQuIS
☒ Excel ☐ Hard Copy ☒ Enviro Data
☐ CLP-Like Package ☐ Other (Specify) →

CLIENT INFORMATION

Client: Weston & Sampson
Address: 55 Walkers Brook Drive, Reading, MA 01867
Phone: 1-800-SAMPSON
Email Distribution List: scanlon.annika@wseinc.com, bridgeot@wseinc.com, dolcino.isabelle@wsein.com

PROJECT INFORMATION

Project Name: Roosevelt School
Project Location: Worcester, MA
Project Number: ENG24-0354
Project Manager: Annika Scanlon
Bill to: invoices@wseinc.com
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOC 8260	SVOC 8270	MCP 14 metals	PCBs 8082	Pesticides 8081	Herbicides 8151	TPH	Flashpoint	Corrosivity/pH	Reactive sulfide	Reactive cyanide	conductivity	% solids					Total Number of Bottles
1	10/11/24	0900	Composite	Soil	SB-101 (0-9')	X	X	X	X	X	X	X	X	X	X	X	X	X					7
2	10/11/24	0840	Composite	Soil	SB-102 (0-10')	X	X	X	X	X	X	X	X	X	X	X	X	X					7
3	10/11/24	0920	Composite	Soil	SB-103 (0-5')	X	X	X	X	X	X	X	X	X	X	X	X	X					7
			[redacted]																				

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial
V AG AG AG AG AG AG AG AG AG AG AG AG

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*
1 1 1 1 1 1 1 1 1 1 1 1

Sampled by : IRD

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only
Cooler Temperature (°C): 2.9
ON ICE

Comments: * Please specify "Other" preservative and containers types in this space

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

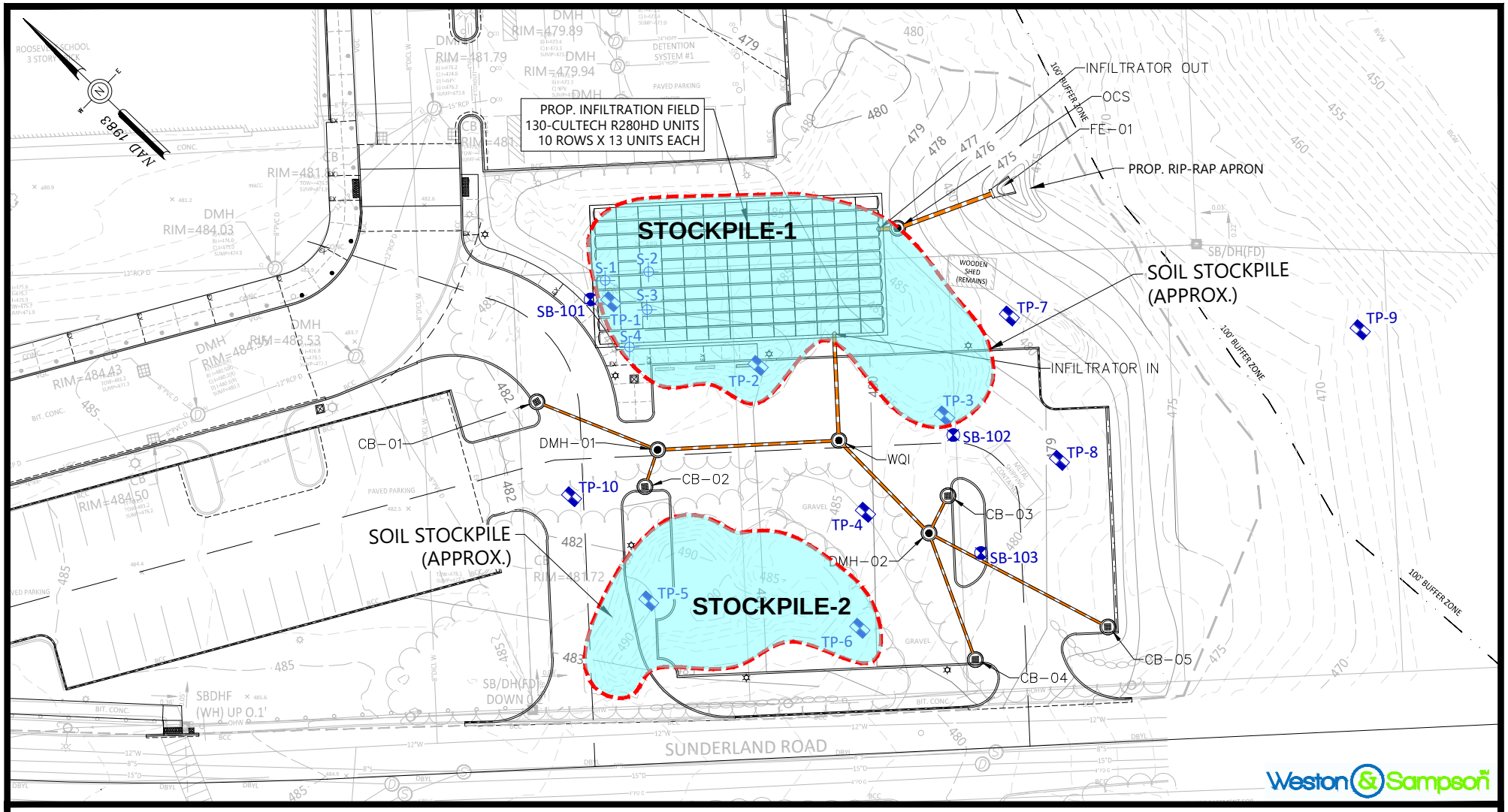
Dissolved Filtration
☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	10/11/24	14:30	[signature] 10/11/24 1433	[signature]	10/11/24	1602	
Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)

ATTACHMENT B

STOCKPILE AND SUBSURFACE PRECHARACTERIZATION PLANS

PRE-CHARACTERIZATION AREAS:
SOIL STOCKPILES



LEGEND

- SOIL BORINGS
- TEST PITS
- STOCKPILE SAMPLES
- STOCKPILE LOCATIONS (APPROX.)

Northern Stockpile = Stockpile 1
Southern Stockpile - Stockpile 2

FIGURE 3
ROOSEVELT SCHOOL
WORCESTER, MASSACHUSETTS
SAMPLING PLAN
GRAPHIC SCALE:
0 30 60

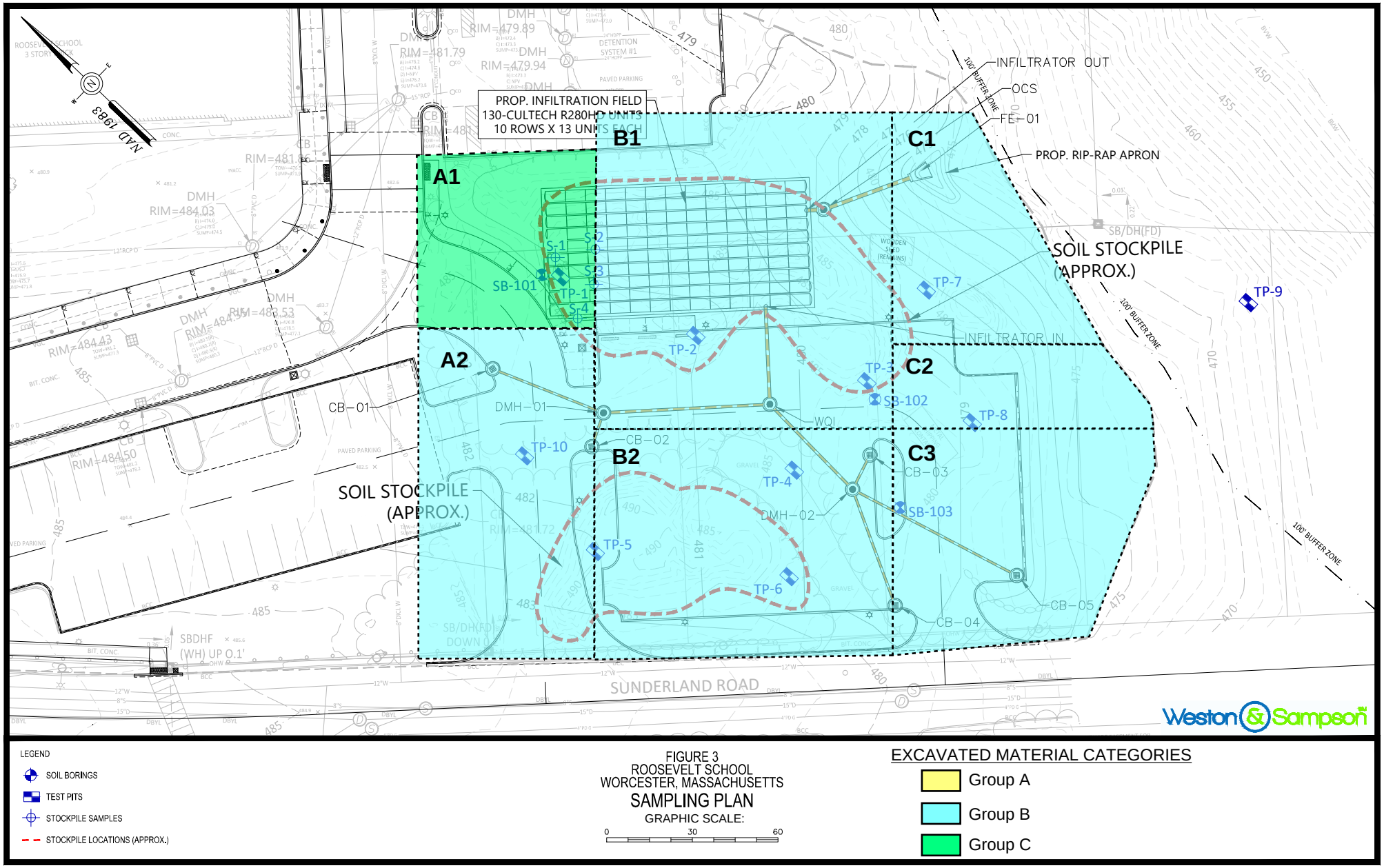
EXCAVATED MATERIAL CATEGORIES

- Group A
- Group B
- Group C

P:\MA\Worcester MA\Roosevelt School Parking\Environmental\Phase II ESA Rpt\CAD\22269 Roosevelt-PR_11x17.dwg

Rev: 1.7 Date: 08/12/2019

PRE-CHARACTERIZATION AREAS:
SUBSURFACE SOIL



LEGEND

- SOIL BORINGS
- TEST PITS
- STOCKPILE SAMPLES
- STOCKPILE LOCATIONS (APPROX.)

FIGURE 3
ROOSEVELT SCHOOL
WORCESTER, MASSACHUSETTS
SAMPLING PLAN
GRAPHIC SCALE:
0 30 60

EXCAVATED MATERIAL CATEGORIES

- Group A
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P:\MA\Worcester MA\Roosevelt School Parking\Environmental\Phase II ESA Rpt\CAD\22269 Roosevelt-PR_11x17.dwg

Rev: 1.7 Date: 08/12/2019

ATTACHMENT C

SOIL MANAGEMENT SPECIFICATIONS

SECTION 02 61 00.13

HANDLING AND DISPOSAL OF EXCAVATED MATERIALS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

A. The Work of this Section consists of all labor, equipment, materials, and services for handling, characterizing/sampling, segregating, reusing, tracking, transporting, and off-site recycling and/or disposing of excavated material generated during the course of the Work.

B. The Engineer collected soil samples to pre-characterize and facilitate acceptance of surplus excavated materials by off-site reuse, recycling and/or disposal facilities. The Contractor shall profile surplus excavated materials based on the pre-characterization results provided as attachment to these specifications. The Engineer will provide soil acceptance request letters and appropriate back-up information for the Contractor's use in obtaining acceptance for excavated materials prior to commencing with the excavation work. As described herein, the Contractor is required to supplement the precharacterization as needed to expedite readiness to haul and dispose.

C. Excavated materials not approved by the OWNER for backfilling because of physical or chemical characteristics shall be disposed of as specified herein.

1.02 RELATED WORK:

A. Section 31 25 00, EROSION AND SEDIMENTATION CONTROLS

B. Section 31 20 00, EARTH MOVING

1.03 SUBMITTALS:

A. The Contractor shall submit to the Engineer for review, an Excavated Materials Management Plan (EMMP), which includes at a minimum the information required by Paragraph 1.03.B of this Section, no more than 14 days after issuance of the Notice to Proceed.

B. The Contractor's EMMP shall include the following:

1. Plans outlining the proposed procedures and sequence for the excavation of materials to be reused on-site and disposed/recycled off-site, procedures used to track excavated materials to be transported off-site and a proposed implementation schedule.

2. All pertinent information relating to the transport of excavated material, at a minimum, shall include:

a. Name and address of all transporters.

b. Transporter identification number (USEPA or Massachusetts Department of Transportation Transporter) and expiration date.

c. Proof of permit, license, or authorization to transport excavated material, when applicable, in all affected states.

d. Dust control measures.

3. The Contractor shall identify appropriate reuse sites and/or disposal/recycling facilities that will accept each category of excavated material identified in Paragraph 3.04 of this Section. The Contractor shall submit names of a minimum two (2) sites or facilities for each category. Disposal/recycling facilities listed in the EPA Superfund Program will not be accepted for this Work. For each facility, the Contractor shall submit the following information:

   a. General Information:

      1) Facility Name
      2) Facility Address
      3) Name of Contact Person
      4) Title of Contact Person
      5) Telephone Number of Contact Person
      6) Permit Number

   b. The facility shall specify the volume of material that can be accepted from the site on a weekly and a total basis.

   c. The facility shall provide written confirmation that they are permitted to accept and will accept the excavated material and/or accumulated sediment of the general quality and quantity described by these Specifications.

   d. The facility shall provide a listing of all current and valid permits, licenses, letters of approval, and other authorizations to operate that they hold, pertaining to the receipt and management of the soils or materials specified in this Contract.

   e. The Contractor shall submit a complete list of the reuse sites and disposal/recycling facility's permitted allowable contaminant levels and physical characteristic requirements for contaminated material, and list any required regulatory approvals for individual waste streams.

   f. After the Contractor obtains approval for off-site reuse and/or disposal/recycling of surplus excavated materials, the Contractor shall submit to the Engineer, approvals or letters of intent and facility information for each facility proposed, prior to transporting material off-site.

4. The Contractor shall include procedures for decontamination of vehicles and equipment in the EMMP.

5. The Contractor shall include procedures for the monitoring and control of dust in the EMMP.

6. Submit a site specific Health and Safety Plan (HASP). Contractor shall prepare HASP that addresses all of the expected physical and chemical hazards likely to be encountered during the work of this Section.

7. Contractor shall provide to the Engineer copies of all weight slips, both tare and gross, for every load weighed and disposed of at the disposal or recycling facilities. The Owner will only allow progress payments after receipt of these weight slips.

1.04 REFERENCES:

A. Massachusetts Department of Environmental Protection (DEP) Policy Number(s):

1. WSC-94-400, Interim Remediation Waste Management Policy for Petroleum Contaminated Soils.
2. WSC-94-320, Construction Activities in Contaminated Areas.
3. COMM-97-001, Reuse and Disposal of Contaminated Soils at Massachusetts Landfills.
4. WSC-13-500, Similar Soils Provision Guidance

B. Massachusetts Contingency Plan (MCP), 310 CMR 40.0000.

C. Toxic Substances Control Act (TSCA), 40 CFR 761.00.

D. Massachusetts Hazardous Waste Regulations, 310 CMR 30.000 and the Resource Conservation Recovery Act (RCRA), 40 CFR 148 and 268.

E. All other applicable Federal, State, and local regulations.

1.05 DEFINITIONS:

A. Excavated Material: All soil, sediment, sewer grit, and miscellaneous materials and/or debris excavated from within the limit of work.

B. Suspected Contaminated Material: Excavated material with any of the following characteristics: significant petroleum and/or chemical odor; an oily sheen; and/or material with staining or significant change of color.

1.06 PERMIT REQUIREMENTS:

A. The Contractor shall obtain all Federal, State, and local permits required for the transport and disposal of excavated material. The Contractor shall adhere to all permit requirements.

B. The Contractor shall document that their proposed offsite receiving facilities have all current

certifications and permits as required by Federal, State, and local regulatory agencies to receive and dispose/recycle/reuse of the excavated material.

1.07 EXISTING CONDITIONS:

A. The Contractor shall note that the work in this Section includes handling soil containing semi-volatile organic compounds (SVOCs), metals, total petroleum hydrocarbons (TPH), and herbicides and pesticides.

B. In June and October 2024, the Engineer performed environmental subsurface investigations to pre-characterize two (2) on-site soil stockpiles and surplus excavated materials to be generated during construction activities. A summary of the environmental testing results is appended to these specifications. The Contractor shall profile excavated materials based on the pre-characterization data. Additional testing to meet off-site receiving facility acceptance criteria is the Contractor's responsibility.

1.08 QUALITY CONTROL:

A. The Contractor shall engage the services of an Environmental Consultant prior to and during the course of the Work. The responsibilities and requirements of the Contractor's Consultant shall include, but not be limited to, the following:

1. Staff of the Contractor's Environmental Consultant shall have completed the 40-hour OSHA health and safety training course, with 8-hour OSHA refresher training, as needed to maintain continual certification.

2. Evaluation of existing analytical data to identify suitable off-site reuse, recycling and disposal facilities for surplus excavated materials generated during the work.

3. Ensure compliance with all references listed in Paragraph 1.04 of this Section.

4. Ensure the work conforms to local, State and Federal regulatory agencies governing the handling of contaminated and hazardous materials.

5. Ensure that best management practices take place while performing the work described in this Section.

6. Develop and implement site-specific emergency response and health and safety protocols and procedures.

7. Notify the Engineer at least three working days in advance of the schedule for off- site disposal/recycling and coordinate handling, transport, and off-site disposal of Excavated Materials in accordance with state and federal regulations.

8. Keep records, including daily logs, of all waste streams, weights, stockpiles, and excavated materials for the purposes of tracking points of origin for excavated materials.

9. Develop and implement dust control measures, which will adequately protect workers

and resident in the nearby community and prevent off-site migration of dust.

PART 2 – PRODUCTS

2.01 GENERAL:

A. All the Contractor's personnel and Sub-Contractors shall wear personal protective equipment and protective clothing consistent with the levels of protection for this Work.

B. Containers and truck beds used by the Contractor for storing and/or hauling the excavated material shall be constructed of steel, in good condition and designed for the intended purpose of safe, secure storage of contaminated and hazardous materials during loading and transport. The containers shall have a secure cover that will prevent a release of material from trucks during transportation. The containers and covers shall be provided at no additional cost to the Owner and shall be approved by the Engineer prior to mobilization of any trucks/containers. The containers must be approved by and labeled in accordance with the U.S Department of Transportation (DOT). The containers shall be sift proof and water resistant in accordance with the DOT.

2.02 CONTAINERS:

A. Containers used for storing surplus excavated soil (i.e. roll-off containers), if required, and hauling contaminated material shall be constructed of steel, in good condition and designed for the intended purpose of safe, secure storage of contaminated material during loading and transport to an approved facility. The containers shall have a secure cover, which will prevent a release of material from truck during transportation. The containers must be approved by and labeled in accordance with the U.S Department of Transportation (DOT). The containers shall be sift proof and water resistant in accordance with the DOT regulations.

PART 3 – EXECUTION

3.01 GENERAL:

A. Soil within the work zone has been pre-characterized for the Contractor's use profiling and obtaining acceptance for surplus excavated materials to be transported off-site. The Contractor shall select an appropriate off-site facility based on the 2024 pre-characterization data provided and the excavated material categories listed in Paragraph 3.04. The Engineer will provide a signed Opinion Letter along with all required facility acceptance forms and shipping documents for the Contractor's use in securing acceptance letters for the material after approving the Contractor's intended disposal facilities identified in the EMMP.

B. The Contractor shall maximize the reuse of all excavated materials on-site as backfill. The excavated materials shall be reused as backfill in the general area where they were generated.

C. The Owner will be the generator of all excavated materials removed from the site and will sign all Material Shipping Records and Massachusetts Bills of Lading. The Contractor shall be the generator of material contaminated as a result of the Contractor or Sub-Contractors

release of oil/hazardous materials on the site caused by them.

D. The Owner shall have final approval over all reuse/disposal/recycling options based on the analytical data.

E. The Contractor shall immediately notify the Engineer of suspected contaminated materials with visible stains or unnatural odor, or if other potentially contaminated and/or hazardous material is encountered. The Contractor shall excavate and manage areas of suspected contaminated and/or hazardous material as required by the Engineer.

F. If an Imminent Hazard, Potential Imminent Hazard, or any other condition requiring an Immediate Response Action as defined in the Massachusetts Contingency Plan 310 CMR 40.0000 is encountered, activities shall be suspended and the Engineer notified immediately.

3.02 DISPOSAL CHARACTERIZATION SAMPLING – GENERAL:

A. Pre-characterization sampling soil data and the associated laboratory reports are provided as an attachment to these specifications. No additional samples shall be collected without approval by the Engineer.

B. If necessary, the Contractor shall perform any additional sampling and characterizing of excavated materials for the purpose of obtaining approvals from reuse/disposal/recycling facilities. No additional sampling or analysis shall be performed in lieu of profiling excavated materials using the pre-characterization data collected by Engineer, only where supplementing the existing data set is required to obtain approval by off-site receiving facilities.

C. The Owner may conduct additional sampling upon excavation of the work site. The Engineer may stop the Contractor's work in a particular location at any time in order to have samples taken and analyzed. If necessary, the Contractor shall assist the Engineer in collecting samples. The work shall not resume in that area until required by the Engineer. Stoppage of work for this reason, or until laboratory results are delivered to the Engineer, shall not be a cause for the Contractor to request additional compensation or an extension of time to the Contract or to other intermediate Contract deadlines.

3.03 HANDLING AND TEMPORARY STOCKPILING OF EXCAVATED MATERIALS:

A. Excavated contaminated soil shall be stockpiled on-site, in an area approved by the Owner and Engineer, and managed to protect public health, safety and the environment, in accordance with state and local requirements.

B. Stockpiled material must be removed and reused/disposed/recycled off-site as soon as possible and in all cases within two (2) weeks from the day of its initial excavation.

C. The Contractor shall manage temporary stockpiles to prevent the cross-contamination of excavated materials between different excavated materials categories, and to prevent cross-contamination between the stockpiles and underlying materials.

D. Temporary stockpiles shall not exceed 250 cubic yards.

E. Temporary stockpiles shall be clearly and securely barricaded from contact by workers and the general public.

F. All excavated material shall be placed entirely on 10-mil (minimum) NRPE or 20-mil (minimum) polyethylene sheeting, as indicated in Paragraph 2.02 of this Section, and shall be covered at the end of each day's work with the same material to minimize the infiltration of precipitation and erosion of the stockpile. Any cover material used shall be properly secured and possess the necessary physical strength to resist tearing by the wind and other elements.

G. The Contractor shall prevent run-off and erosion of temporary stockpiles by placing hay bales, silt fence, or other appropriate erosion and sedimentation controls around each temporary stockpile location.

H. Any failure of materials or procedures used in employing the base layer or cover layer shall be immediately repaired, replaced or re-secured so as to minimize precipitation infiltration, dust, and erosion/runoff of the excavated material.

I. Contractor shall segregate materials of different excavated materials categories as defined by this Section. Cross contamination of excavated material of differing soil categories for off-site disposal is prohibited. Disposal of material that is contaminated as a result of careless handling or use of unauthorized procedures shall be disposed of off-site at the Contractor's expense. Delays of Work resulting from temporary storage of excavated material shall be at no additional cost to the Owner.

J. The Contractor shall handle excavated material that minimizes the creation of visible dust. Contractor shall manage dust control according to the requirements of Section 31 20 00.

3.04 EXCAVATED MATERIAL CATEGORIES:

A. Excavated materials shall be categorized and managed as described in Paragraphs 3.02 and 3.03 of this Section. The Contractor shall transport the material for off-site disposal or treatment at a DEP-approved landfill or facility based on the following categories and the pre-characterization analytical data appended to these specifications.

B. Group A – Excavated material which excavated materials with contaminant concentrations less than (<) MCP Reportable Concentrations, category S-1 (RCS-1), that meet the acceptance criteria for in-state soil reclamation project or similar soils reuse facilities with a written Soil Management Plan (SMP) and approved Administrative Consent Order (ACO) from MassDEP.

C. Group B – Excavated material which meets DEP criteria for disposal at in-state landfills, to be used as daily cover, intermediate cover, and pre-cap contouring material. The material must not exceed the contaminant levels listed in DEP Policy #COMM-97-001. Alternatively, receiving facilities for this category of excavated materials included licensed asphalt recycling facility or meets the criteria for thermal treatment at a thermal treatment processing facility.

D. Group C – Excavated material with contaminant concentrations that do not meet acceptance

for an in-state lined or unlined landfill, thermal treatment or recycling facility (i.e., Group A), requiring disposal at an out-of-state, non-hazardous landfill or licensed thermal desorption/recycling facility.

E. Contaminated material shipped to a Group A, B, or C disposal facility must meet the selected facility's chemical and physical acceptance criteria. Selected facilities must be established, fully operational, appropriately insured, and be operating in compliance with all applicable local, state, and federal regulations.

F. The existing soil stockpiles will be managed as Group B materials based on the pre-characterization data provided.

G. Subsurface soil generated from proposed parking lot improvements will be managed according to the excavation cells provided in pre-characterization summary attached to these specifications. Subsurface soil includes both Group B and Group C materials.

3.05 WEIGHT AND MEASUREMENT:

A. The Contractor shall provide certified tare and gross weight slips for each load received at the accepted facility and these shall be attached to each returned hazardous waste manifests, Massachusetts Bill of Ladings or Material Shipping Records within 21 days of obtaining all final signatures from a representative of the reuse/disposal/recycling facility, the Contractor (transporter), Engineer (if applicable), and the Owner.

B. Measurement for payment will be based on the actual weight in tons of material excavated and disposed of as measured at the receiving facility.

3.06 WASTE PROFILES AND MANIFESTS:

A. The Contractor shall submit to the Engineer for review all waste profile applications and questionnaires, and coordinate with disposal facilities and all Federal and State Environmental Agencies.

B. The Owner will be designated as generator and will sign all manifests and waste profile application or questionnaires.

C. The Contractor shall submit to the Engineer, prior to receiving progress payment, documentation certifying that all materials were transported to, accepted, and disposed of, at the selected disposal facility(ies). The documentation shall include the following, as a minimum:

1. Documentation shall be provided for each load from the site to the disposal facility, including all manifests and any other transfer documentation as applicable.

3.07 TRANSPORT OF EXCAVATED MATERIAL:

A. The Contractor shall not be permitted to transport excavated materials off-site until all applicable disposal or recycling facility documentation has been received, reviewed, and

approved by the Engineer. The Contractor shall transport the excavated material under a Material Shipping Record and Massachusetts Bill of Lading and the requirements of this Section.

B. The Contractor shall take all precautions and any actions necessary, at no additional cost to the Owner, to prevent cross-contamination from transport vehicles to areas outside the Limit of Work.

C. The Contractor shall transport excavated materials from the site to the storage, disposal, reuse of recycling facility or off-site reuse location in accordance with all United States Department of Transportation (DOT), USEPA, DEP, and applicable state and local regulations.

D. The Hauler(s) shall be licensed in all states affected by transport.

E. The Contractor shall be responsible for ensuring that free liquid is properly transported. “Wet soils” shall not be loaded for transport. The Contractor shall dewater “wet soils”, and properly dispose of free liquid in accordance with local, State, and Federal regulations and at no additional cost to the Owner. The Contractor shall also dispose of any free liquids that may result during transportation in accordance with local, State, and Federal regulations and at no additional cost to the Owner.

F. Transporters shall submit proof of permit, license, or authorization to transport excavated material, when applicable, in all affected states.

3.08 REUSE, RECYCLING AND DISPOSAL:

A. Groups A, B, and C excavated material shall be reused, recycled or disposed of at an approved facility as specified in this Section and in accordance with all Federal, State and Local regulations.

END OF SECTION

SECTION 26.00.00

ELECTRICAL
(FILED SUB-BID REQUIRED)

PART 1 - GENERAL

1.1 FILED SUB-BID REQUIREMENTS

A. The Sub-Bidder of this Section shall submit Form for Sub-Bid as required by Section 44F of Chapter 149 of the General Laws, as amended.

B. The Sub-Bidder of this Section is directed to Instructions to Bidders. All Sub-Bids shall be filed with the Awarding Authority in accordance with requirements stipulated therein.

C. The Sub-Bidder of this Section shall include Work of the following Section:
1. 33 70 00 – Electrical Utilities

D. The Sub-Bidder of this Section shall examine all drawings and specification sections affecting the Work of this Section as shown primarily in the following drawings: ES-1 through ES-3, L-01.

E. The Sub-Bidder of this Section shall examine other drawings and specification sections that could affect the Work of this Section as it relates to coordination. The other drawings are the following: CP-01 through DT-04.

1.2 SCOPE

A. Labor, supervision, materials, tools, equipment, supplies, transportation, and services for a complete and operational civil and electrical system as specified shall be provided.

B. The Owner reserves the right to request references from all subcontractors and the right of final selection of Subcontractors.

C. Materials and equipment shall be installed in accordance with standards of the National Electrical Code, local codes, safety codes and ordinances.

D. Work under this Section shall include, but not be limited to:

1. Installation of six (6) new site poles, LED luminaires, handholes and concrete bases. Include all related crane and rigging requirements for the poles. Relocation of three (3) existing site poles.

2. Installation of underground duct-bank with cable and conduit from a new Handhole. Intercept existing branch circuitry currently feeding existing site poles, as shown on electrical drawings.
3. Installation of cable and conduit from the new Handhole near existing light pole to a new Handhole to feed to the new site lighting poles.
4. Installation of new heavy duty handholes.
5. Grounding system.
6. PVC raceways.
7. Power Wiring.
8. Any other system herein after called for or shown on the drawings.

1.3 EXAMINATION OF SITE

A. Before submitting a Bid, this Contractor must visit the job site to determine the conditions under which the work is to be done.

1.4 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are complementary to each other. Any labor and material which is called for by either, whether or not by both, or which is necessary for the successful operation of all systems, shall be furnished and installed. Discrepancies should be brought immediately to the attention of the Engineer.

B. Plans and specifications for this project should be examined to determine the scope and character of the work, the building design and function, and the required coordination with the Electrical Contractor and other Trades before and during construction.

C. Shop drawings and submissions of materials shall be made within five (5) days after the signing of the Contract; they are to be bound by section and submitted as a complete section. Submittals are to be submitted electronically with two (2) hard-bound copies to be held by the Electrical Contractor until job completion, at which time they are to be bound in two (2) binders and transferred to the Owner.

D. This Contractor shall prepare an electrical set of coordination drawings to overlay with all other Trades. Drawings shall be prepared on translucent drawings to properly coordinate all of the other equipment to be installed. Prior to any installations, the Electrical Contractor must receive approval of drawings from the Engineer.

1.5 INSURANCE

A. Insurance is to conform to the provisions and requirements as set forth in Information for Bidders Section.

1.6 CHANGES AND REVISIONS

A. Costs for changes and/or revisions shall be submitted to the Engineer with material and labor breakdown of charges and credits clearly itemized.

B. Work shall not be executed until approval has been received in writing from the Engineer.

1.7 WORKMANSHIP

A. Materials shall be new and shall conform to the standards of UL, Inc., in every case where such a standard has been established for the particular type of material in question. Work shall be executed in a workmanlike manner and a competent Foreman shall be provided for the entire project.

B. After wires are pulled in and fixtures and equipment are installed, this Contractor shall make tests for performance, grounds, etc., and shall immediately remedy any defects. This Contractor shall provide equipment to be used for tests.

C. Work under this Contract must be so performed that the progress of the entire project, including work of all Trades, shall not cause delays or interference.

D. It will be the responsibility of the Electrical Foreman to instruct the Owner in the function, operation and maintenance of electrical systems and equipment. This is to be done upon completion of the installation, before leaving the job site and to the satisfaction of the Owner and Engineer.

1.8 MANUFACTURERS' NAMES AND TRADE NAMES

A. Throughout the specification types of materials may be specified by manufacturer's name and catalogue number in order to establish standards of performance and quality, and not to limit competition.

1.9 MATERIAL STORAGE AND OFFICE SPACE

A. This Contractor shall maintain at his own expense, where directed on the premises, neat, covered storage for material and equipment, and office space where drawings and specifications shall be kept for records.

B. Equipment or material damaged during the construction period shall be replaced at this Contractor's expense.

1.10 GUARANTEE

A. Materials and labor incorporated in the work are to be guaranteed against defects for a period of one (1) year from date of substantial completion. This Contractor shall correct such defects that occur within the guarantee period and to the satisfaction of the Engineer without cost to the Owner, within a twenty-four (24) hour period.

B. This Contractor shall not be responsible for failures through normal usage, nor for those caused by neglect or abuse on the part of the Owner or his employees.

1.11 RELATED WORK

A. Following related work is included in this Section and will be performed by the Site Contractor

1. Excavation, saw cutting, backfill and resurfacing required for underground electrical systems. Re-establishing the loam and seed within the grass areas.
2. Installation of the light pole concrete bases – Furnished by the Electrical Contractor.

3. Excavation for the handhole assembly boxes – installed by the Electrical Contractor.

1.12 OPERATING INSTRUCTIONS

A. This Contractor shall furnish three (3) Operating and Maintenance Manuals outlining in detail the operational features of the following systems:

1. Site lighting system.
2. Handholes
3. PVC raceway systems.
4. Cable.

1.13 PERMITS

A. This Contractor shall obtain and pay for permits for the electrical systems on this project.

1.14 RECORD DRAWINGS

A. A set of record drawings shall be maintained at the job site for reference by the Engineer. Weekly, the Electrical Foreman will note changes and review drawings periodically with the Engineer. Changes, including feeders, lighting, power, panel schedules, duct-bank changes, etc., shall be recorded on the drawings. At the conclusion of the construction this Contractor shall order from the Engineer a disc with all drawing files. All changes shall be made on the disc and shall be compatible to that of AutoCAD Release 2020. The as-built electrical plans shall be submitted digitally in a PDF format to the electrical engineer for review and approval. Final payment for electrical work is contingent upon receipt of drawings. Cost of record drawings will be borne by this Contractor.

1.15 DEFINITIONS

A. The terms “Electrical Contractor”, “This Contractor", "Electrical Subcontractor", all refer to the work of this Section 26.00.00.

1.16 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The General Contractor shall provide and pay for all dumpster services during the entire construction period. Suppliers and Sub-Contractors to bring all rubbish and debris to the dumpster location daily.

B. The Electrical Contractor, Sub-Contractors and suppliers, individually, shall furnish their own staging, scaffolding, and hoisting equipment to get workers, material and equipment from the point of delivery at the project site to the point of use or installation within the building and project site. All crane and rigging services required are the responsibility of each individual trade.

1.17 WORK CONDITIONS/SEQUENCE

A. If the Electrical Contractor find that conditions are not appropriate for them to begin the work of their trade, or if they are directed to perform their work out of sequence by the General Contractor, or if the General Contractor directs the Electrical Contractor to start and continue regardless of job conditions, the Electrical Contractor shall notify the Architect in writing by certified mail immediately.

PART 2 - PRODUCTS

BASIC MATERIALS AND METHODS

2.1 RACEWAYS AND FITTINGS

A. Size of conduit used shall be as indicated on the contract drawings.

B. Plastic conduit shall be Type PVC40 and PVC80 Carlon Co. as noted on the drawings.

C. Conduit installed underground shall be rigid galvanized or Type PVC40 plastic conduit. Raceways and underground sweeps rising up into the junction shall be rigid galvanized conduit.

D. During construction, ends of conduit shall be kept tightly plugged to exclude plaster, dirt, dust, moisture, and debris.

E. Ends of conduit entering boxes shall be equipped with galvanized locknuts or bushings. Cut ends of conduit shall be reamed free of burrs and sharp edges.

F. A minimum of two 200 pound tensile strength plastic lines shall be left in each interior conduit run in which permanent wiring is not installed. Each spare underground conduit or duct between service points shall be provided with a minimum of two fish wires.

2.2 WIRE

A. Unless otherwise specified, conductors installed in conduit shall be Type THHN and THW, 600V, 90 degree C. - Anaconda Densheath 900. Conductors shall be copper.

B. Covering of wires and cables designed to meet the above specifications shall have distinctive markings as required by the latest standards of UL, Inc., making them readily identifiable in the field.

2.3 GROUNDING

A. The entire system shall be grounded in accordance with the National Board of Fire Underwriters', State, and local requirements.

B. Framework of the site lighting poles shall be grounded to a ground rod.

C. This Contractor shall furnish and install an equipment ground wire in feeder runs to meet requirements of the National Electrical Code.

2.4 PULL AND JUNCTION BOXES

A. Pull and junction boxes shall conform to requirements of the National Electrical Code. Refer to the electrical plans for the specification requirements pertaining the NEMA 1, NEMA 3 and handhole pull boxes.

2.5 SLEEVES

A. It shall be the responsibility of this Contractor to furnish and install sleeves through the walls, etc., where necessary.

2.6 SYSTEM OF LIGHT AND POWER

A. The secondary distribution system's is existing 277/480V and 120/208 volt, 3 phase, 4 wire, 60HZ AC.

2.9 TIME CLOCK – SITE LIGHTING

A. Furnish and install Intermatic Company or equal programmable time clock model number EI20C series within a single gang junction box. Coordinate with the owner to determine the preferred times of operation.

PART 3 - EXECUTION

3.1 INSPECTION AND COORDINATION

A. This Contractor shall inspect surfaces and areas that will receive his material and the job conditions as they exist and report any conditions that may adversely affect his work. Notify Engineer or Electrical Contractor of unsuitable conditions.

B. Coordinate work with construction schedule and job progress.

C. This Contractor shall confer with the General Contractor and other Trades to coordinate his work and to properly locate systems to avoid conflict and interference.

D. Any interference with the work of other Trades or with Engineering or structural details shall be brought to the attention of the Engineer for decision before installation. Contractor's failure to so coordinate his work will not relieve him of the responsibility to correct work to suit building conditions.

3.2 INSTALLATION

A. Installation shall be by skilled workmen using proper equipment. Commencement of work shall be deemed as acceptance of existing conditions by installer.

B. Entire application shall be in strict accordance with manufacturer's recommendations and the standards of the National Electrical Code, local codes and ordinances, OSHA safety codes and regulations.

C. After wires are pulled in and all fixtures are installed, this Contractor shall make tests for performance, grounds, etc., and shall immediately remedy defects. Equipment for tests shall be borne by this Contractor.

D. Work under this Contract must be so performed that the progress of the entire project, including work of all Trades shall not cause delays or interference. Material and apparatus shall be installed as fast as condition of the building will permit.

3.3 RACEWAYS AND FITTINGS

A. Refer to drawings for conduit sizes.

B. Conduit installed underground or under concrete slabs shall be painted with Rustoleum protective compound before installation, touched up and sealed to exclude water entering conduit after installation.

C. During construction ends of conduit shall be tightly plugged to exclude dirt, dust, and moisture.

D. Ends of conduit entering boxes shall be equipped with galvanized locknuts and bushings. Cut ends of conduit shall be reamed free of burrs and sharp edges.

3.4 WIRE

A. Wire #8 and larger shall be stranded and no wire less than #12 shall be used, unless otherwise noted.

3.5 UNDERGROUND RACEWAYS

A. Underground raceways shall be supported with plastic spacers every five (5') feet.

3.6 INSTRUCTIONS TO OWNER

A. It shall be the responsibility of the Electrical Foreman to instruct the Owner in the function, operation and maintenance of electrical systems and equipment.

END OF SECTION

SECTION 31 09 00

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. All the Contract Documents, including Drawings, General Conditions and Supplementary Conditions and all Sections of Division 1 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. The Work of this Section includes, but is not limited to, furnishing and installation of the following:

1. All materials, equipment, labor, and services required for all Subsurface Investigation work, including all items incidental thereto, as specified herein and as shown on the Drawings.

1.03 SOIL REPORT

A. Preliminary Geotechnical Engineering Recommendations for the Proposed Parking Lot – Roosevelt Elementary School dated February 27, 2024, prepared by Lahlaf Geotechnical Consulting, Inc., 100 Chelmsford Road, Suite 2, Billerica, MA 01862 attached hereto and hereby made a part of the Contract Documents

B. The Owner assumes no responsibility for the Contractor's failure to make his own site investigation and makes no representation other than the soils reports regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work. The Contractor shall refer to attached Geotechnical Engineering Recommendations. Failure by the Contractor to be aware of existing site conditions shall not be cause for additional cost to the Owner.

C. Information on subsurface conditions is made available for the convenience of the Bidders. The Owner does not represent to the Contractor that the information is either an accurate or a comprehensive indication of subsurface conditions. Bidders are invited to review the information to apprise themselves of the information available, and to make additional investigations at their own expense.

D. No claim for extra cost or extension of time resulting from reliance by the Contractor on information presented herein shall be allowed, except as provided in the Contract Documents.

E. Information on subsurface conditions is made available for the convenience of the Bidders. The Owner does not represent to the Contractor that the information is either an accurate or a comprehensive indication of subsurface conditions. Bidders are invited to review the information to apprise themselves of the information available, and to make additional investigations at their own expense.

F. No claim for extra cost or extension of time resulting from reliance by the Contractor on information presented herein shall be allowed, except as provided in the Contract Documents.

1.04 QUALITY ASSURANCE

A. A soil engineer will be retained by the Owner to observe performance of work in connection with excavating, trenching, filling, backfilling, and grading, and to perform compaction tests.

B. Re-adjust work performed that does not meet technical or design requirements but makes no deviation from the Contract Documents without specific and written approval from the Architect.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

February 27, 2024

Mr. Bill Peters
Mount Vernon Group Architects, Inc.
200 Harvard Mill Square
Suite 140
Wakefield, MA 01880
Phone: (413) 377-2866
Mobile: (413) 530-0817
E-mail: bpeters@mvgarchitects.com

Re: **Geotechnical Letter Report**
Proposed Parking lot – Roosevelt Elementary School
Worcester, Massachusetts
LGCI Project No. 2402

Dear Mr. Peters,

Lahlaf Geotechnical Consulting, Inc. (LGCI) has completed a geotechnical study for the proposed parking lot at the Roosevelt Elementary School in Worcester, Massachusetts. This geotechnical letter report presents the results of our study.

We performed our services in general accordance with our proposal No. 23126-Rev. 1 dated November 8, 2023, and signed by Mr. Frank Tedesco of Mount Vernon Group Architects, Inc. (MVG) on January 24, 2024.

1. PROJECT INFORMATION

1.1 Purpose and Scope of Services

The purpose of our geotechnical services was to perform subsurface explorations at the site and to provide construction recommendations for subgrade preparation for the proposed parking lot.

LGCI performed the following services:

- Coordinated the test pit locations with MVG and with Brennan Consulting (Brennan), the project civil engineer. We also provided an LGCI geotechnical field representative to mark the test pit locations in the field, and we contacted Dig Safe Systems, Inc. for utility clearance.

- Engaged an excavation subcontractor to excavate two (2) test pits.

- Provided an LGCI geotechnical field representative, full-time, at the site to coordinate and observe the test pits, describe the soil samples, and prepare the field logs. Our field

representative also performed two (2) double ring infiltrometer tests in the two (2) test pits (one each).

- Prepared this geotechnical letter report containing the results of our subsurface explorations and our geotechnical recommendations for subgrade preparation for the proposed parking lot.

LGCI did not perform environmental services for this project. LGCI's scope of services did not include an environmental assessment for the presence or absence of wetlands or analytical testing for hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site, or mold in the soil or in any structure at the site. Any statements regarding odors, colors, or unusual or suspicious items or conditions are for information only and to support our geotechnical services.

Our scope did not include attending meetings, preparing specifications, performing contract document review, or providing construction services. LGCI would be pleased to perform these services when needed under a separate agreement. Recommendations for stormwater management, erosion control, pavement design, slope stability analyses, and detailed cost or quantity estimates are not included in our scope of work.

1.2 Site Description

Our understanding of the existing conditions is based on our field observations and on the following drawing.

- "Partial Existing Conditions Plan, Lot 4-Lot 8, Sunderland Road & 1006 Grafton Street, Worcester, Massachusetts (Worcester County)," (Existing Conditions Plan) prepared by Brennan, dated January 5, 2024, and provided to LGCI by Brennan via e-mail on February 14, 2024.

The Roosevelt Elementary School is located at 1006 Grafton Street in Worcester, Massachusetts as shown in Figure 1. The site is accessible from Grafton Street on the eastern side and from Sunderland Street on the western side. The site is bordered by private properties on the northern and southern sides.

The site is occupied by the existing school, a paved driveway that connects Grafton Street to Sunderland Street, a paved parking lot on the western side of the site and a larger parking lot on the southern side of the site, and landscaped areas.

1.3 Project Description

Our understanding of the proposed improvements is based on the following drawing: "Roosevelt School, Worcester, Phase 1 – Revised 10/23/2023." (Proposed Improvement Layout) prepared by Brennan Consulting, dated January 5, 2024, and provided to LGCI by Brennan Consulting via e-mail on February 14, 2024.

Based on the Proposed Improvement Layout, we understand that the proposed improvements will include a new parking lot near the southwestern corner of the site. The proposed parking lot will fit parking 37 spaces, including 2 handicap spaces. The proposed improvements will also include reconfiguring the existing parking lot on the southern side of the site and adding a small parking lot near the northeastern corner of the site. The focus of this letter report is the proposed southwestern parking lot.

Based on the Existing Conditions Plan, the grades within the proposed southwestern parking lot range between El. 475 feet on the southern side and El. 483 feet on the northern side with several local highs extending up to El. 490 feet on top of stockpiles of soil.

1.4 Elevation Datum

The elevations referenced in the Existing Conditions Plan are referenced with respect to the North America Vertical Datum of 1088 (NAVD 88).

2. SITE AND SUBSURFACE CONDITIONS

2.1 Surficial Geology

LGCI reviewed the following surficial geologic map: "Surficial Materials Map of the Worcester South Quadrangle, Massachusetts," compiled by Stone, B.D., Stone J.D., and DiGiacomo-Cohen, M.L., Scientific Investigation Map 3402, Quadrangle 81 – Worcester South, 2018.

The Surficial Geologic Map indicates that the soils in the general vicinity of the site consist of thin till.

The thin till consists of a non-sorted, non-stratified matrix of sand, some silt, and little clay containing scattered pebble, cobble, and boulder clasts. The thin till is generally less than 10 to 15 feet thick. The thick till is similar in composition to the thin till but is commonly more than 100 feet thick.

The Surficial Geological Map of the site is shown in Figure 2.

2.2 LGCI's Explorations

2.2.1 General

LGCI coordinated our exploration locations with Brennan and marked the exploration locations in the field by taping distances from the existing landmarks. We contacted the utility clearance agency (Dig Safe Systems, Inc.) for utility clearance.

Unless notified otherwise, we will dispose of the soil samples obtained during our explorations after three (3) months.

2.2.2 Test Pits

LGCI engaged Saunders Construction of Reading, Massachusetts to excavate two (2) test pits (TP-1 and TP-2) on February 16, 2024. Test pits TP-1 and TP-2 were advanced to depths of 8 and 9.8 feet beneath the ground surface, respectively. The test pits were excavated using a Takeuchi TB-240 excavator.

The LGCI representative performed double ring infiltrometer tests in the test pits at depths of about 4 feet beneath the ground surface. After the tests were completed, the test pits were extended to the termination depths described above. Upon completion, the excavations were backfilled with the excavated material that was placed in 18 to 24-inch lifts and tamped with the excavator bucket.

An LGCI geotechnical field representative observed and logged the test pits in the field.

2.2.3 Boring Logs and Locations

The test pit locations are shown in Figure 3 and Attachment A contains LGCI's test pit logs. Table 1 includes a summary of LGCI's test pits.

2.3 Subsurface Conditions

The subsurface description in this report is based on a limited number of borings and is intended to highlight the major soil strata encountered during our test pits. The subsurface conditions are known only at the actual test pit locations. Variations may occur and should be expected between test pit locations. The test pit logs represent conditions that we observed at the time of our test pits and were edited, as appropriate, based on the results of the laboratory test data and inspection of the soil samples in the laboratory. The strata boundaries shown in our test pit logs are based on our interpretations and the actual transitions may be gradual. Graphic soil symbols are for illustration only.

The soil strata encountered in the test pits was as follows, starting at the ground surface.

Topsoil – Topsoil was encountered at the ground surface in test pits TP-1 and TP-2 and extended to depths of 0.3 and 0.7 feet beneath the ground surface, respectively.

Subsoil – Subsoil was encountered beneath the topsoil in test pit TP-2. In test pit TP-1, the subsoil was encountered beneath a thin layer of fill. The subsoil extended to depths of 4.2 and 1.9 feet beneath the ground surface in test pits TP-1 and TP-2, respectively. The samples in the subsoil consisted of silt, silty sand, and silty gravel; and contained up to 30 percent fines and up to 20 percent gravel. When described as silt or gravel, the subsoil contained up to 30 percent sand. The subsoil contained cobbles and boulders up to 3.5 feet in diameter.

Fill – A layer of fill was encountered beneath the topsoil in test pit TP-1 and below the subsoil in test pit TP-2 and extended to depths of 1.4 feet and 3.9 feet beneath the ground surface,

respectively. The samples in the fill consisted of well graded sand and silty sand with up to 30 percent fines and up to 30 percent fine to coarse gravel. The fill contained traces of roots, traces of organic soil, and boulders.

Sand and Gravel – A layer of sand and gravel was encountered beneath the subsoil and fill and extended to the termination depths of the test pits. The test pits terminated on refusal on what appears to be rock. The samples in the sand and gravel were described as well graded sand and silty sand with 5 to 20 percent fines and 15 to 45 percent fine to coarse gravel. The sand and gravel layer contained cobbles and boulders up to 2 feet in diameter.

2.4 Groundwater

Groundwater was not encountered in the test pits.

The groundwater information reported herein is based on observations made during or shortly after the completion of the test pits and may not represent the actual groundwater conditions. The groundwater information presented in this report only represents the conditions encountered at the time and location of the explorations. Seasonal fluctuation should be anticipated.

2.5 Laboratory Test Data

LGCI submitted three (3) soil samples collected from the test pits for grain-size analysis. The results of the grain-size analyses are provided in the test data sheets included in Attachment B and are summarized in the table below.

Grain-Size Analysis Test Results

Boring No.	Stratum	Sample Depth (ft.)	Percent Gravel	Percent Sand	Percent Fines
TP-1	Subsoil	4	55.4	30.3	24.3
TP-1	Sand and Gravel	4.2 – 8.0	44.4	50.6	5
TP-2	Fill	3.8	29.6	44.4	26

2.6 Infiltrometer Tests

LGCI provided a geotechnical field engineer to perform two (2) double ring infiltrometer tests in test pits TP-1 and TP-2 (one each).

The excavation was first advanced to the test depth where the test pit bottom was leveled using the excavator bucket. After the infiltrometer rings were driven into the ground, the test was conducted by filling the rings with water. The test pit was advanced deeper after the completion of the test. At test pit TP-2, a test was attempted at a depth of 3.8 feet beneath the ground surface. The subgrade at the test elevation was gravelly and contained cobbles. It was difficult to

maintain a head of water in the infiltrometer rings as the water was leaking from beneath the bottom of the rings. After pouring about 20 gallons of water, with no success in sealing the bottom of the rings, the test was abandoned.

The test results are included in Attachment C.

The results include plots of the hydraulic conductivity for flow within the inner and outer rings. The stabilized portion of the plot for the inner ring indicates the permeability value. The results indicate the following approximate permeability, K, value:

TP-1: K = 1.3 10-3 cm/sec.

3. EVALUATION AND RECOMMENDATIONS

3.1 Site Preparation and Earthwork

- Topsoil, subsoil, and fill were encountered in the test pits and extended to depths of up to 4.2 feet beneath the ground surface. These materials are not suitable to support the proposed paved areas. We recommend entirely removing the topsoil within the proposed paved areas. We recommend removing the subsoil and the existing fill to a depth of 18 inches beneath the existing ground surface and improving the exposed subgrade as described below.

- After the surficial organic soil, the subsoil, and the existing fill are removed from within the proposed paved areas, the exposed subsoil and existing fill should be improved by compacting the exposed surface with at least six (6) passes of a vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft zones of soil are observed, the soft soil should be removed, and the grade should be restored using Ordinary Fill to the bottom of the proposed subbase layer. If pumping of the existing fill is observed, the compactor should be switched to static mode.

- Fill placed under the subbase of paved areas should meet the gradation and compaction requirements of Ordinary Fill, shown in Section 3.3.

- Fill placed in the top 12 inches beneath sidewalks should consist of Structural Fill with less than 5 percent fines as shown in Section 3.3.

- Loose or soft soils identified during the compaction of the subgrade should be excavated to a suitable bearing stratum, as determined by the representative of LGCI.

- When crushed stone is required in the drawings or is used for the convenience of the contractor, it should be wrapped in a geotextile fabric for separation except where introduction of the geotextile fabric promotes sliding. A geotextile fabric should not be placed between the bottoms of the footings and the crushed stone.

- An LGCI representative should observe the exposed subgrades. If soft or loose pockets are encountered at the subgrade, the soft or loose materials should be removed and the bottom of the footing should be placed at a lower elevation on firm soil, or the resulting excavation should be backfilled with suitable material.

3.2 Subgrade Protection

The onsite fill and natural soils are frost-susceptible. If construction takes place during freezing weather, special measures should be taken to prevent the subgrade from freezing. Such measures should include the use of heat blankets or excavating the final 6 inches of soil just before pouring the concrete. Soil used as backfill should be free of frozen material, as should the ground on which it is placed. Filling operations should be halted during freezing weather.

Materials with high fines contents are typically difficult to handle when wet, as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor should keep exposed subgrades properly drained and free of ponded water. Subgrades should be protected from machine and foot traffic to reduce disturbance.

3.3 Fill Materials

Structural Fill and Ordinary Fill should consist of inert, hard, durable sand and gravel free from organic matter, clay, surface coatings, and deleterious materials, and should conform to the gradation requirements shown below.

3.3.1 Structural Fill

The Structural Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9- inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of the optimum moisture content.

Sieve Size Percent	Passing by Weight
3 inches	100
1 ½ inch	80-100
½ inch	50-100
No. 4	30-85
No. 20	15-60
No. 60	5-35
No. 200*	0-10

* 0 – 5 for the top 12 inches under sidewalks, exterior slabs, pads, and walkways

3.3.2 Ordinary Fill

Ordinary Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of the optimum moisture content.

Sieve Size Percent	Passing by Weight
6 inches	100
1 inch	50-100
No. 4	20-100
No. 20	10-70
No. 60	5-45
No. 200	0-20

3.4 Reuse of Onsite Materials

Based on our field observations and the results of the grain-size analyses, the existing fill is not suitable for reuse as Structural Fill. Some of the existing fill free of organic soil may be reused as Ordinary Fill.

Should the contractor encounter materials suitable for reuse during earthwork operations, the contractor should avoid mixing the reusable soils with fine-grained and/or organic soils. The soils to be reused should be excavated and stockpiled separately for compliance testing.

Soils with 20 percent or greater fines contents are generally very sensitive to moisture content variations and are susceptible to frost. Such soils are very difficult to compact at moisture contents that are much higher or much lower than the optimum moisture content determined from the laboratory compaction test. Therefore, strict moisture control should be implemented during the compaction of onsite soils with fines contents of 20 percent or greater. The contractor should be prepared to remove and replace such soils if pumping occurs.

Materials to be used as fill should first be tested for compliance with the applicable gradation specifications.

3.5 Groundwater Control Procedures

We do not anticipate that groundwater control procedures will be needed during the excavations to remove the topsoil, the subsoil, and the existing fill to a depth of 18 inches beneath the existing ground surface. We anticipate that filtered sump pumps installed in a series of sump pump pits located at least 3 feet below the bottom of planned excavations may be sufficient to handle surface runoff that may enter the excavation during wet weather. The contractor should be prepared to use multiple sump pumps to maintain a dry excavation during the removal of the existing fill.

The contractor should be permitted to employ whatever commonly accepted means and practices are necessary to maintain the groundwater level below the bottom of the excavation and to maintain a dry excavation during wet weather. Groundwater levels should be maintained at a minimum of 1 foot below the bottom of the excavations during construction. The placement of reinforcing steel or concrete in standing water should not be permitted.

To reduce the potential for sinkholes developing over sump pump pits after the sump pumps are removed, the crushed stone placed in the sump pump pits should be wrapped in a geotextile fabric. Alternatively, the crushed stone should be entirely removed after the sump pump is no longer in use, and the sump pump pit should be restored with suitable backfill.

3.6 Temporary Excavations

All excavations to receive human traffic should be constructed in accordance with OSHA guidelines.

The site soils should generally be considered Type "C" and should have a maximum allowable slope of 1.5 Horizontal to 1 Vertical (1.5H:1V) for excavations less than 20 feet deep. Deeper excavations, if needed, should have shoring designed by a professional engineer.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain the stability of the excavation sides and bottom.

4. REPORT LIMITATIONS

Our analysis and recommendations are based on project information provided to us at the time of this report. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

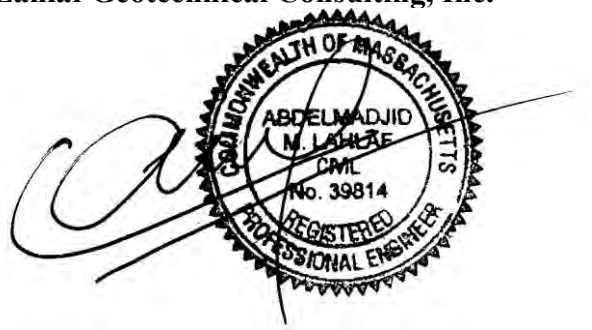
It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.

We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to 1) make site visits during construction to check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and 2) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our report has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Mount Vernon Group Architects, Inc. for the specific application to the proposed parking lot at the Roosevelt Elementary School in Worcester, Massachusetts as conceived at this time.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.



Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

Attachments: Table 1 – Summary of LGCI's Test Pits
Figure 1 – Site Location Map
Figure 2 – Surficial Geologic Map
Figure 3 – Test Pit Location Plan
Attachment A – Test Pit Logs
Attachment B – Laboratory Test Results
Attachment C – Double Ring Infiltrometer Test Results

Table 1 - Summary of LGCI's Test Pits
Proposed Parking Lot, Roosevelt School
Worcester, Massachusetts
LGCI Project No. 2402

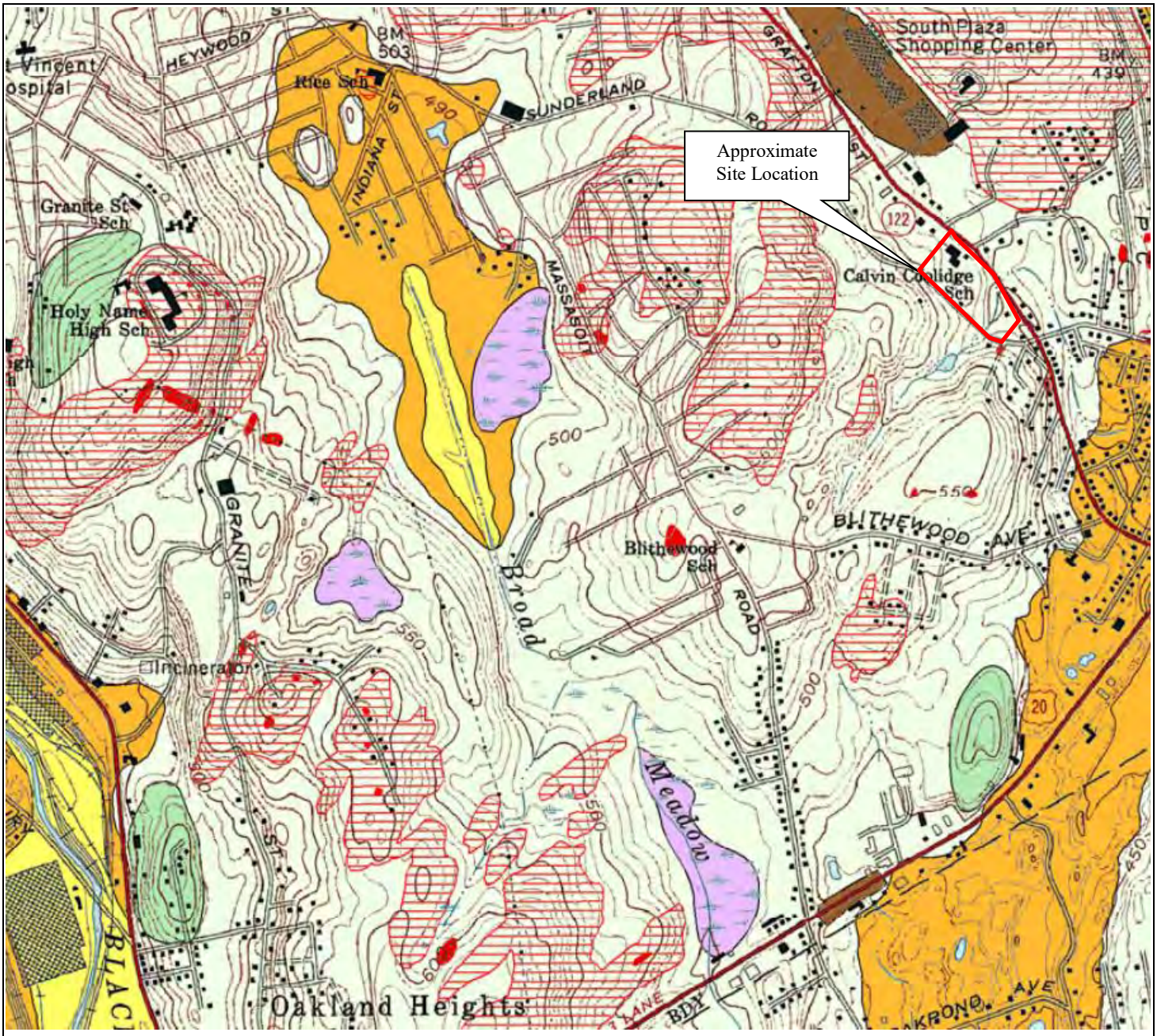
Test Pit No.	Ground Surface Elevation (ft.)[1]	Groundwater Depth/ Elevation (ft.)	Bottom of Topsoil Depth/ Elevation (ft.)	Bottom of Subsoil Depth/ Elevation (ft.)	Bottom of Fill Depth/ Elevation (ft.)	Bottom of Sand and Gravel Depth/ Elevation (ft.)	Bottom of Test Pit Depth/ Elevation (ft.)
TP-1	481.0	- / -	0.3 / 480.7	4.2 [3]/ 476.8	- [5]/ -	8.0 [6]/ 473.0	8.0 / 473.0
TP-2	485	- / -	0.7 / 484.3	1.9 [4]/ 483.1	3.9 / 481.1	9.8 [6]/ 475.2	9.8 / 475.2

1. The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, Lot 4-Lot 8 Sunderland Road & 1006 Grafton Street, Worcester, Massachusetts," prepared by Brennan Consulting, dated January 5, 2024, and provided to LGCI by Brennan Consulting via e-mail on February 14, 2024.
2. "-" means ground water table or layer was not encountered.
3. Double Ring Infiltrometer test was performed in subsoil layer at depth of 4'.
4. Double Ring Infiltrometer test was performed in fill layer at depth of 3.8'.
5. A layer of fill was encountered on top of the subsoil layer and extended to a depth pf 1.4 feet beneath the ground surface.
6. Test pit terminated on refusal in the sand and gravel layer.

Contour Intervals: 10 feet

Note: Figure based on USA Topo Maps of Worcester, MA obtained from https://viewer.nationalmap.gov/

Client:	Project:	Figure 1 – Site Location Map	
Mount Vernon Group Architects, Inc.	Proposed Parking Lot, Roosevelt School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Worcester, MA	LGCI Project No.: 2402	Date: Feb. 2024



N

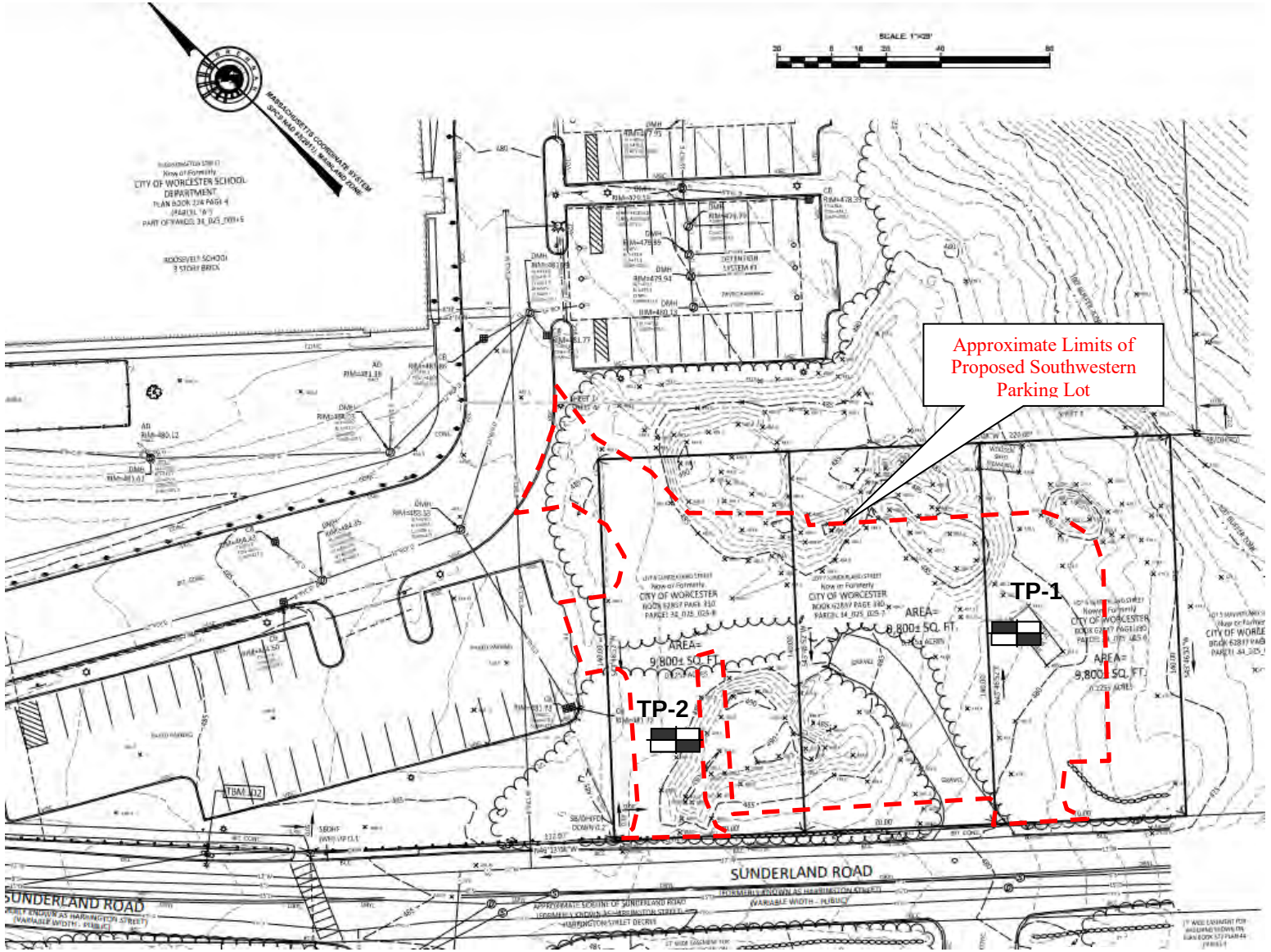
Thin till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered pebble, cobble, and boulder clasts; large surface boulders are common; unit was mapped where till is generally less than 10 to 15 ft thick including areas of shallow bedrock. Predominantly consists of upper till of the last glaciation; loose to moderately compact, generally sandy, commonly stony. Two facies are present in some places: a looser, coarser grained ablation facies, melted out from supraglacial position; and an underlying more compact, finer grained lodgement facies deposited subglacially. In general, both ablation and lodgement facies of upper till derived from fine-grained bedrock are finer grained, more compact, less stony and have fewer surface boulders than upper till derived from coarse-grained crystalline rocks. Across Massachusetts, fine-grained bedrock sources include the red Mesozoic sedimentary rocks of the Connecticut Valley lowland, marble in the western river valleys, and fine-grained schists in upland areas

Note: Figure based on map titled: "Surficial Materials Map of the Worcester South Quadrangle, Massachusetts," prepared by Stone, B.D., Stone, J.D. and DiGiacomo-Cohen, M.L., Scientific Investigation Map 3402, Quadrangle 81 – Worcester South, 2018.

Client:	Project	Figure 2 – Surficial Geologic Map	
Mount Vernon Group Architect, Inc.	Proposed Roosevelt Elementary School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Worcester, MA	LGCI Project No.: 2402	Date: Feb. 2024

Legend

Approximate location of proposed test pits advanced by the Saunders Construction on February 16, 2024, and observed by LGCI.



Note

Figure based on drawing titled: "Partial Existing Conditions Plan, Lot 4-Lot 8. Sunderland Road & 1006 Grafton Street," prepared by Brennan Consulting dated January 5, 2024, and provided to LGCI by Brennan Consulting via e-mail on January 24, 2024.

Client:	Project:	Figure 3 – Test Pit Location Plan	
Mount Vernon Group Architects, Inc.	Proposed Parking Lot, Roosevelt School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Worcester, MA	LGCI Project No.: 2402	Date: Feb. 2024

Attachment A – Test Pit Logs

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TEST PIT LOG

TP-1
PAGE 1 OF 1

CLIENT: Mount Vernon Group Architects, Inc.
PROJECT NAME: Proposed Parking Lot, Roosevelt School
LGCI PROJECT NUMBER: 2402
PROJECT LOCATION: Worcester, MA

DATE STARTED: 2/16/24 **DATE COMPLETED:** 2/16/24
TEST PIT LOCATION: Southern side of proposed paved areas
COORDINATES: NA
SURFACE EL.: 481 ft. (see note 1) **TOTAL DEPTH:** 8 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: -
AT END OF EXCAVATION: -

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Paul Meniates
EXCAVATOR TYPE/MODEL: Takeuchi TB-240
WEATHER: 30's / Sunny
TEST PIT DIMENSIONS: 7' x 13'
LOGGED BY: OL **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		M		Topsoil	0.3 480.7	0 ft. - 0.3 ft.: Topsoil
	480.0	M		Fill		0.3 ft. - 1.4 ft.: Well Graded SAND with Silt (SW-SM), fine to coarse, 10-15% fines, 5-10% fine to coarse subangular gravel, trace of roots, trace of organic, orange to brown, moist
		M			1.4 479.6	
		M				1.4 ft. - 4 ft.: SILT with Sand (ML), 20-25% fine to medium sand, 0-5% subangular gravel, trace of roots, trace of organic soil, orange, moist
2.5		D		Subsoil		
	477.5		1			
		D	2		4.2 476.8	REMARK 1: Double Ring Infiltrometer test performed at depth of 4'.
						4 ft. - 4.2 ft.: Silty GRAVEL with Sand (GM), fine to coarse, subangular, ~25% fines, ~30% fine to coarse sand, trace of roots, trace of organic soil, brown, moist
5.0		D				REMARK 2: Boulders up to 3.5' in diameter removed from top 4'.
	475.0			Sand and Gravel		4.2 ft. - 8 ft.: Well Graded SAND with Gravel (SW), fine to coarse, ~5% fines, ~45% fine to coarse subangular gravel, light brown, moist
		V				
7.5			3		8.0	REMARK 3: Cobbles and boulders between 6"-18" in diameter removed from depths of 3'-8'.
			4			REMARK 4: Refusal on rock at depth of 8'.
						Bottom of test pit at 8.0 feet. Backfilled test pit with excavated materials, which were placed in 18" to 24" lifts and tamped with the excavator bucket.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, Lot 4-Lot 8 Sunderland Road & 1006 Grafton Street, Worcester, Massachusetts," prepared by Brennan Consulting, dated January 5, 2024, and provided to LGCI by Brennan Consulting via e-mail on February 14, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-2
PAGE 1 OF 1

CLIENT: Mount Vernon Group Architects, Inc.
PROJECT NAME: Proposed Parking Lot, Roosevelt School
LGCI PROJECT NUMBER: 2402
PROJECT LOCATION: Worcester, MA

DATE STARTED: 2/16/24 **DATE COMPLETED:** 2/16/24
TEST PIT LOCATION: Northern side of proposed paved area
COORDINATES: NA
SURFACE EL.: 485 ft. (see note 1) **TOTAL DEPTH:** 9.8 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: -
AT END OF EXCAVATION: -

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Paul Meniates
EXCAVATOR TYPE/MODEL: Tekeuchi TB-240
WEATHER: 30's / Sunny
TEST PIT DIMENSIONS: 6' x 13'
LOGGED BY: OL **CHECKED BY:** JKW

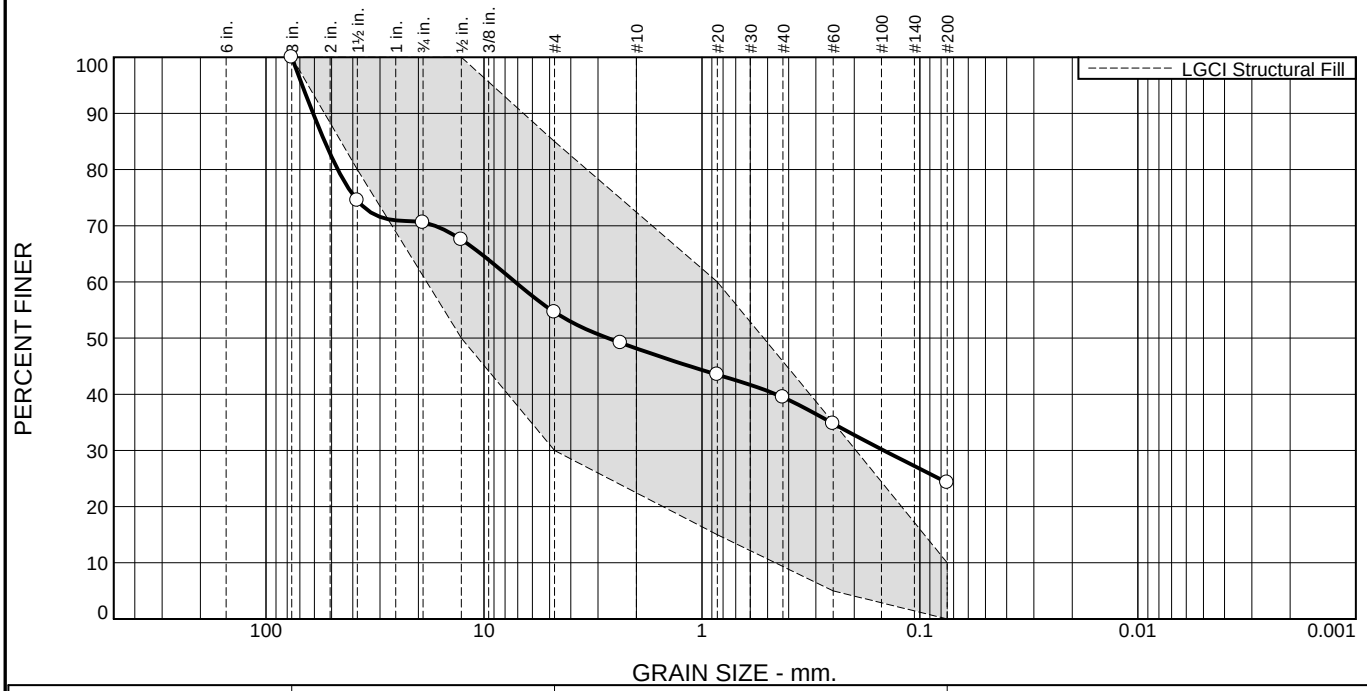
Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.7	0 ft. - 0.7 ft.: Topsoil
		E	1	Subsoil	484.3 1.9	0.7 ft. - 1.9 ft.: Silty SAND with Gravel (SM), fine to coarse, 25-30% fines, 15-20% fine to coarse subangular gravel, trace of roots, trace of organic soil, light brown, moist REMARK 1: Cobbles and boulders between 6"-18" in diameter removed.
2.5	482.5	M		Fill	483.1	1.9 ft. - 3.8 ft.: Silty SAND with Gravel (SM), fine to medium, 15-20% fines, ~15% fine to coarse subangular gravel, trace of roots, tan brown, moist
		D	2			REMARK 2: Boulders on four sides of excavation REMARK 3: Double Ring Infiltrometer test performed at depth 3.8'.
		D	3		3.9	REMARK 4: Metal pipe encountered at about 3.8 feet.
		M	4		481.1	3.8 ft. - 3.9 ft.: Silty SAND with Gravel (SM), mostly fine with medium to coarse, 25-30% fines, 25-30% fine to coarse subangular gravel, light brown
5.0	480.0	D	5	Sand and Gravel		3.9 ft. - 9.8 ft.: Silty SAND with Gravel (SM), fine to coarse, 15-20% fines, 15-20% fine to coarse subangular gravel, tan brown, moist REMARK 5: Boulders up to 2' in diameter at depth of 6'.
7.5	477.5	V				
			6		9.8	REMARK 6: Refusal on rock at depth of 9.8'. Bottom of test pit at 9.8 feet. Backfilled test pit with excavated materials, which were placed in 18" to 24" lifts and tamped with the excavator bucket.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, Lot 4-Lot 8 Sunderland Road & 1006 Grafton Street, Worcester, Massachusetts," prepared by Brennan Consulting, dated January 5, 2024, and provided to LGCI by Brennan Consulting via e-mail on February 14, 2024.

Attachment B – Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.4	16.0	6.4	8.7	15.2	24.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	74.5	80.0 - 100.0	X
0.75"	70.6		
0.5"	67.5	50.0 - 100.0	
#4	54.6	30.0 - 85.0	
#8	49.2		
#20	43.5	15.0 - 60.0	
#40	39.5		
#60	34.8	5.0 - 35.0	
#200	24.3	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty GRAVEL with Sand (GM), fine to coarse, subangular, 25% fines, 30% fine to coarse sand, trace of roots, trace of organic soil, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 60.8359 D_{85}= 53.8316 D_{60}= 7.1981
D_{50}= 2.7033 D_{30}= 0.1465 D_{15}=
D_{10}= C_u= C_c=

Remarks

Subsoil Sample

Infiltrometer test preformed beneath this soil layer.

Date Received: 2/16/2024 **Date Tested:** 2/20/2024

Tested By: JKW

Checked By: SG

Location: TP-1
Sample Number: 4' **Depth:** 4'

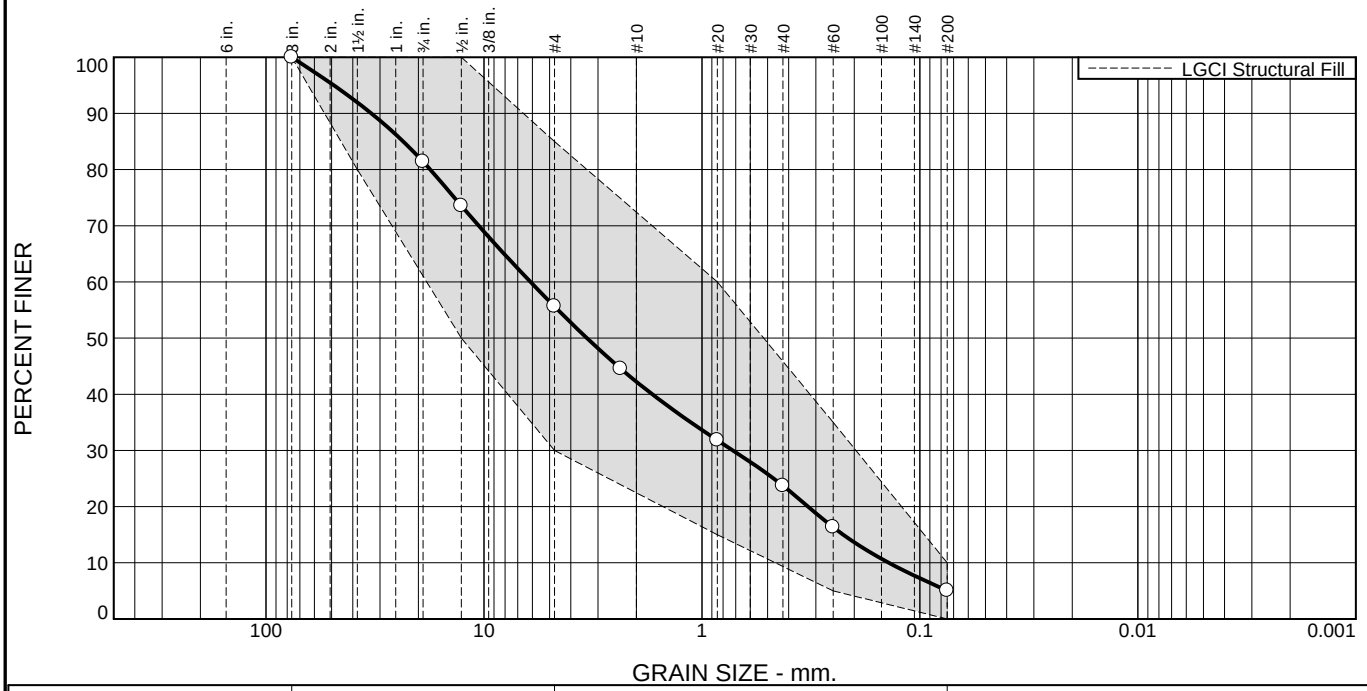
Date Sampled: 2/16/2024

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Mount Vernon Group Architects, Inc.
Project: Proposed Parking Lot, Roosevelt School, Worcester, MA

Project No: 2402 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.6	25.8	13.4	18.5	18.7	5.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
0.75"	81.4		
0.5"	73.6	50.0 - 100.0	
#4	55.6	30.0 - 85.0	
#8	44.6		
#20	31.8	15.0 - 60.0	
#40	23.7		
#60	16.3	5.0 - 35.0	
#200	5.0	0.0 - 10.0	

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Well Graded SAND with Gravel (SW), fine to coarse, 5% fines, 45% fine to coarse subangular gravel, light brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 32.8693 D_{85}= 23.4751 D_{60}= 6.1153
D_{50}= 3.3719 D_{30}= 0.7214 D_{15}= 0.2248
D_{10}= 0.1390 C_u= 44.01 C_c= 0.61

Remarks

Natural Soil Sample

Date Received: 2/16/2024 **Date Tested:** 2/20/2024

Tested By: JKW

Checked By: SG

Location: TP-1
Sample Number: 4.2'-8' **Depth:** 4.2'-8'

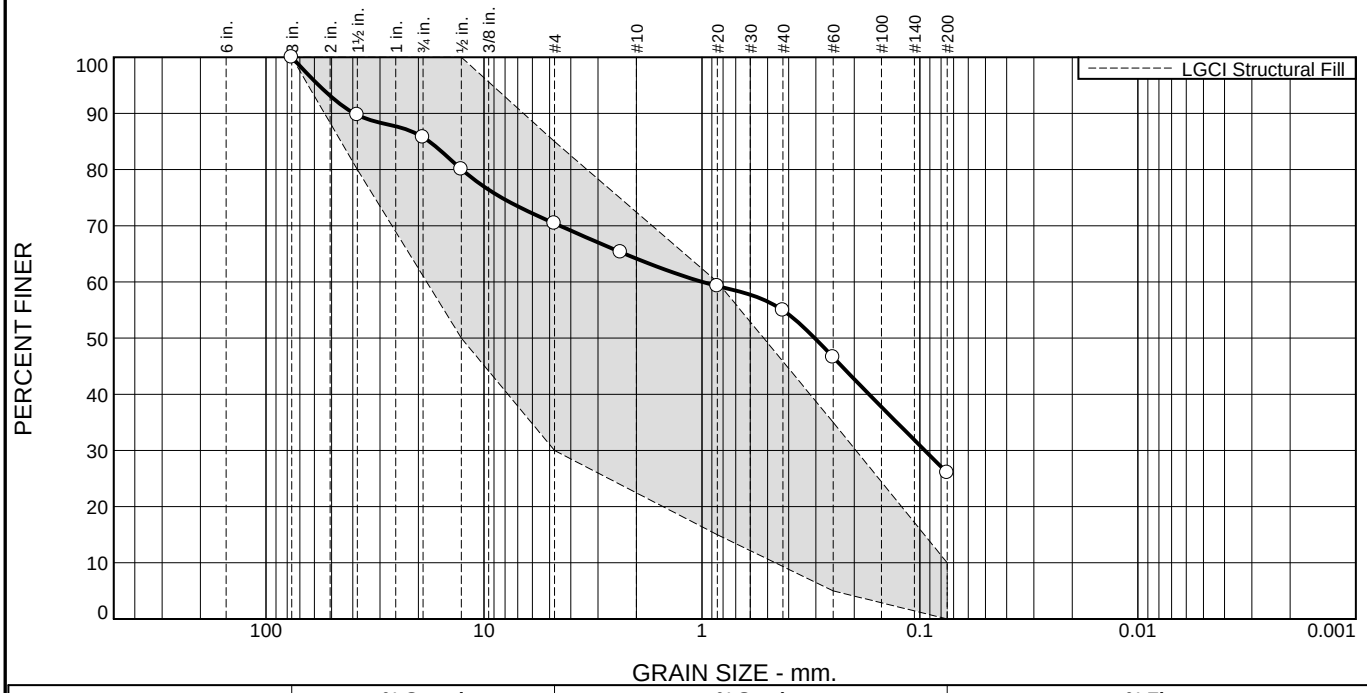
Date Sampled: 2/16/2024

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Mount Vernon Group Architects, Inc.
Project: Proposed Parking Lot, Roosevelt School, Worcester, MA

Project No: 2402 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.2	15.4	6.2	9.3	28.9	26.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	89.7	80.0 - 100.0	
0.75"	85.8		
0.5"	80.1	50.0 - 100.0	
#4	70.4	30.0 - 85.0	
#8	65.3		
#20	59.3	15.0 - 60.0	
#40	54.9		
#60	46.6	5.0 - 35.0	X
#200	26.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM), mostly fine with medium and coarse, 25-30% fines, 30% fine to coarse subangular gravel, light brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 39.3017 D_{85}= 17.8047 D_{60}= 0.9954
D_{50}= 0.3037 D_{30}= 0.0949 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill

Infiltrometer Test preformed at depth of 3.8' on this material

Date Received: 2/16/2024 **Date Tested:** 2/20/2024

Tested By: JKW

Checked By: SG

Location: TP-2
Sample Number: 3.8' **Depth:** 3.8'

Date Sampled: 2/16/2024

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Mount Vernon Group Architects, Inc.
Project: Proposed Parking Lot, Roosevelt School, Worcester, MA

Project No: 2402 **Figure**

Attachment C – Double Ring Infiltrometer Test Results

LGCI
Lahlaf Geotechnical Consulting, Inc.

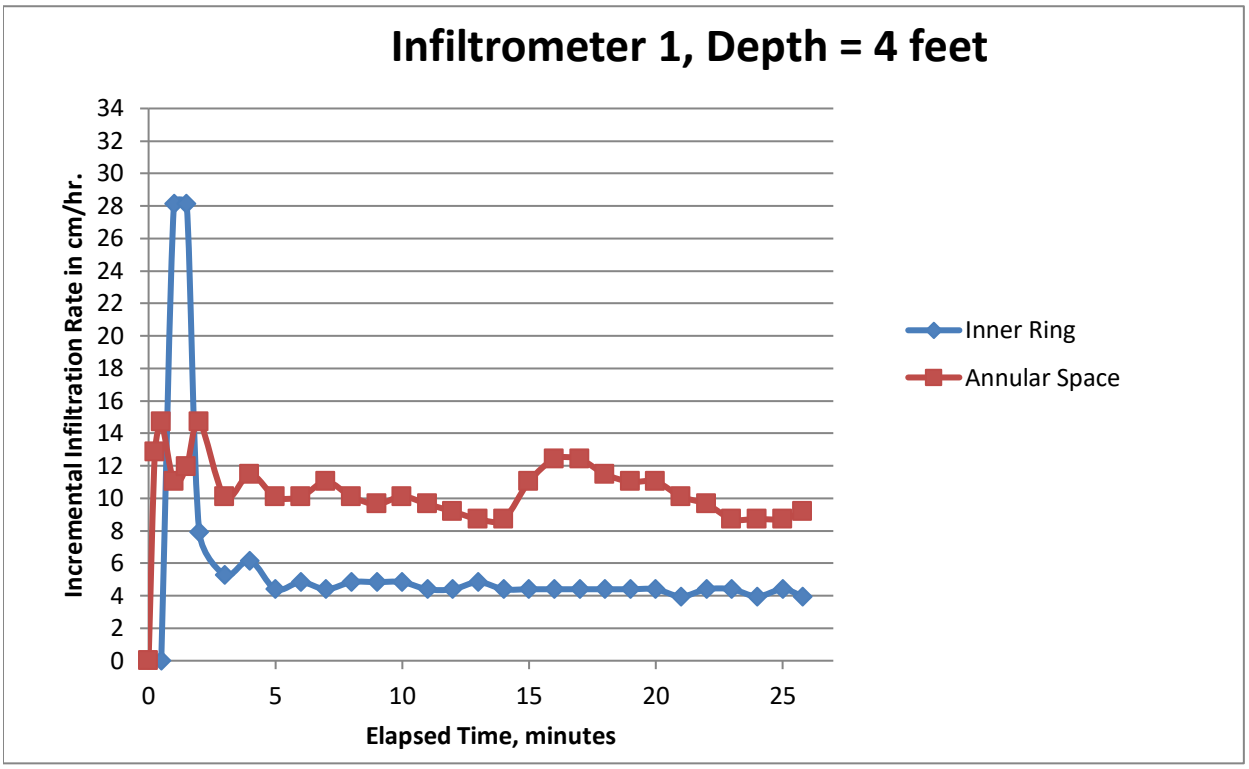
Double Ring Infiltrometer Test

Project:	Name: Proposed Parking Lot, Roosevelt Elementary School Location: Worcester, MA LGCI Project Number: 2402
Test Location:	TP-1
Test Procedure:	General accordance with ASTM D 3385
Test Date	2/16/2023
LGCI Representative:	OIL
Weather Conditions:	Sunny, 32 degrees
Test Depth:	4 feet
Groundwater Depth:	NA
Soil Stratum:	Silty GRAVEL with Sand (GM), fine to coarse, subangular, 25% fines, 30% fine to coarse sand, trace of roots, trace of organic soil, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration	Reading	Volume	Infiltration
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	58.3	0	0	58.2	0	0
0.25	0.25	56.7	86	28.2	57.5	117	12.9
0.5	0.25	55.1	86	28.2	56.7	134	14.7
1	0.5	54.2	48	7.9	55.5	201	11.0
1.5	0.5	53.6	32	5.3	54.2	218	11.9
2	0.5	52.9	37	6.2	52.6	268	14.7
3	1	51.9	54	4.4	50.4	369	10.1
4	1	50.8	59	4.8	47.9	419	11.5
5	1	49.8	54	4.4	45.7	369	10.1
6	1	48.7	59	4.8	43.5	369	10.1
7	1	47.6	59	4.8	41.1	402	11.0
8	1	46.5	59	4.8	38.9	369	10.1
9	1	45.5	54	4.4	36.8	352	9.6
10	1	44.5	54	4.4	34.6	369	10.1
11	1	43.4	59	4.8	32.5	352	9.6
12	1	42.4	54	4.4	30.5	335	9.2
13	1	41.4	54	4.4	28.6	318	8.7
14	1	40.4	54	4.4	26.7	318	8.7
15	1	39.4	54	4.4	24.3	402	11.0
16	1	38.4	54	4.4	21.6	452	12.4
17	1	37.4	54	4.4	18.9	452	12.4
18	1	36.4	54	4.4	16.4	419	11.5
19	1	35.5	48	4.0	14.0	402	11.0
20	1	34.5	54	4.4	11.6	402	11.0
21	1	33.5	54	4.4	9.4	369	10.1
22	1	32.6	48	4.0	7.3	352	9.6
23	1	31.6	54	4.4	5.4	318	8.7
24	1	30.7	48	4.0	3.5	318	8.7
25	1	29.8	48	4.0	1.6	318	8.7
25.8	0.8	28.1	91	9.3	0	268	9.2

Notes:
Material at a depth of 4.2 feet consisted of Well Graded SAND with Gravel (SW), fine to coarse, 5% fines, 45% fine to coarse subangular gravel, light brown



K = 1.3E-03 cm/sec.

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project:	Name: Proposed Parking Lot, Roosevelt Elementary School Location: Worcester, MA LGCI Project Number: 2402
Test Location:	TP-2
Test Procedure:	General accordance with ASTM D 3385
Test Date	2/16/2023
LGCI Representative:	OIL
Weather Conditions:	Sunny, 32 degrees
Test Depth:	3.8 feet
Groundwater Depth:	NA
Soil Stratum:	Silty SAND with Gravel (SM), mostly fine with medium and coarse, 25-30% fines, 30% fine to coarse subangular gravel, light brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time (min)	Time Increment (min)	Inner Ring			Annular Space		
		Reading (div)	Volume (cc)	Infiltration (cm/hr.)	Reading (div)	Volume (cc)	Infiltration (cm/hr.)
			0	0		0	0
SEE NOTE BELOW			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	
			0			0	

Notes:
Attempted to perform an infiltrometer test at a depth of 3.8 feet beneath the ground surface. The subgrade at the test elevation was gravelly and contained cobbles. It was difficult to maintain a head of water in the infiltrometer rings as the water was leaking from beneath the bottom of the rings. After pouring about 20 gallons of water, with no success in sealing the bottom of the rings, the test was abandoned.

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. Section includes, without limitation, providing:
   1. The contractor shall provide all equipment and do all work necessary to demolish and/or remove the structures indicated and prepare the site as indicated on the Drawings.
   2. The contractor shall comply with the Worcester Conservation Commission's Order of Conditions prepared for the site.
   3. The contractor shall perform the work in accordance with the Construction Phasing Plans provided and allow the day to day operations of the Roosevelt School to operate without interruption through the end of the School's calendar year.

B. Extent: As shown, if not, as follows:
   1. Clearing and grubbing areas marked on the plans and as needed to install proposed features.
   2. Tree removal of trees in the areas noted on the plans. Includes clearing and grubbing all shrubs, cutting and removing trees. Removal of all stumps new or existing. Backfilling of holes with clean fill.
   3. Stripping and stockpiling topsoil.
   4. Removal of plants and soil containing invasive species.
   5. Tree pruning trees that are to remain.
   6. Removal of all rubbish, debris, and other materials to be disposed of as a result of the work of this section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section includes, without limitation, providing:
   1. Section 01 57 12 - Temporary Erosion & Sedimentation Controls
   2. Section 02 61 00.13- Handling and Disposal of Excavated Materials
   3. Section 31 21 00 - Site Preparation
   4. Section 31 21 01 - Site Utilities Preparation
   5. Section 31 20 00 - Earth Moving

1.04 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American National Standards Institute (ANSI):Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush
2. Commonwealth of Massachusetts Department of Transportation (MassDOT) Highway Division:
3. Standard Specifications for Highways and Bridges latest edition as posted on the MassDOT website.
4. Construction Standard Details latest edition as posted on the MassDOT website.
5. MassDOT Work Zone Safety Manual for Temporary Traffic Control

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

B. The following shall be submitted:
1. Certificates of severance of utility services.
2. All City of Worcester DPW permits required. Including but not limited to Curb Cut Permit.
3. Permit for transport and legal disposal of debris.
4. Location plan of staging areas and schedule for moving staging equipment into those areas shall be submitted for Architect's approval prior to mobilization and related site preparation operations.
5. After review of the site, Contractor shall submit proposed location for temporary access road around stormwater outfalls and existing utilities.
6. Professional Arborist certification for review and approval by Architect or Owner’s Representative.

C. Submit schedule of existing trees to be pruned including extent of pruning.

1.06 PROTECTION

A. Prevent movement, settlement or collapse of adjacent services and trees. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.

1.07 EXISTING SERVICES

A. Existing structures and utilities shall be suitably protected from damage.

1.08 MAINTAINING TRAFFIC

B. Do not close or obstruct roadways without permits.

C. Conduct operations with minimum interference to public or private roadways. Comply with standard manuals for safe work access.

1.09 QUALITY ASSURANCE

D. Selective clearing methods shall conform to the applicable requirements of ANSI Z133.1

E. Selective pruning methods shall conform to the applicable requirements of ANSI Z133.1.

1. Work of this section shall be completed by a professional Certified Arborist with a minimum five years' experience, who has successfully completed a certification program equal to the Massachusetts Certified Arborist (MCA) program/examination sponsored by the Massachusetts Arborists Association, 8-D Pleasant Street, South Natick, MA 01760; (508) 653-3320; FAX: (508) 653-4112; E-mail: info@massarbor.org.

PART 2 - PRODUCTS

2.01 ARBORIST REPORT

A. Arborist Report: Shall include tree type, size, health, and any special pruning or care recommendations for all trees within the project site and within 25' of limit of work.

PART 3 - EXECUTION

3.01 STRIPPING AND STOCKPILING TOPSOIL

A. Remove sod and grass before stripping topsoil.

B. Remove and dispose of all soil containing invasive species.

C. Topsoil shall be stripped to full depth from areas to be excavated, filled, regraded, or resurfaced. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

D. Topsoil shall be stockpiled on-site and protected. No topsoil shall be removed from the site without the written permission of the Architect.

E. Stockpiled topsoil which conforms to the specifications may be used for fill and finish grading within landscaped areas. Refer to Section 32 92 00, PLANTING.

F. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. If duration of stockpile is 3 months or less: Limit height of topsoil stockpiles to 72 inches.
2. If duration of stockpile is greater than 3 months: Limit height of topsoil stockpiles to 40 inches.
3. Do not stockpile topsoil within tree protection zones.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

G. Stockpiled topsoil which conforms to the Section 32 92 00, LAWNS AND PLANTING may be used for within landscaped areas. Material which does not conform shall be deemed unsuitable and shall be removed from the site and legally disposed.

3.02 CLEARING AND GRUBBING

A. Trees, shrubs, and other vegetation not indicated on the Drawings or designated in the field by the Architect to remain and required for execution of the Work shall be cleared and grubbed.

B. Stumps shall be removed to their full depth. Roots 3 in. and larger shall be removed to a depth of 2 ft. below finished grade. Stumps shall be legally disposed of off-site.

3.03 TREE REMOVAL

A. Unless otherwise indicated, trees and shrubs not indicated on the Drawings or designated in the field by the Architect to remain, and required for execution of the Work shall be removed.

B. Trees shall be cut and stumps shall be removed to their full depth. Trees may be able to be pushed over exposing complete root system; dig entire root mass and completely remove.
1. Roots 3 in. and larger shall be removed to a depth of 2 ft. below finished grade.
2. Stumps and all debris from grubbing shall be legally disposed of off-site.

C. Do not apply herbicide to remaining stumps or plant life to inhibit growth.

D. Fill depressions caused by stump removal and clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated. Seed with temporary erosion control mixture as specified.
1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

E. At the Contractor's option:
1. Felled trees, including stumps, may be legally disposed of off-site at a location selected by the Contractor; or
2. Felled trees, not including stumps, may be chipped on-site and completely removed to a location selected by the Contractor.
3. Felled trees, not including stumps, may be chipped off-site and removed to a location selected by the Contractor.

F. Stumps: Contractor shall be required to haul stumps to and legally dispose of at an off-site location selected by the Contractor.

G. Burning shall not be permitted on-site.

3.04 TREE PRUNING

A. Tree pruning shall be "Class II Medium Pruning" conforming to NAA Ref. 1.

B. Schedule of trees to be pruned and extent of pruning shall be as indicated on the Drawings. Tree pruning shall be as directed and approved by the Architect.

3.05 TREE CABLING AND GUYING

A. Cabling and guying methods shall conform to ANSI A300, Best Management Practices Tree Support Systems: Cabling, Bracing, and Guying.
1. Provide cabling and guying systems to accomplish structural support of the tree as scheduled on the Drawings.

3.06 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place or outside of the limit of work. Protect improvements on adjoining properties and on User Agency's property.

1. Restore improvements damaged by Contractor's clearing activities to their original condition, at no additional expense to the Commonwealth.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

3.07 DEADWOOD AND BRUSH REMOVAL

A. Deadwood and brush within the limits of work indicated on the Drawings shall be disposed of as follows:

1. Brush, limbs, and other material less than 6 in. in diameter shall be chipped and stockpiled on-site in an area designated by the Architect.
2. All deadwood shall be chipped and stockpiled as specified above.
3. Limbs 6 in. and larger shall, at the Contractor's option, be disposed of as follows:
    a. Material shall become the property of the Contractor and be disposed of off-site, or;
    b. Material shall be cut to 4 ft. lengths and stacked in an on-site location designated by the Architect.

B. All debris material not otherwise indicated shall be legally disposed of off-site.

3.08 RUBBISH REMOVAL

A. The General Contractor shall remove and dispose daily all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

B. Debris, rubbish, and other material shall be disposed of promptly and shall not be left until final cleanup of site.

END OF SECTION

SECTION 31 20 00

EARTH MOVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General and Supplementary Conditions and Division 1 – General Requirements, apply to the Work of this Section.

1.02 SPECIAL INSTRUCTIONS

A. The General Contractor shall become familiar with other Sections of the Specifications to determine the type and extent of work there under which affects the work of this section whether, or not such work is specifically mentioned.

B. Examine all drawings and all other Sections of the Specifications for the requirements therein affecting the work of this trade. Plans, surveys, measurements and dimensions, under which the work is to be performed are believed to be correct to the best of the Architect's knowledge, but the Contractor shall have examined them for himself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found herein. The contractor shall reconcile all drawings.

C. Where there is a conflict between drawings and these specifications, the stricter requirement and the interpretation that is most in favor of the owner shall be adopted at no additional cost to the owner.

1.03 DESCRIPTION OF WORK

A. The Base Bid shall include the following:

1. The excavating, disposing of excavated material generated within the limit of excavation at the location of the proposed parking lot and driveway areas as shown on the Drawings.
2. Backfill and compact all completed work in accordance with these specifications.
3. Removal and disposal of asphalt and concrete pavement, retaining walls, fences, curbing, and trees as shown on the drawings.
4. Remove and stockpile all topsoil materials on site. Screen and respread topsoil as directed. Provide supplemental loam as needed and as specified. And provide supplemental loam as needed to meet the proposed design grades.
5. Excavate/trench and backfill all proposed utilities including but not limited to drains and all drainage structures and infiltration system, stone lined outlet protection and electrical lighting conduits and light pole foundations and light poles and fixtures, signs and posts, as noted in various specifications.
6. Provide spread and compact all gravel borrow materials for parking areas, roadways, sidewalks, curbs and wheelchair ramps as detailed on the drawings and specified in other specification sections.
7. Excavate, backfill and compact test pits as noted on the drawings.

8. Provide equipment for the removal of rock as needed to install the drainage system components as needed.
9. Excavate and prepare and install all base materials for all surface features as noted on the drawings using materials as specified herein.

B. The Work of this Section includes, but is not limited to, furnishing and installation of the following:

1. Do not commence any excavation or construction work until verification of the layout performed by the Contractor's Engineer/Surveyor has been received and approved by the Architect.
2. All materials, equipment, labor and services required for all Earth Moving work, including all items incidental thereto, as specified herein and as shown on the Drawings:
3. All excavated soils shall be removed from the site and disposed of. No burning on the site shall be permitted.
4. Removing unsuitable materials from within the proposed parking lot and access road footprint, including but not limited to topsoil containing invasive species, asphalt, existing fill, and organic matter, construction debris, remnants of existing foundations, masonry materials, pallets, trailer, woodshed remnants, abandon machinery and other deleterious matter.
5. Improving the subgrade of the proposed paved areas in the existing fill as described in these specifications.
6. Dewatering trenches and excavations.
7. Proof-rolling of exposed subgrade for fill, footings, foundations, slabs, walks, pavements, lawns and grasses, and exterior plants.
8. Performing test pits before the start of and during excavation as required by the Geotechnical Engineer and as noted on the drawings.
9. Removing and/or improving the existing fill in accordance with the requirements of Section 3.02 of these specifications.
10. Amending the existing fill to meet the gradation requirements of Gravel Fill and/or Ordinary Fill.
11. Fill slopes and stone lined outlet protection.
12. Excavation support, shoring or bracing as necessary.
13. Protecting existing utilities during the different phases of the earthwork operations.
14. Disposing off-site of excess or unsuitable materials.
15. Placing bedding, sub-base and base course layers.
16. Stabilizing/mitigating of saturated or otherwise disturbed materials.
17. Excavating and backfilling required for the installation of the building slab and footings, pavements, underground utilities including storm drainage, sanitary, electrical and water.
18. Pumping and/or bailing necessary to maintain excavated spaces free from water from any source whatsoever.
19. Compliance with the City of Worcester Conservation Commission Order of Conditions number CC-2024-016.

20. Preparation, submission of, and compliance with an approved, phased erosion control plan in accordance with DEP requirements for a SWPPP (Stormwater Pollution Prevention Plan) to include materials and measures required to control soil erosion resulting from construction operations for the duration of the project.
21. Designation of an Erosion Control Supervisor and submission of weekly erosion control reports.
22. Coordination with Archaeological Monitor.
23. Sediment removal and disposal.
24. Maintenance of erosion control devices.
25. Removal of erosion control devices as directed.
26. Install temporary construction fencing and safety devices or controls as specified and as necessary.
27. Dust control and clean-up.

1.04 GENERAL REQUIREMENTS

A. The Contractor shall furnish all labor, material, tools and equipment necessary to excavate materials; segregate, track, handle, sample, analyze, and test excavated materials, backfill, and re-grade as indicated on the Drawings.

B. The Contractor shall use suitable, amended on-site soils and fill, and soil from off-site sources, as needed. Note that most of the on-site materials will likely not be suitable for reuse without amendment, nor will all required material gradations be present on the site. The contractor shall avoid mixing the reusable soils with fine-grained and/or organic soils.

C. The Contractor shall make excavations in such a manner and to such widths that will provide suitable room for performing the Work and shall furnish and place all sheeting, bracing, and supports, if necessary. Excavation support is anticipated for this project.

D. The Contractor shall provide labor and material for all pumping and draining, as necessary; and shall render the bottom of excavation firm and unyielding, and dry and in all respects acceptable. The Contractor shall collect and properly dispose of all discharge water from dewatering systems in accordance with local and State requirements and permits.

E. The Contractor shall grade the Site to final grades and compact the subgrade and intermediate layers to the required criteria set forth within this Section.

F. The contractor shall provide routine monitoring of in-place excavation support system.

G. Contractor shall protect and moisture condition all onsite and imported materials for proper installation, compaction and use. This includes covering, drying, and adding moisture in order to maintain suitable workability of the soil materials. Failure by the Contractor to follow this requirement shall not be cause for additional cost to the Owner.

1.05 LAWS AND REGULATIONS

A. Work shall be accomplished in accordance with regulations of local, county, state and national agencies or utility company standards as they apply.

B. Comply with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc., the Commonwealth of Massachusetts Rules and Regulations For the Prevention of Accidents in Construction Operations, and the requirements of the Occupational Safety and Health Administration (OSHA), United States Department of Labor.

C. Comply with the MassDOT Traffic Management Requirements while working on City of Worcester owned roadways and property.

D. The Contractor shall procure and pay for all permits and licenses required for the complete work specified herein, in other specification sections and as shown on the Drawings.

1.06 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements that affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this section include, but are not limited to, the following Sections:

1. Section 31 10 00 - Site Clearing
2. Section 02 61 00.13- Handling and Disposal of Excavated Materials
3. Section 31 21 00 - Site Preparation
4. Section 31 21 01 - Site Utilities Preparation
5. Section 32 25 00 - Erosion & Sedimentation Controls
6. Section 32 10 03 – Bituminous Concrete Paving
7. Section 32 10 04 – Portland Cement Paving
8. Section 32 16 40 – Granite Curbing
9. Section 33 40 00 - Storm Drainage Utilities
10. Section 33 70 00 -Electrical Utilities
11. Geotechnical Reports
12. Phase 1- Environmental Assessments
13. Phase 2- Environmental Assessments

1.07 REFERENCE SPECIFICATIONS

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements govern.

1. American Society for Testing and Materials (ASTM):
   a. ASTM C136, Sieve Analysis of Fine and Coarse Aggregates.
   b. ASTM D1556, Density of Soil In Place by the Sand-Cone Method
   c. ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbs/ft.^{3} (2,700 kN-m/m^3)).
   d. ASTM D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
   e. ASTM D422, Particle Size Analysis of Soils.

f. ASTM D2487, Standard Test Method for Classification of Soils for Engineering Purposes.

2. Commonwealth of Massachusetts:
   a. Massachusetts Department of Transportation (MassDOT), "Standard Specifications for Highways and Bridges" latest edition.
   b. Commonwealth of Massachusetts State Building Code.
3. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO T-11, Standard Method of Test for amount of material finer than 0.075 mm sieve in aggregate.
   b. AASHTO T-27, Standard Method of Test for sieve analysis of fine and coarse aggregates.
4. Occupational Safety and Health Act (OSHA) of 1970 (Public Law 91-596 of the United States, 29 USC Section 651 et seq.).

1.08 BENCH MARKS AND ENGINEERING

A. Employ, with the Contract Price, a competent Civil Engineer or Land Surveyor, registered in Massachusetts, who shall perform the following work:
   1. All lines and grade work not presently established at the site shall be laid out by the Engineer/Surveyor in accordance with the Drawings and Specifications. Establish permanent bench marks necessary for the work under this Contract. Maintain all established bounds and bench marks and replace as directed at no expense to the Owner any that are destroyed or disturbed.
   2. Establish all lines and grades for the work and verify all locations, property lines, work lines, and other dimensioned points indicated on the Contract Drawings for the existing site.
   3. Submit to the Architect, a written confirmation of locations of all lines, and any discrepancies between conditions and locations as they actually exist and those indicated on the Contract Drawings. Such confirmation shall bear the registration stamp of the Engineer/Surveyor.

B. The General Contractor shall use GPS (Global Positioning System) to locate all horizontal and vertical data shown on the CAD drawings for all proposed site work.

C. Do not commence any excavation or construction work until verification of the layout performed by the Engineer/Surveyor has been received and approved by the Architect.

D. Do not commence any excavation or construction work until verification of the layout performed by the Engineer/Surveyor has been received and approved by the Architect.

1.09 SOIL REPORT

A. Contractor shall refer to the Geotechnical Letter Report titled: Proposed Parking Lot – Roosevelt Elementary School, Worcester Massachusetts LGCI Project Number 2402 Dated: February 27,2024 attached hereto, and hereby made a part of the Contract Documents.

B. The Owner assumes no responsibility for the General Contractor's failure to make his own site investigation and makes no representation other than the soils reports regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work.

The General Contractor shall refer to the attached soil Reports. Failure by the General Contractor to be aware of existing site conditions shall not be cause for additional cost to the Owner.

C. The subsurface explorations and geotechnical report were performed primarily for use in preparing the design and are included for the convenience of the contractor. Use and interpretation of these data for purposes of the work shall be the responsibility of the Contractor. Subsurface conditions and groundwater levels are not considered as accurate for any times or locations other than the specific time and location of each of the explorations.

D. Information on subsurface conditions is made available for the convenience of the Bidders. The Owner does not represent to the General Contractor that the information is either an accurate or a comprehensive indication of subsurface conditions. Bidders are invited to review the information to apprise themselves of the information available, and also to make additional investigations at their own expense.

E. No claim for extra cost or extension of time resulting from reliance by the General Contractor on information presented herein shall be allowed, except as provided in the Contract Documents.

1.10 ASTM PHASE I ENVIRONMENTAL SITE ASSESSMENT & PHASE II ENVIRONMENTAL SITE ASSESSMENT

A. Contractor shall refer to the ASTM Phase I Environmental Site Assessment (ESA) located at Roosevelt Elementary School, Worcester Massachusetts Dated: May, 2024 Prepared By Weston & Sampson attached hereto, and hereby made a part of the Contract Documents.

B. Contractor shall refer to the Phase II Environmental Site Assessment (ESA) located at Roosevelt Elementary School, Worcester Massachusetts Dated: August, 2024 Prepared By Weston & Sampson attached hereto, and hereby made a part of the Contract Documents.

C. The Owner assumes no responsibility for the General Contractor's failure to make his own site investigation and makes no representation other than the soils reports regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work. Failure by the General Contractor to be aware of existing site conditions shall not be cause for additional cost to the Owner.

D. The contractor shall follow the requirements detailed in specification Section 02 61 00.13- Handling and Disposal of Excavated Materials.

E. All submittals included in Section 02 61 00.13 shall be submitted and approved the Engineer prior to starting any earth moving operations.

1.11 EXISTING UTILITIES

A. Locate and mark underground utilities to remain in service before beginning the work. Active utilities existing on the site and work areas shall be carefully protected from damage and relocated or removed as necessitated by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record drawings as described in this Section and both Architect and Utility Owner notified in writing.

B. Active utilities existing at the site and work areas shall be carefully protected from damage and relocated or removed as required by the work. When an active utility line is exposed during

construction, its location and elevation shall be plotted on the record drawings as described in this Section and both Architect and Utility Owner notified in writing.

C. Inactive or abandoned utilities encountered during construction shall be removed if within the building area or grouted, plugged, or capped. The location of such utilities shall be noted on the record drawings and reported in writing to the Architect.

1.12 QUALITY ASSURANCE

A. The Owner may retain and pay for the services of an independent testing agency (Soils Representative) to monitor backfill operations, perform laboratory tests on soil samples, and to perform field density tests; and a Geotechnical Engineer to periodically observe the earthwork operations, observe the preparation of the subgrade for footings, slabs, and paved areas, and to review laboratory and field test data. The geotechnical engineer may from time to time request that the contractor excavate tests pits ahead of excavation to confirm subsurface conditions. Test pits shall be performed at no additional cost to the Owner.

B. The Engineer's duties do not include the supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observation and testing by the Engineer shall excuse the contractor from defects discovered in his Work at that time or subsequent to the testing.

C. Subgrades shall be observed and approved by the geotechnical engineer before placing fill. The compaction and material composition shall be approved by the geotechnical engineer before placement. The by the Architect, and/or Geotechnical Engineer prior to placing subsequent lifts. If inspections indicate subgrade does not meet specified requirements, the unsuitable subgrade shall be excavated, the unsuitable material shall be removed, and replaced with approved structural backfill material and compacted at no additional cost to the owner or architect. The work shall be done in accordance with this specification.

D. Costs related to retesting due to unacceptable quality of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner, and the costs thereof will be deducted by the Owner from the Contract Sum.

1. The Soils Representative's presence or the Geotechnical Engineer does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Soils Representative, nor any observations and testing performed by him, nor any notice or failure to give notice shall excuse the Contractor from defects discovered in his work.
2. The Owner reserves the right to modify the services of the Soils Representative or Geotechnical engineer.

E. The contractor shall make provisions for allowing safe and timely observations and testing of Contractor's Work by the Geotechnical Engineer and by the Soils Representative. The presence of the independent testing agency and/or the Geotechnical Engineer does not include supervision or direction of the actual work of the Contractor, his employees or agents. Neither the presence of the Soils Representative and/or the Geotechnical Engineer, nor any observations and testing performed by them, nor failure to give notice of defects shall excuse the Contractor from defects discovered in his work.

F. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, Engineer, consultants, Soils Representative, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

G. Testing: Compaction tests will be required by the Owner and will be paid for by the owner. No specific testing schedule has been established at this time. If tests indicate that density requirement have not been achieved, the contractor continue compacting the tested material. All retesting is these areas shall be paid for by the contractor.

H. The Owner's Testing Agency will perform water content, gradation tests on onsite and processed materials, and compaction tests at a frequency and at locations as required. The results of these tests will be submitted to the Architect, and a copy submitted to the Contractor, on a timely basis so that the Contractor can take such action as is required to remedy the indicated deficiencies.

I. Contractor shall notify Architect when excavations have reached required subgrade and provide a minimum notice of 24 hours prior to placement of backfill on exposed subgrade. Density and Compaction Testing: The contractor is responsible to schedule compaction tests and allow adequate time for the proper execution of said tests. **This section also applies to instances when the General Contractor resumes earthwork operations after a period of pause in earthwork operations that require observations by the Geotechnical Engineer.**

1.13 PROTECTION

A. All rules and regulations governing the respective utilities shall be observed in executing all work under this Section.

B. All work shall be executed in such a manner as to prevent any damage to existing streets, curbs, paving, service utility lines, structures and adjoining property. Monuments and benchmarks shall be carefully maintained and, if disturbed or destroyed and replaced.

C. The work of this Section shall be performed in such a manner as to cause no interference with access by the abutters, Subcontractors or other Contractors to all portions of the site as is necessary for the normal conduct of their work.

1.14 DEFINITIONS

A. MassDOT specifications shall mean "The Standard Specification for Highways and Bridges", Commonwealth of Massachusetts, Massachusetts Department of Transportation, latest edition, including supplements.

B. The words "finished grades" as used herein mean the required final grade elevations indicated on the Drawings and defined in this specification section. Where not otherwise indicated, areas outside of buildings shall be given uniform slopes between points, for which finished grades are shown, or between such points and existing grade except that vertical curves or roundings shall be provided at abrupt changes in slope.

C. Excavation: Removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed. See EXECUTION section for directions for treatment of excavations in rock.

D. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense. See EXECUTION section for instructions for treatment of unauthorized excavation.

E. Additional Excavation: Excavation required beyond anticipated subgrade elevation. See EXECUTION section for procedures.

F. Natural Subgrade: The undisturbed, inorganic native soil exposed below site fill and disturbed native soils at footing and/or structural fill bearing elevations; or Rock at least 12" below the footing bearing elevation, slabs on grade, or utilities.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

H. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

I. Structural Fill: Imported or approved on site aggregate or select soil meeting the physical properties described in Section 2.1 MATERIALS and compacted in place to form a supportive bearing surface.

J. Unsuitable material: On-site materials which are of improper gradation to allow adequate compaction, and/or defined as organically contaminated (including roots), uncontrolled fill material, disturbed native material, or otherwise identified as improper for the intended use by the Architect. Refer to the Supplemental info section of the Geotechnical Engineering Report.

K. Rock: All materials which, in the opinion of the Architect, require blasting or special impact tools such as jack hammers, hoe rams, sledges, chisels or devices similar in purpose which are designed for use in cutting or breaking materials that have compressive strengths in excess of 300 pounds per square inch in their natural states. Boulders larger than 3 cubic yards in volume in open excavations and larger than 1 cubic yard in trenches are classified as Rock.

L. Zone of Influence: The area bounded by a one horizontal to one vertical (1H:1V) line sloping downward and outward from the bottom, outer edge of the footings and foundations.

M. The words "invert" or "invert elevation" as used herein shall be defined as the elevation at the inside bottom surface of the pipe or channel.

N. The words "bottom of the pipe" as used herein shall be defined as the base of the pipe at its outer surface.

O. Trench shall be defined as an excavation of any length where the width is less than twice the depth and where the shortest distance between payment lines does not exceed ten (10') feet. All other excavations shall be defined as open excavations.

P. Rock (Mass & Rock): Excavated material in beds, ledges, unstratified masses, and conglomerate deposits that cannot be removed by rock excavating equipment equivalent to the following size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted.

Q. Common Borrow: See MATERIALS Section.

R. Bedding Fill for Pipe and Other Utility Structures: See MATERIALS Section.

S. Bedding Fill for Gravity Sewers: See MATERIALS Section.

T. Gravel Base Course for Paved Areas: See MATERIALS Section.

U. Trenching Fill: See MATERIALS Section.

V. Loam Borrow: See MATERIALS Section.

W. Filter Fabric: See MATERIALS Section.

X. Vapor Retarder: See MATERIALS Section.

1.15 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures in accordance with requirements of the Contract Documents.
   1. Submit a detailed earthwork sequence plan for project excavation indicating temporary stockpile areas and procedures for subgrade protection.

B. Submit a dewatering plan for review by the Architect at least two weeks before the start of construction. Dewatering and groundwater control systems shall be designed to keep excavations free of water and to avoid disturbance of the subgrade.

C. Excavation and Excavation Support Plan: Submit at least 10 calendar days prior to the start of the work a detailed plan for the sequence of excavation, and methods to be used to shore roadways, sidewalks and other structures.

D. Obtain required permits for discharge of dewatering effluent. Submit two copies of all permits obtained at least one week prior to system installation.

E. The contractor shall submit 50-lbs samples of each type of fill material, in air-tight containers, proposed for use on-site in accordance with PART 2 - PRODUCTS, to the Owner's Geotechnical Engineer (Geotechnical Consultant) for preliminary compliance testing at least two (2) weeks prior to use. No fill material shall be delivered to the site or placed until the material has been approved. The final review of the material will be based on the re-tested sample by the owner's testing agency upon delivery of the material to the site. The gradation curves shall fit entirely within the envelopes defined by the limits specified herein for the material to be approved for use at the site.
   1. Samples shall be delivered to the office of the Architect or as directed.
   2. Samples required in connection with compaction tests will be taken and transported by the Soils Representative.
   3. Additional tests, including grain-size analyses and laboratory compaction tests shall be performed on the material after it is delivered to the site.
   4. For on-site materials, submit representative samples, collected from each stockpile of excavated on-site material to be used, directly to the Owner's Geotechnical Consultant's office at least two (2) weeks in advance of use of these materials.

F. Submit representative samples of approved equivalent materials, such as Filter Fabric, for approval prior to delivery to the site.

G. Submit gradations from suppliers of crushed stone for pipe bedding, structure bedding, and infiltration system encasement and bedding.

1.16 EXAMINATION OF SITE AND DOCUMENTS

A. It is hereby understood that the General Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs shall be allowed because of a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation of the site.

B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the General Contractor shall have examined them for himself during the bidding period and formed his own conclusions as to the full requirements of the work involved.

1.17 PROJECT COORDINATION

A. Prior to start of earthwork, the General Contractor shall arrange an onsite meeting with the Architect and the Geotechnical Engineer for the purpose of establishing the General Contractor's schedule of operations, and scheduling observation and requirements. The Geotechnical Engineer may from time-to-time request that the General Contractor excavate test pits ahead of excavation to confirm subsurface conditions at no additional cost to the Owner.

B. Protect all benchmarks, monuments, and property boundary pins. Replace if destroyed by General Contractor's operation.

C. As construction proceeds, the Contractor shall be responsible for notifying the Geotechnical Engineer and the independent testing firm prior to the start of earthwork operations requiring observation and/or testing.

1.18 PROJECT CONDITIONS

A. "GEOTECHNICAL ENGINEERING REPORT"

1. The geotechnical engineering report prepared for this site (which includes subsurface exploration data and an exploration location plan) referenced in this section is included in the Supplemental information section and is made available for the convenience and information to the Contractor only. It is expressly understood that the Owner will not be responsible for any interpretation, conclusions or generalizations made by the contractor based on the contractor's review of the report.

B. Do not proceed with utility interruptions without Architect's written permission.

C. Contact utility-locator service for area where Project is located before excavating.

D. Protect nearby structures from damage. All construction induced damage shall be repaired by the General Contractor at no additional expense to the Owner.

E. The General Contractor shall obtain and pay for all permits and licenses required to complete the work of this Section.

F. In case of conflict between regulations or between regulations and Specifications, the General Contractor shall comply with the strictest applicable codes, regulations, or Specifications at no additional cost to the owner.

G. The General Contractor may perform additional test borings and other explorations at no cost to the Owner.

1.19 SEQUENCING AND SCHEDULING

A. As construction proceeds, notify the Architect prior to the start of earthwork operations which require observations and testing. A minimum of 72 hours notification shall be provided for work that requires observation or testing

1.20 AS BUILT SURVEY

A. At the completion of the specified work, a field survey shall be performed by a surveyor registered in Massachusetts of the as built building, ground elevations (spot elevations 50’ on center and at edges of pavement and or curbing, top and bottom of walls and utility structures, floor elevations, utilities, fencing, walls and all site improvements, limit-of-work line, property lines, and tree line within the limit of work. The building corners shall be included as well as the location of doors with the finished floor grade. The surveyed information shall be presented in a CAD electronic file format and submitted to the Architect in the form of a CD with PDF’S at a scale of 1”=20’.

B. All field survey work and presentative of the surveyed information shall be completed and submitted to the Architect within four weeks of completion of the construction as specified and as shown on the drawings.

1.21 UNIT PRICES

A. The base bid shall include the excavating and disposing of excavated material generated within the limit of work and specified subgrades grades shown on the drawings or specified herein.

B. Unit prices shall be provided for all items listed in Part 2- PRODUCTS. The unit rates shall include furnishing/processing, stockpiling, placing, and compacting the material).

C. Provide unit rate for rock excavation in trenches and pits, removed from the site, and any placement of fill required to bring excavated surface to specified subgrade.

D. Provide unit rate for rock excavation as open excavation, removed from the site, and any placement of fill required to bring excavated surface to specified subgrade.

PART 2 – PRODUCTS

2.01 FILL MATERIAL

A. Processed gravel for base course for hot mixed asphalt pavement and cement concrete pavement shall be a processed material with angular particles meeting the requirements conforming to MassDOT Specifications Section M1.03.1.

U.S. Bureau of Standards	**Percent Passing**	
Sieve Size and Number	Minimum	Maximum
3-inches	100 percent	----
1-1/2 inch	70 percent	100 percent
No.3/4	50 percent	85 percent
No.4	30 percent	60 percent
No.200	3 percent	10 percent

B. Ordinary Fill - Well-graded, natural inorganic soil approved by the Architect and meeting the following requirements to be used for general filling to subgrades in lawn areas and to the bottom of the subbase beneath pavements, sidewalks and other than specified above, and conforming to the following graduation requirements. Soil finer than the No. 200 sieve shall be non-plastic. Ordinary Fill shall have a plasticity index of less than 6 and shall be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within +- 2 percentage points of the optimum moisture content.

U.S. Bureau of Standards	**Percent Passing**	
Sieve Size and Number	Minimum	Maximum
6-inches	100 percent	----
1 inch	50 percent	100 percent
No.4	20 percent	100 percent
No. 20	10 percent	70 percent
No.60	5 percent	45 percent
No.200	0 percent	20

1. It shall be free of organic or other weak or compressible materials, of frozen materials, trash or other deleterious materials and of stones larger than six (6) inches maximum dimension.
2. It shall be of such nature and character that it can be compacted to the specified densities in a reasonable length of time.
3. It shall be free of highly plastic clays, of all materials subject to decay, decomposition or dissolution and of cinders or other materials which shall corrode piping or other metal.

4. It shall have a maximum dry density of not less than one hundred (100) pounds per cubic foot.
5. Material from excavation on the site may be used as ordinary fill if it meets the above requirements.
6. Excavated rock and boulders not to exceed two (2) cubic yards may be used only in fill areas under lawns, provided they are at a minimum of twenty-four (24) inches below subgrades, placed and compacted in layers with no voids and all interstices filled.
7. Ordinary Fill and Processed Gravel for base course shall be tested for gradation using wash sieves using the appropriate ASTM Standards.

C. Sand shall consist of clean inert, hard, durable grains of quartz or other hard durable rock, free from clay, organics, surface coatings or other deleterious material, confirming to the MassDOT Specifications Section M1.04.1. Sand shall conform to the following gradation:

Sieve Size	Percent Passing by Weight
1/2-inch	100
3/8-inch	85-100
No. 4	60-100
No. 16	35-80
No. 50	10-55
No. 100	2-10

D. Crushed stone for PVC and HDPE drain pipe bedding shall consist of clean inert, hard, durable grains of quartz or other hard durable rock, free from clay, organics, surface coatings or other deleterious material, confirming to the MassDOT Specifications Section M2.01.0. for ½" crushed stone and shall conform to the following gradation:

Sieve Size	Percent Passing by Weight
5/8-inch	100
1/2-inch	85-100
3/8-inch	15-45
No. 4	0-15
No. 8	0-5

E. Loam Borrow - Loam borrow shall meet the requirements the planting specifications. All topsoil shall be screened free of roots, rocks and vegetative matter. Refer to planting specifications for Loam Borrow requirements.

2.01 FILTER FABRIC

A. Conform to MassDOT Specifications for Type III Fabric Embankment or Subgrade Stabilization, Section M9.50.0, Mirafi 140 Filter Fabric, or approved equivalent.

2.02 Vapor Retarder:

A. Vapor Retarder must have the following qualities:
   1. WVTR less than or equal to 0.006 gr/ft2/hr as tested by ASTM E 96
   2. ASTM E 1745 Class A (Plastics)

B. Vapor Retarder Products:
   1. Stego Wrap (15-mil) Vapor Barrier by Stego Industries, LLC, San Juan Capistrano, CA (877) 464-7834 www.stegoindustries.com, or approved equivalent.

C. Accessories:
   1. Vapor Retarding Seam Tape must have the following qualities:
      a. Water Vapor Transmission Rate of 0.3 perms or lower by ASTM E 96
   2. Vapor Proofing Mastic have the following qualities:
      b. Water Vapor Transmission Rate of 0.3 perms or lower by ASTM E 96
   3. Pipe Boots:
      c. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

2.03 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
   1. Red: Electric
   2. Yellow: Gas
   3. Orange: Telephone and other communications.
   4. Blue: Water System
   5. Green: Sewer

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavation of Subgrades
   6. Topographic survey has been made of the project site following completion of the earthwork and this survey is included in the Bid Documents.

B. General
   1. Excavate all materials to the elevations, dimensions and form as shown on the Drawings and as specified for the construction of the building, site walls, utility structures, utilities, paving, site improvements and other structures necessary for the completion of the building, utilities, and site work. All unsuitable materials within the indicated and specified limits shall be excavated and removed from the site. Unsuitable materials shall include the following:

a. Pavements, utility structures, building foundations and other man-made structures.
b. Peat, organic silts, and other organic materials subject to decomposition, consolidation, or decay.
c. Miscellaneous fill including sand, gravel, cinders, ash, glass, wood, and metal.
d. Ledge or boulders except as specified for fills herein.
e. Material that contains more than 3 percent organic matter by weight.

2. All unsuitable materials within the indicated and specified limits shall be excavated and removed from the site. The removal shall vertically extend to the elevations of the bottom of existing fill and buried organic soil shown in the test pit logs included in the Geotechnical Report or to the limits shown in the drawings, whichever is deeper. The excavation resulting from the removal of the unsuitable soils shall extend to the natural/native undisturbed soil. Horizontally, the removal shall extend to the limits of ZOI or 5 feet beyond the limits of the building and 2 feet outside the limits pipes and manholes. The excavations shall be carried at least 12 inches beneath the bottom of footings and 12 inches beneath the bottom of slabs.
3. Employ a Registered Land Surveyor to survey to bottom of the excavation for unsuitable soils throughout the building footprint. Excavations shall be surveyed at the corners, high and low points, and a maximum spacing for survey points of 20 feet in each direction on a grid.
4. Control the grading so that ground is pitched to prevent water from running into excavated areas, damaging other structures, or adjacent properties.
5. Where soil has been softened or eroded by flooding, equipment, traffic, or placement during unfavorable weather, or such other conditions, it shall be removed and replaced by the Contractor with suitable material at no cost to the Owner.
6. The topsoil/subsoil layer, root balls, where encountered, organic soil, the existing fill, and other deleterious matter shall be entirely removed from within the proposed building footprint.
7. Topsoil/subsoil, organic material, root balls, where encountered, and other deleterious material shall be entirely removed from within the paved areas.
8. Maintain all subgrades for site improvements in satisfactory condition, protected against traffic and properly drained, until the surface improvement is placed. In areas to receive pavement or other surface materials, at top and bottom of embankments, along swales and elsewhere, place sufficient grade stakes to facilitate checking the subgrade levels. Correct all irregularities, compacting thoroughly any fill materials.
9. Minimum depth of excavation in rock shall be performed in accordance with the requirements in Section 3.04 E.
10. The base of the footing excavations in the natural soil shall be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade. All compaction shall be to specified levels.
11. The subgrades of paved areas in the natural soil shall be compacted with a vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft materials are encountered, they shall be removed and replaced with gravel borrow within the proposed paved areas.
12. Where paved areas are located in existing fill areas, the existing fill shall be improved after the surficial topsoil and subsoil are removed by compacting the exposed subgrade in the fill using at least six (6) passes of a vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft zones are revealed by the compaction effort and where organic soil

is exposed, the soft materials or organic oil shall be removed and replaced with gravel borrow to the bottom of the subbase layer.

13. The Contractor shall obtain from the proper authority locations of all utilities within the scope of this work so that there will be no damage done to such utilities. Neither the Owner nor the Architect will be responsible for any such damage, and the Contractor shall restore any structure or utility so damaged without additional compensation. Written notifications to the appropriate utility agencies shall be made at least ten (10) days prior to the commencement of any work.
14. Excess Material - Suitable excavated material which is required for fill and backfill shall be separately stockpiled as directed by the Architect. All surplus fill other than that required to complete the intent of the Contract shall become the property of the Contractor and shall be disposed of off the property by the Contractor. All excavated materials which, in the opinion of the Architect, are not suitable for fill or backfill shall be removed and disposed of off the property.
15. Any unsanitary conditions encountered, such as broken sewer mains or uncovered garbage shall be corrected or removed entirely as directed by the Architect.

C. The Contractor shall remove materials beneath the existing building to or to the bottom of the unsuitable material, whichever is deeper. In proposed paved areas, the Contractor shall remove a minimum of 12 inches beneath the existing grades. Refer to quantities in item. Should quantities of certain materials or classes of work be increased or decreased from what is shown in the drawings and specified herein, the Contract Unit Rates listed below shall be the basis of payment to the Contractor, or credit to the Owner, for such increase or decrease in the work. The Contract Unit Rates shall represent the exact net amount, per unit, to be paid to the Contractor in the case of increase in the quantities, and the exact amount to be refunded to the Owner in the case of decreases in the quantities. No additional adjustment shall be allowed for overhead, profit, insurance, or other direct or indirect expenses by the Contractor. Contract Unit Rates of materials shall include hauling, storing, stockpiling, moving, importing, spreading, and compacting. Increases or decrease in the quantities shall be approved by the Owner.

D. Amending the existing fill free of organic matter by adding and blending with crushed stone shall be allowed. Blending shall produce a uniform, homogeneous mixture. Blending by pushing with a dozer shall not be allowed.

E. Excavation for Site Improvements

1. Excavate to the lines and grades shown on the Drawings and as specified to obtain the subgrades for the following items of work:
    a. Concrete slabs on grade
    b. Bituminous concrete road and parking pavement
    c. Concrete paving
    d. Curbing Seeded areas
    e. Unspecified improvements – to elevations noted on the plans

F. Utilities and Utility Structures

1. Construct surface subgrades including filling prior to excavation for utilities and utility structures. Excavate to the lines and grades shown on the Drawings and as specified herein to obtain the subgrade for the following items of work:

a. Utility structures -grades shown on the Drawings in the building and outside the building. Remove by excavating all unsuitable materials; including buried organics, from under drainage structures and backfill with specified fills compacted in place to subgrades.
b. Excavation for structures and other accessories shall have twelve (12) inch minimum and twenty-four (24) inch maximum clearance on all sides.
c. All utility lines - to 12 inches below bottom of utility lines or structures.
d. Unless otherwise shown, provide separate trenches for each utility. Lay all piping in open trenches except where tunneling is required. Excavation for structures and other accessories shall have 12 in. minimum and 24 in. maximum clearance on all sides.
e. Grade the bottom of trenches evenly to have a constant pitch in the direction of flow and to insure a uniform compacted thickness of selected material as called for.

2. Existing services and utilities encountered shall be immediately repaired, protected, and maintained in use until relocation of same has been completed or be cut and capped where directed or be prepared for connections when so required.

G. Excavation Classification

1. Unclassified Excavation - For the purposes of payment, materials shall be unclassified except for those materials beyond the limits specified in Section 31 20 00, paragraph 3.01G, Item 2, as described in item 3.1-B of these specifications. Excavation shall comprise and include the satisfactory excavation, removal, and disposal of all materials encountered within the lines and grades shown in the Drawings or limits specified herein, whichever is deeper, regardless of the nature of the materials, and shall be understood to include, but not be limited to, earth, topsoil, subsoil, hardpan, fill, foundations, pavements, curbs, piping, railroad track and ties, cobblestones, footings, bricks, concrete, abandoned drainage and utility structures, debris, and materials classified as unsuitable materials. All excavation and replacement, if applicable, with suitable material within the lines and grades shown in the Drawings or the limits specified herein, whichever is deeper, will be considered and bid as unclassified and shall be included in the Contractor's lump sum (i.e., shall not be paid for using Unit Rates).

2. All excavation and replacement, if applicable, with suitable material within the lines and grades shown in the drawings and in these specifications that are within the quantities listed in paragraph 3.01G, Item 2 shall be considered and bid as unclassified and shall be included in the Contractor's lump sum (i.e., shall not be paid for using Contract Unit Rates). Excavations beyond these lines described herein and beyond the quantities listed in paragraph 3.01G, Item 2 in the item shall be measured and paid for after approval of the measurements by the Architects as Classified Excavation using the Contract Unit Rates for respective classification in accordance with the allowance included in the contract documents. All quantities shall be measured in place. There shall be no swell, fluff, of expansion factor allowed. Measurements using truck loads shall not be allowed. Should quantities be less than those listed in paragraph 3.01G, Item 2, the Contractor shall provide a credit to the Owner using the contract unit rates.

H. Contaminated Soil Allowance: The Contractor shall carry in the base bid an allowance of 3,000 c.y.'s of unsuitable contaminated soils with a greater than RSC-1 reportable concentration as directed in Section 01 22 00 Unit prices, contaminated soil materials. Allowance shall cover removal and disposal of contaminated soil and furnishing imported suitable backfill materials compacted in place as directed herein. The base bid shall cover all costs related to such

excavation, removal off site, disposal, and replacement with compacted fill of approved material, overhead, and profit. No amount other than that herein specified will be paid by the Owner for the work defined herein.

1. If the total void volume of unanticipated contaminated material excavation, and its replacement with compacted fill exceeds the amount included in the Contract as listed above, the Owner shall pay the excess excavation and replacement at the Unit Rate submitted in the Bid Attachment – Unit Rates Schedule.
2. If the total quantity of unanticipated contaminated materials, and its replacement with compacted fill is less than the amount included in the Contract as listed above, the contract sum will be decreased by the difference in excavation and its replacement multiplied by the Unit Rate submitted in the Bid Attachment – Unit Rates Schedule.
3. Final excavated surfaces shall be surveyed by the Contractor and shall be measured from specified subgrade to bottom of excavation. Payment shall be based upon actual volumes with no bulking or swell factors applied. Contractor shall submit all survey data and quantity calculations to Architect for approval."

3.02 FROST PROTECTION

A. Protect excavation bottoms and sides against freezing. Provide protective insulating materials as necessary, including by means of heat blankets, and heating plant.

B. A layer of fill shall not be left in an uncompacted state at the close of a day's operation when there is the potential for that layer to freeze.

C. The Contractor shall not place any material on snow, ice, frozen soil, or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory materials will be at the Contractor's expense.

D. Do not excavate to full indicated depth when freezing temperatures may be expected, unless work can be completed to subgrade, the materials installed, and the excavation backfilled the same day. Protect the excavation from frost if placing of materials or backfilling is delayed.

E. The Contractor shall keep the operations under this Contract clear and free of accumulation of snow within the limits of Contract Lines as necessary to carry out the work.

F. Frozen materials shall be installed on frozen ground. Fill materials shall be free of frost.

G. The subgrade of footings and slabs shall be protected from frost before placing concrete. The subgrade on the sides of the footings shall be protected from frost after the footings are constructed until sufficient fill is placed to protect the bottom of footings from frost induced heave. Uninsulated slabs shall be covered with heat blankets until the slab areas are heated. The cover shall extend at least 4 feet beyond the limits of the slabs.

3.03 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

A. The Contractor shall take the necessary steps to avoid disturbance of subgrade and underlying natural soils/compacted fill during excavation and filling operations. Methods of excavation and filling operations shall be revised as necessary to avoid disturbance of the subgrade and underlying natural soils/compacted fill, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials. The Contractor shall coordinate with the Architect or Soils Representative to modify his operations as necessary

to minimize disturbance and protect bearing soils, based on the Architect's or Soils Representative's observations.

B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with compacted approved material in accordance with these Specifications. Fill that cannot be compacted within 48 hours because of its saturated condition shall be removed and replaced with compacted approved material in accordance with these Specifications. Costs of removal of disturbed material and replacement with approved material shall be borne by the Contractor.

C. If requested by the Architect or Geotechnical Engineer, the Contractor shall place a six-inch layer of Crushed Stone or 12-inch layer of Granular Fill/Structural Fill over natural underlying soil to stabilize areas disturbed during construction.

D. The placement of the Crushed Stone layer or Granular Fill/Structural Fill as well as material costs shall be borne by the Contractor. A geotextile fabric shall be used to separate the crushed stone from the natural soil and from the overlying fill when directed by the Geotechnical Engineer at no additional cost to the owner at no extra cost to the owner.

E. Material that is above or below optimum moisture for compaction of the particular material in place as determined by the Architect or the Soils Representative and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall be classified as unsuitable bearing materials. This material shall be removed and replaced with lean concrete, suitable/approved backfill material, or crushed stone as directed by the Geotechnical Engineer or Soils Representative at no additional cost to the Owner.

3.04 FILLS, BACKFILLS AND COMPACTION

A. Samples and Testing

1. All fill material and its placement shall be subject to quality control testing. A qualified laboratory will be selected by the Owner to perform tests on materials. All costs of testing will be paid for by the Owner. Test results and laboratory recommendations shall be available to the Architect.

B. Provide samples of each fill material from the proposed source of supply including on-site sources. Allow sufficient time for testing and evaluation of results before material is needed. Submit samples from alternate source if required.

C. Architect will be sole and final judge of suitability of all material.

D. The laboratory will determine maximum dry density and optimum water content in accordance with A.S.T.M.

E. D-1557, Method D and the in-place density in accordance with A.S.T.M. D-1556.

F. Tests of material as delivered shall be made from time to time. Materials in question shall not be used, pending test results. Tests of compacted materials will be made regularly. Remove rejected materials and replace with approved material.

G. Cooperate with laboratory in obtaining field samples of in-place materials after compaction. Furnish incidental field labor in connection with these tests.

H. Placing Fills and Compacting

1. Fill material shall be placed in horizontal layers not exceeding the maximum loose lift thickness with the minimum number of passes of compaction equipment as summarized on the table below. Each layer shall be compacted to the percentage of maximum dry density specified for the particular type of fill and at a water content equal to optimum water content plus or minus two (2) percent. The maximum dry density and optimum water content shall be as specified herein:

	Max Stone Size	**Max. Loose Lift Thickness** Below Structures & Pavements	Less Critical Areas	**Min, Number of Passes** Below Structures & Pavements	Less Critical Areas
Hand-operated vibratory plate or light roller in confined areas	4 in.	8 in.	8 in.	6	4
Hand-operated Vibratory drum rollers weighing at least 1,000# in confined areas	6 in.	8 in.	10 in.	6	4
Light vibratory drum Roller, minimum weight at drum 5,000#, minimum Dynamic force 10,000#	6 in.	10 in.	12 in.	6	4
Medium to heavy Vibratory drum roller, Minimum weight at Drum 10,000#, minimum Dynamic Force 20,000#	8 in.	12 in.	12 in.	6	4

I. Areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water. Do not place fill when fill materials or layers below it are frozen.

J. Notify the Architect when excavation is ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Architect.

K. Before backfilling against walls, the permanent structures must be completed and sufficiently aged to attain strength required to resist backfill pressures without damage. Temporary bracing will not be permitted except by written permission from the Architect. When filling on both sides of a wall or pier, place fill simultaneously on each side. Correct any damage to the structure caused by backfilling operations at no cost to the Owner. Place no stones closer than 18 inches to wall surfaces.

L. In confined areas adjacent to footings and foundation walls and in utility trenches beneath floor slab, the fill shall be compacted with hand operated vibration tampers. The maximum lift thickness shall be four inches. The degree of compaction attained shall be equivalent to that attained in the adjacent open areas where heavy rolling equipment is used.

M. After the subgrade under concrete slabs and paved areas has been shaped to line, grade and cross-sections, it shall be rolled with an approved power roller weighing not less than six tons until thoroughly compacted. This operation shall include any reshaping, refilling or wetting required to obtain proper compaction. Any areas that subsequently settle shall be refilled to true subgrade and properly compacted.

N. In freezing weather, a layer of fill shall not be left in an un-compacted state at the close of a day's operations. Prior to terminating operations for the day, the final layer of fill, after compaction, shall be rolled with a smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks and compaction equipment.

O. Placing Fills

1. Additional gravel borrow shall be placed under Processed Gravel for Subbase in paved areas. The material shall be placed and compacted in layers as described in the above table and compacted to at least 95 percent of maximum dry density as determined by A.S.T.M. Test D1557.with moisture contents within +- 2 percentage points of optimal moisture content. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum coverages.

P. Placement of structural fill should not be conducted when air temperatures are low enough to cause freezing of the moisture in the fill during or before placement, approximately 32 degrees F., or below. Fill materials should not be placed on snow, ice or un-compacted frozen soil. Structural fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of un-compacted soil and protected from freezing.

Q. Deficiency of Fill Materials

1. Provide required additional fill materials as specified if a sufficient quantity of suitable materials is not available from the required excavation on the project site at no additional cost to the Owner.

R. Where water content of the fill must be adjusted to meet this Specification, the fill shall be thoroughly disked to ensure uniform distribution of any water added.

S. Fill and Backfill for Utilities

1. Backfill trenches only after pipe and leaching chambers have been inspected, tested and locations of pipes and appurtenances have been recorded.

T. Each pipe section shall be laid on a 12 inches minimum bed of crushed stone as specified herein above. In addition, all underground utilities in the building and on the site including water lines, sanitary waste, vent piping, electrical conduit, mechanical piping, gas piping and storm drainage piping serving the roof drains and =downspouts shall be set in a six inches bed of sand. Bed shall be shaped by means of hand shovels to give full and continuous support to the lower 1/3 of each pipe. Backfill by hand around pipe, until the crown of the pipe if covered by at least two (2) feet of sand for which there is a sieve analysis chart on page 8, paragraph 2.01D. Use sand or crushed stone and tamp firmly in layers not exceeding six inches in thickness. Take care not to disturb the

pipe. Compact the remainder of the backfill thoroughly with a rammer of suitable weight or with an approved mechanical tamper to achieve compaction of 95 percent as specified.

U. Trenches and utility structures shall be backfilled with greatest care; fill materials required for backfilling to subgrades shall be Structural Fill or Ordinary Fill as specified. Backfill shall be compacted to 95 percent as specified. No mud, frozen earth or stone more than six inches in greatest diameter or other objectionable material shall be used for refilling. Any selected material required for filling shall be furnished and placed by the Contractor

3.05 ROCK EXCAVATION

A. Should highly fractured or weathered bedrock and boulders be encountered during excavation, the following shall apply:

1. When rock is encountered within the building footprint and its zone of influence and site improvements it shall be excavated or ripped with a hydraulic excavator. When it is demonstrated to the satisfaction of the Architect and the Geotechnical Engineer that this material can no longer be removed with a hydraulic excavator and requires drilling and blasting, this material shall be classified as Rock Excavation.

B. Intermittent drilling and ripping performed to increase production and not necessary to permit excavation of material.

C. Measurements:

1. When, during the process of excavation, rock is encountered, it shall be uncovered and exposed in such a manner that the unbroken ledge surface is clearly visible, and the Architect shall be notified by the General Contractor, before proceeding further. The areas in question shall then be cross-sectioned as hereinafter specified.

D. The General Contractor shall perform rock probes at the site in a grid pattern before the start of excavations. At a minimum, the results of the probes should include the ground surface elevation and the elevation of the top of the rock. The probes should extend at least 10 feet beyond the perceived top of rock to make sure that the perceived top of rock is not a boulder.

E. Failure on the part of the General Contractor to perform the probes and identify the depth to top of the rock surface and to notify the Architect and proceeding by the General Contractor with the rock excavation before cross-sections are taken, shall forfeit the General Contractor right of claim towards the stated allowance or additional payment over and above the stated allowance at the quoted unit price.

F. The General Contractor shall employ and pay for a licensed Registered Civil Engineer or Land Surveyor to take cross- sections of rock before removal and to make computations of volume of rock encountered within the Payment Lines. Cross-sections shall be taken in the presence of the Geotechnical Engineer and the computations approved by the Architect. The Owner has the option to perform independent cross-sections and computations of rock quantities.

G. Where removal of boulder or ledge is required the extent of this removal and basis of payment shall be determined by the Architect with payment made as stated in Unit Prices.

H. Blasting

1. Blasting: Obtain written permission and approval of method from local authorities before proceeding with rock excavation. Explosives shall be stored, handled, and employed in

accordance with state and local regulations or, in the absence of such, in accordance with the provisions of the "Manual of Accident Prevention of Construction" of the Associated General Contractors of America, Inc.

I. Notify the Architect at least 48 hours before any intended blasting and do no blasting without his specific approval of each blasting operation.

2. General Contractor shall present evidence that his insurance includes coverage for blasting operations before doing any blasting work. A pre and post survey shall be performed for all buildings and utilities within 250 feet of the nearest blasting operations, conforming to the Municipal ordinance governing blasting and the Municipal Fire Department regulations.

J. All rock blasting shall be well covered with heavy mats or timbers chained together and the General Contractor shall take great care to do no damage to existing structures, utility lines and trees to remain.

K. Any damage caused by the work of this General Contractor shall be repaired to the full satisfaction of the Architect at no additional cost to the Owner.

L. Any rock fragments or loose material from blasting operations shall be removed. All voids shall be filled with a leveling layer of Structural Fill

M. Additional blasting requirements:

a. Comply fully with National and City of Worcester Regulations.

b. All documentation submitted with application for “Use and Handling’ PERMIT. 527 CMR 13:04 (11) E-1 states “A Use and Handling” Permit may be suspended or revoked by the head of the Fire Department or the Marshal or their designees for any violation of 527 CMR 13:00, or MGL c. 148”

c. Meet all requirements of 527 CMR 13;00

d. All Pre-Blast Surveys completed per 527 CMR 13:00

e. Hours of Blasting 09:00 hrs. through 16:00 hrs. Mon. through Fri.

f. No Blasting Saturdays, Sundays or Holidays.

g. All shots to be double matted unless approved in advance by the City of Worcester Fire Chief.

h. Shot size limited to 500 lbs. unless approved in advance by the City of Worcester Fire Chief.

i. Blast warning signals to be sounded in accordance with 527 CMR 13:00

j. 24 hours notification to the fire department of intent to blast.

k. In or near residential areas, written notification must be distributed to homes advising of intent to blast at least three (3) days prior to blasting operations. Such written notification to include time frame of blasting operations and description of warning signals. The area of distribution shall be determined by the Fire Chief during pre-blast conference. A Fire Department detail shall be required unless waived by the Fire Chief.

l. Two or more seismographs required on all shots.

m. All seismographs to be calibrated and certified according to manufactures specifications and 527 CMR 13:00

N. Rock should be cut at least 12 inches beneath the bottom of footings, 2 feet beneath the bottom of slabs, 18 inches beneath the bottom of paved areas, and 12 inches below the bottom of utilities. Laterally, the rock should be removed at least 1 foot beyond the limits of footings and 2 feet beyond the limits of walls. Rock should be cut a minimum of 12 inches outside utility structures and a minimum of 18 inches on each side of utility pipes.

O. Rock surfaces that heave due to blasting should be compacted with a vibratory roller that imparts a minimum of 40 kips to the rock surface. To reduce the magnitude of rock heave, drilling for blast holes should extend no more than 2 feet beneath proposed subgrades.

P. Complaints:

Q. Report all blasting complaints to the Architect within 24 hours of receipt thereof. Include the name, address, date, time received, date and time of blast complained about, and a brief description of the alleged damages or other circumstances upon which the complaint is predicated. Assign each complaint a number, and number all complaints consecutively in order of receipt.

R. Submit a summary report to the Architect each week which indicates the date, time and name of person investigating the complaint, and the amount of damage, if any.

S. When settlement of a claim is made, furnish the Architect with a copy of the release of claim by the claimant.

T. Immediately notify the Architect, throughout the statutory period of liability, of any formal claim or demands made by attorneys on behalf of claimants, or of serving of any notice, summons, subpoena, or other legal documents incidental to litigation, and of any out-of-court settlement or court verdict resulting from litigation.

U. Immediately notify the Architect of any investigations, hearings, or orders received from any governmental agency, board or body claiming to have authority to regulate blasting operations.

V. Basis of Payment: The total amount of rock excavation shall be based upon the volume of rock excavated within and/or above the lines referred to in the next paragraph as "Payment Lines". The payment lines are only to be used as a basis of payment, and are not to be used as limits of excavation. Limits of excavation area as shown on the Drawings and as specified herein.

Payment Lines for Rock Excavation:

1. Payment lines for columns and footings within the building shall be a vertical line one foot from the toe of the footings; the depth shall be measured at 24 inches below the bottom elevations shown on the Drawings. Payment lines for walls to be damp-proofed shall be a vertical line two feet outside the walls.
2. Payment lines for manholes and catch basins shall be one foot outside of the outer wall and six inches below crushed stone beneath the structure.
3. Payment lines for the infiltration field shall be 2 feet below the crushed stone base.
4. Payment lines for rock excavation under sidewalks on grade shall be six inches below the bottom elevation of the specified gravel base course.
5. Payment lines for rock excavation at paved areas and lawns shall be 24 inches below respective subgrades.
6. Payment lines for rock excavation under pipes shall in no case be calculated as greater in width than the outside diameter of the pipe plus two feet for pipes up to 18 inches. For pipes

18 inches and larger payment lines shall in no case be calculated as greater in width than the outside diameter of the pipe plus three feet. Payment lines at bottom of all pipe and utility trenches shall be six (6) inches below subgrade.

W. Allowance for Rock Excavation: The Contractor shall carry in the Base Bid an allowance of 120 cubic yards for rock encountered in trench excavation removed from the site as directed in Section 01 22 00 Unit Prices. The Contractor shall also carry in the Base Bid an allowance of 400 cubic yards for open rock excavation removed from the site as directed in Section 01 22 00 Unit Prices. The Base Bid shall cover all costs relating to such rock excavation, including blasting, removal and placement of the excavated material, overhead and profit. No amount other than that herein specified will be paid by the Owner for excavation herein defined.

1. Quantities shall be measured by the volume of void created using survey points of the excavated area. The fixed Unit Rate shall be applicable to variations in excess of the allowance quantity up to 100% of the allowance quantity.
2. If the total quantity of Rock Excavation, open and/or trench, is less than the amount of Rock Excavation included in the Contract as listed above, the Contract sum will be decreased by the difference in Rock Excavation multiplied at the fixed Unit Rate. Quantities shall be measured by the volume of void created using survey points of the excavated area. The fixed Unit Rate shall be applicable to variations of the allowance quantity by decreases of 100% of the allowance quantity.
3. Hoe ramming rock shall be paid for as rock excavation and shall not be paid for as time and material (T&M).

3.06 OFF-SITE DISPOSAL OF SOILS

A. All off-site disposal of soils shall meet the minimum requirements of the following as applicable:
   1. DEP Policy #Comm-97-001: Reuse and Disposal of Contaminated Soil at Massachusetts Landfills.

B. DEP Policy #WSC-13-500: Similar Soils Provision Guidance

C. The Contractor is responsible for any and all disposal characterization sampling and analysis and preparation of disposal applications as required by the facility to be used. Copies of all applications and approvals.

3.07 TEMPORARY STEEL SHEETING

A. An excavation support system will be required to construct the proposed foundations near roadways and sidewalks as referenced in the Drawings. The contractor is responsible for the adequacy of the excavation support system and shall retain the services of a Professional Engineer registered in the Commonwealth of Massachusetts to design the required excavation support systems. The contractor's Professional Engineer shall practice in a discipline applicable to excavation work, shall have experience in the design of excavation support system and shall design in conformance with OSHA requirements. The contractor's Professional Engineer shall provide sufficient on-site inspection and supervision to assure that the excavation support system is installed and functions in accordance with his design. Criteria listed here in defining the responsibilities of the construction manager's Professional Engineer are minimum requirements.

B. The contractor shall submit the attached Certificate of Design completed and signed by the contractor and the Professional Engineer, identifying the Contractor's Professional

Engineer who will be responsible for design of the excavation support system, and including, for record purposes only:

1. An overall time schedule for construction of the braced excavation system.

C. A description of the anticipated sequence of construction.

D. Submit three (3) copies to the Architect of:

a. Complete details of braced excavation methods, equipment and sizes and lengths of materials proposed to be used.

b. Details of vibration monitoring devices and reports.

c. Details of the means and methods that will be used in monitoring the integrity of the support system during its entire period of use to insure the safety of the excavation.

d. Complete computations of the design of the braced excavation system bearing the seal of the responsible Registered Professional Engineer duly registered licensed to practice within a discipline applicable to excavation work, in the state where the project is located.

e. Any other pertinent data required for record purposes by the Engineer.

E. Receipt of the information by the Architect will not relieve the contractor of the sole responsibility for the adequacy of the braces excavation system, and for assuring that there will be no resulting damage to adjacent existing pavement, utilities, or structures, and for providing safe conditions within the sheeted areas.

F. Further for the record, upon completion of the work of this section, the contractor shall submit three copies of all records of survey, vibration monitoring and inspection of existing structures to the Architect.

G. Work shall not be started until all materials and equipment necessary for construction are either on the site of the work or satisfactorily available for immediate use as required.

H. The sheeting shall be sufficiently tight to minimize any resulting lowering of the groundwater level outside the excavation.

I. The sheeting shall be driven by approved means to the design elevation. No ends or edges of sheeting shall be left exposed in a manner, which could create a possible had to safety of the public or a hindrance to traffic of any kind.

J. The satisfactory construction and maintenance of the excavation support system, complete in place, shall be the responsibility of the contractor.

3.08 SUBGRADE PREPARATION

A. Bring all areas to required subgrade levels as specified and as determined from the Drawings.

B. Maintain all subgrades for site improvements in satisfactory condition, protected against traffic and properly drained, until the surface improvement is placed. In areas to receive pavement or other surface materials, at top and bottom of embankments, along swales and elsewhere, place sufficient grade stakes to facilitate checking the subgrade levels. Correct all irregularities, compacting thoroughly any fill materials.

C. Check all manhole covers, grates, valve boxes and similar structures for correct elevation and position and make, or have made any necessary adjustments in such structures.

D. All subgrades must be inspected and approved by the Architect before site improvements are made.

E. The asphalt, topsoil/subsoil, root balls, organic soil, existing fill, and other deleterious matter shall be entirely removed from within the proposed building footprint.

F. Topsoil/subsoil, asphalt, organic material, root balls, and other deleterious material shall be entirely removed from within the paved areas.

G. Tree stumps, root balls, and roots larger than ½ inch in diameter shall be removed and the cavities shall be filled with Structural Fill within the building footprint and Ordinary Fill beneath the subbase layer within paved areas.

H. The base of the footing excavations in the natural soil shall be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing concrete.

I. The subgrades of slabs and paved areas in the natural soil shall be compacted with a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips.

J. Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil should be removed and replaced with Structural Fill within the building and with Ordinary Fill beneath the subbase of paved areas

K. Due to the high susceptibility of the natural soil for disturbance under foot and vehicular traffic, a minimum of 12 inches of Structural Fill shall be placed under footings on top of the natural soil to provide a firm working surface during placement of formwork and rebar.

L. Fill placed within the footprint of the proposed building shall meet the gradation and compaction requirements of Structural Fill.

M. Fill placed under the subbase of paved areas, shall meet the gradation and compaction requirements of Ordinary Fill.

N. Fill placed in the top 12 inches beneath sidewalks shall consist of Structural Fill with less than 5 percent fines.

O. When crushed stone is required in the drawings or it is used for the convenience of the contractor, it shall be wrapped in a geotextile fabric for separation.

3.09 PROTECTION, SHORING AND DEWATERING

A. Protect open excavations with steel plates, fencing, warning lights and other suitable safeguards.

B. Provide all pumps and pumping facilities to keep all excavations free from water from whatever source at all times, when work is in progress.

C. The Contractor shall control the grading in areas under construction on the site so that the surface of the ground will properly slope to prevent accumulation of groundwater and surface water in excavated areas and adjacent properties.

D. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural

ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property.

E. The groundwater level shall me maintained at 12 inches beneath the bottom of excavation or deeper until the excavation is backfilled to at least 2 feet above the groundwater level.

F. Damage resulting from the failure of the dewatering operations of the Contractor, and damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Engineer, at no additional expense to the Owner. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

G. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and stormwater management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

H. The Contractor shall excavate interceptor swales and ditches, as necessary, prior to the start of major earthmoving operations to reduce the potential for erosion and to keep areas as free from surface and ponded water as possible. All piping exposed above ground surface for this use, shall be properly covered to allow foot traffic and vehicles to pass without obstruction.

I. Should surface, rain or groundwater be encountered during the operations, the Contractor shall furnish and operate pumps or other equipment and provide all necessary piping to keep all excavations clear of water at all times and shall be responsible for any damage to work or adjacent properties for such water. All piping exposed above ground surface for this use, shall be properly covered to allow foot traffic and vehicles to pass without obstruction.

J. The presence of groundwater or stormwater in soil will not constitute a condition for which an increase in the contract price may be made. Under no circumstances place concrete fill, lay piping or install appurtenances in excavation containing free water. Keep utility trenches free of water until pipe joint material has hardened and backfilled to prevent flotation

3.10 DUST CONTROL

A. Comply with 310 CMR 7.09 “Dust, Odor, Construction and Demolition” of the Commonwealth of Massachusetts.

B. Maintain all excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work areas free from dust which would cause the standards of air pollution to be exceed or case a hazard or nuisance to others.

C. Take necessary measures to control dust resulting from construction operations and do prevent spillage of material on public roads and streets.

D. Provide wet machine sweeping of street surfaces after each workday or as needed to minimize dust and sediment.

3.11 MAINTENANCE

A. Protection of graded areas: protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning compacted areas: where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add fill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

E. Unless directed otherwise by the City of Worcester Engineering Department, erosion control measures shall be maintained, inspected, repaired as required by the Architect or City Engineer and left in place.

3.12 RUBBISH REMOVAL

A. The General General Contractor shall remove all waste and debris and dispose daily in accordance with requirements of Section 01 74 19 – Construction Waste Management and Disposal.

END OF SECTION

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SECTION 31 21 00

SITE PREPARATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. Section includes, without limitation, providing:
   1. The contractor shall provide all equipment and do all work necessary to demolish and/or remove the structures indicated and prepare the site as indicated on the Drawings.
   2. This section also includes installing construction fencing as needed to secure the phase 1 work area as delineated on the Construction Phasing Plans.

B. Extent: As shown, if not, as follows:
   1. As shown on the drawings and as specified.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:
   1. Section 02 61 00.13- Handling and Disposal of Excavated Materials
   2. Section 31 25 00 –Erosion & Sedimentation Controls
   3. Section 31 10 00 - Site Clearing
   4. Section 31 21 01 - Site Utilities Preparation
   5. Section 31 20 00 - Earth Moving

1.04 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

B. The following shall be submitted and approved before work begins:
   1. Permits and notices authorizing building construction.
   2. Permits required by Worcester Department of Public Works.
   3. Contractor’s base schedule.
   4. Street Cut permit.
   5. Certificates of severance of utility services.
   6. Permit for transport and legal disposal off-site of demolition material and debris.
   7. Plan showing the contractor’s temporary site layout, including the location of field trailers, staging areas, construction fencing limits and gate locations.
   8. A list of all site operations and programs to be accommodated during the construction period.

C. Pre-pavement and site demolition photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by site clearing operations. Submit before the Work begins.

1.05 QUALITY ASSURANCE

A. Pre-Construction Conference:

B. Review requirements of site clearing work to be performed.

C. Review areas where existing materials and conditions are to remain and which elements require protection.

1.06 PROTECTION

A. Do not interfere with use of adjacent buildings. Maintain free and safe passage to and from accessible entrances, delivery and garbage areas, and for emergency vehicles.

B. Prevent movement or settlement of adjacent structures. Provide and place bracing or shoring and be responsible for safety and support of structures. Assume liability for such movement, settlement, damage, or injury.

C. Cease operations and notify Architect immediately if safety of adjacent structures appears to be endangered. Take precautions to properly support structures. Do not resume operations until safety is restored.

D. Prevent movement, settlement or collapse of adjacent services, sidewalks, driveways and trees. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.

E. Maintain street, sidewalk access, install signing, provide traffic channeling devices as required to protect general public, workers, and adjoining property.

1.07 EXISTING CONDITIONS

A. Arrange, mark limits and maintain a dig safe for Grafton Street and Sunderland Street throughout the duration of the project. Mark all castings for visibility and prevent damage.

1.08 MAINTAINING TRAFFIC

A. Do not close or obstruct roadways without permits, adequate notice to City Departments and City approved detours and traffic management plans.

B. Conduct operations with minimum interference to public or private roadways.

1.09 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of the Contractor.

B. See plans for plaques, sculpture, and decorative light covers that shall be stockpiled, cataloged, cleaned, and either re-installed, or transported to owner appointed location.

C. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of

interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.10 WARRANTY

D. 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

2.01 SALVAGING

A. Materials indicated on the Drawings or designated in the field by the Owner to be salvaged shall be carefully removed and delivered to a secure location on site.

B. Storage requirements during construction. - storage site/location to be determined by the Contractor and reviewed by Architect and Owner.

PART 3 - EXECUTION

3.01 DEMOLITION

A. Backfill areas excavated as a result of demolition or removal of miscellaneous materials currently on site. Use backfill material specified in Section 31 20 00, EARTH MOVING.

B. Rough grade areas affected by demolition and leave areas level, maintaining grades and contours of site based on the proposed site plan provided.

C. Site Access and Temporary Controls: Conduct utility demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.02 REMOVALS

A. Materials indicated on the Drawings or designated by the Architect in the field to be removed shall be dismantled, removed, and legally disposed of off-site or stockpiled as indicated on the Drawings.

B. Areas formerly occupied by structures shall be regraded to conform with the grading plan provide following demolition and removal.

3.03 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. Existing memorials, fences, stone walls, catch basins, structures and utilities shall be suitably protected from damage.

3.04 PAVEMENT AND CURB REMOVAL

A. Where pavement and/or curb to be removed abuts pavement and curb to remain, a neat, straight saw cut shall be made with a concrete power saw.

1. Pavement and/or curb removal shall include removal of subbase as required to accommodate proposed construction materials.

3.05 SITE RESTORATION

A. Backfill footings of all structures removed as per Section 31 21 00 EARTH MOVING.

B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades. Grading shall conform to the grading plan provided. Access roads and laydown areas shall be constructed as per the plans.

3.06 PROTECTION OF PROPERTY TO REMAIN

A. The Contractor's attention is directed to Section 31 20 00, EARTH MOVING for protection of utilities to remain. Refer to 31 10 00 SITE CLEARING for the protection of existing trees, fences, etc.

3.07 DISPOSAL OF MATERIALS

A. Material resulting from demolition and not scheduled for salvaging shall become the property of the Contractor and shall be suitably disposed of off-site. Disposal shall be performed as promptly as possible and not left until the final clean up.

B. Debris, rubbish, and other material shall be disposed of promptly and shall not be left until final cleanup of site.

END OF SECTION

SECTION 31 21 01

SITE UTILITIES PREPARATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

A. This section consists of providing all materials labor and equipment including but not limited to laying out and preparing for and completing excavation and trenching for pipelines and all associated handling and storage of materials, dewatering as necessary, and subgrade preparation and surface restoration of the trench. Providing trench protection for workers and protection of the trench work. Obtaining permits required to perform the installation of each utility. The work includes preparing trenches including excavating and backfilling for utilities to be installed or completed by others.

B. Extent:
   1. As shown on the drawings or as specified

1.03 RELATED WORK AS SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:
   1. Section 02 61 00.13- Handling and Disposal of Excavated Materials
   2. Section 31 10 00 - Site Clearing
   3. Section 31 20 00 – Earth Moving
   4. Section 31 21 00 - Site Preparation
   5. Section 31 25 00 – Erosion and Sedimentation Controls
   6. Section 33 40 00 - Storm Drainage Utilities
   7. Section 33 70 00 – Electrical Utilities

1.04 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 DIG SAFE COORDINATION

A. Contractor shall coordinate with DIG SAFE (811) and request a full mark out of all utilities on site and in public ways. The contractor shall mark out dig safe limits to coincide with the project utility limits and keep the dig safe limit marks visible by remarking the limits throughout the project construction. An electronic copy of the dig safe ticket shall be sent to the architect and the various City Department upon request. The contractor is required to renew the dig safe ticket at the intervals required by Dig Safe and call Dig Safe for remarks as needed.

3.02 UTILITY MARK OUT LIMITS

A. Before excavation establish the route of proposed utility alignments in the field by marking out locations for review by the architect and confirm that the routes will be obtainable when compared with the dig safe marks labeled by various utility companies.

B. Trench limits in pavement may be jack cut for temporary patching and shall be saw cut with power driven saws for final patching.

3.03 TEST PITS FOR CONFIRMATION

A. Exposure of buried utilities that might interfere with alignment or grade shall be accomplished by Exploratory Excavation (test pits) prior to construction. If any existing utility interferes with the proposed work in either alignment or grade and has to be moved, such work shall be done by or arranged for by the CONTRACTOR.

B. Exploratory Excavation via test pits performed by the contractor may be required either prior to or during construction to verify location(s) of the utilities or underground facilities when there are discrepancies with surface “locates” or discrepancies with how the utilities are identified on the drawings in relation to their true underground location.

C. The CONTRACTOR shall communicate to the ENGINEER and they shall agree on the appropriateness to proceed with Exploratory Excavation prior to commencing with the work.

3.04 UTILITY EXCAVATION

A. During excavation, materials suitable for backfilling shall be piled in an orderly manner and a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Excavated material shall be piled on one side of the trench only, to permit ready access to existing fire hydrants, valves, manholes and other appurtenances. Surface drainage of adjoining areas shall be unobstructed.

B. All excavated materials not required or suitable for backfill shall be removed from the site and disposed of in a manner and/or by methods acceptable to OWNER. The architect will require certification of proper disposal procedures copies of dump slips, etc.

C. The contractor shall grade or provide temporary dikes as necessary to prevent surface water from flowing into excavations, and any other water accumulating therein shall be promptly removed. Under no circumstances shall water be permitted to rise in un-backfilled trenches until after the pipe has been placed, tested and covered to final grade with backfill. Any pipe having its alignment or grade changed as a result of a flooded trench shall be re-laid at no additional cost to the OWNER.

D. Adequate provisions shall be made for maintaining the flow of sewers, drains and water courses encountered during construction. Culverts, ditches, fences, crossings, and structures that are

disturbed by this construction, shall be satisfactorily restored to their original condition upon completion of the work.

3.05 SAFE SITE CONDITIONS

A. The CONTRACTOR or a CONTRACTOR DESIGNATED COMPETENT PERSON under his/her employment shall be responsible for enforcing safety and maintaining safe working conditions and all trenching and shoring to conform to OSHA regulations.

B. The CONTRACTOR shall employ qualified, properly trained personnel to design shoring, perform safety inspections of the trenches, and other operations involving safety procedures, as prescribed by OSHA.

C. The CONTRACTOR shall do all shoring, bracing and tight sheeting required to prevent caving and to protect his workmen, in accordance with Occupational Safety and Health (OSHA) Regulation Requirements, and to protect adjacent property and structures.

3.06 STRUCTURES ENCOUNTERED

A. The CONTRACTOR shall exercise every precaution to prevent damage to existing buildings or structures in the vicinity of his work. In the event of such damages, he shall repair them to the satisfaction of the owner of the damaged structure at no cost to the OWNER.

3.07 OVERHEAD UTILITIES

A. The CONTRACTOR shall use extreme caution to avoid a conflict, contact, or damage to overhead utilities such as power lines, streetlights, telephone lines, television lines, poles or other appurtenances during the course of construction of the Project.

3.08 SURVEY MARKERS AND MONUMENTS

A. The CONTRACTOR shall use every care and precaution to protect and not disturb any survey markers or monuments, such as those that might be located at lot or block corners, property pins, street intersection monuments or addition line demarcation. Such protection shall include marking with flagged high stakes and markers and field coordination with operators and other workers and close supervision. No monument shall be disturbed without prior approval of the OWNER and ENGINEER. Any survey marker or monument that is disturbed or destroyed by the CONTRACTOR without approval during construction of the Project shall be replaced at no cost to the OWNER by a licensed land surveyor.

3.10 DEWATERING

A. Where ground water is encountered in the excavation, it shall be removed to avoid interfering with pipe laying, footing placement and other construction operations. The contractor shall provide all dewatering design and equipment.

B. Dewatering shall be considered a cost paid for as part of the contractor’s utility installation work. No separate payment will be made for dewatering utility trenches.

C. Discharge from dewatering operations shall be directed to approved natural drainages or storm sewers as appropriate and into catch basins only. All discharge dewatering system shall control silts from entering the City drainage system. The use of silt sacks is required in Section 01 57 12

Temporary Erosion & Sediment Controls. All silt sacks shall be in place, inspected and approved before any excavation work shall commence.

D. Discharge form dewatering operations shall be in accordance with rules and regulations established by the Massachusetts Department of Environmental Protection (MDEP). These activities require coverage under the City of Worcester MS-4 permit. The contractor shall use silt bags fitted on all dewatering hoses. The silt bags shall be adequately sized so as to eliminate silt and turbidity from the dewatering discharge. The City of Worcester has the right to inspect the contractor's dewatering equipment and stop the contractor's work if it is found that the contractor is in violation of the City's MS-4.

E. All water exiting the contractor's pumping and sedimentation/filtration equipment shall be clear and free of turbidity.

3.11 GENERAL EXCAVATION OPERATIONS

A. The CONTRACTOR shall excavate as necessary at the locations shown on the drawings, staked in the field or otherwise specified for the installation of the structure, service pipelines and other utilities as noted on the drawings or as required.

B. The CONTRACTOR shall take precautions and protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures, trees, and fences. Any disturbed or damaged facilities will be suitably restored or replaced by the CONTRACTOR with no cost to the owner.

C. Crossing under sidewalks or curbs may be made by tunneling is not allowed. If the CONTRACTOR elects to remove a portion of the sidewalk or curb, he must use a concrete saw for making neat joints corresponding to existing joints, compact the backfill as specified, and install a new concrete sidewalk or curb section.

D. Excavations for manholes, hydrants, structures, and other appurtenances shall be sufficient to leave clearance adequate for proper compaction efforts on all sides. The depth, provisions for removing water, and other applicable portions of these specifications shall apply to excavation for appurtenances.

3.12 TRENCH DIMENSIONS

A. Trench dimensions shall be as specified below:

1. Trench width from the trench bottom to a point one foot (12 inches) above the top of the pipe shall be no less than the outside diameter of the pipe plus twenty-four (24) inches plus the shoring on each side of the trench. The width of the trench from the bottom of the trench to the existing ground surface shall be adequate to allow proper compaction effort along both sides of the pipe.
2. Depth of Trench. Trench depth shall be as required for the invert grade or pipe bury depth shown on the plans. Care shall be taken not to excavate below the required depth.
3. When soft or unstable material or rock is encountered at the subgrade, which will not uniformly support the pipe, such material shall be excavated to an additional depth as necessary and backfilled with Gravel Pipe Bedding Material per Section 31 20 00 Earth Moving.
4. Were trench depths exceed 20 feet, the contractor shall provide trenching protection designed by a Registered Professional Engineer per OSHA standards.

3.13 TRENCH BOTTOM

A. The bottom of the trenches shall be accurately graded to the line and grade show on the drawings or shall provide the cover depth required by the utility owner. Bedding material shall provide uniform bearing and support for each section of the pipe at every point along its entire length. Bell holes and depressions for joints shall be dug after the trench bedding has been graded, and shall be only of such length, depth and width as required for properly making the particular joint type. Unauthorized over depths shall be backfilled with bedding material at the CONTRACTOR's expense.

3.14 TIME OF OPEN TRENCHES

A. The CONTRACTOR will be required to conduct his work so that trenches will remain open a minimum possible time.

B. No trench excavating shall begin until approved compaction equipment is at the site where the excavating is to take place. All backfill and compacting shall be completed in all trenching and structural excavations within a maximum distance based on the work that can be accomplished in a day.

C. The contractor shall provide road plates to cover trenches that are not backfilled and compacted at the end of a work day. The plates shall be shimmed and wedged with temporary bituminous when placed across roadways.

D. No trenches are to be left plated over holiday weekends. Trenches shall be backfilled as soon as the utility is inspected and approved.

3.15 EQUIPMENT

A. The use of trench digging machinery will be permitted except in places where its operation will cause damage to existing structures or features, in which case hand methods shall be employed.

B. Any equipment on tracks, or that have outriggers which are to be used on pavement, shall be equipped with suitable pads to prevent damage to the pavement. All pavement damaged during construction by the CONTRACTOR's equipment shall be replaced to its original condition by the CONTRACTOR.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

SUMMARY

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

B. Section includes, without limitation, providing:

1. Installation and maintenance of straw wattles and sedimentation fence as noted on the plans, silt sacks over catch basins, and construction entrance treatment.
2. Installing siltation fencing around stockpiles.
3. Slope stabilization.
4. Sediment removal and disposal of all sedimentation devices as directed and as required by SWPPP.
5. Periodic sweeping of roadway and paved surfaces with mechanical sweepers with water sprays.
6. Removal and disposal of all erosion control devices installed under this contract.
7. Final Cleanup.

C. Extent: As shown, if not, as follows:

1. Furnish all labor, materials, equipment, and other incidentals required to complete all sedimentation and erosion control work as shown or specified.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:

1. Section 02 61 00.13- Handling and Disposal of Excavated Materials
2. Section 31 10 00 - Site Clearing
3. Section 31 20 00 - Earth Moving
4. Section 31 21 00 - Site Preparation

1.04 PERFORMANCE REQUIREMENTS

A. The Contractor shall be responsible for the timely installation and maintenance of all sedimentation control and dewatering devices necessary to prevent the movement of sediment from the construction site to off site areas or into adjacent properties, wetlands, or other drainage systems. Measures in addition to those shown on the contract plans necessary to prevent the movement of sediment off site including temporary sedimentations basins trenches and check

dams shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the owner shall be considered.

B. Sedimentation and erosion control measures shall conform to the requirements of the City of Worcester Conservation Commission requirements and as shown on the drawings and as required per the Conservation Commission Order of Conditions.

C. Sedimentation fencing and straw wattles shall be subject to inspection of the City of Worcester Conservation Commission. The contractor shall comply with any changes and modifications made by the Commission.

D. All Soil Erosion and Sediment Control practices are to be installed prior to any major soil disturbance, and maintained until permanent protection against soil erosion is established.

E. Any disturbed areas that will be left exposed for more than thirty (30) days, and not subject to construction traffic, will immediately receive a temporary seeding. If the season prevents the establishment of temporary cover, the disturbed areas will be mulched with straw or equivalent material, at the rate of two (2) tons per acre, according to MassDOT Standards.

F. Immediately following initial disturbance, all critical areas subject to erosion (i.e. steep slopes and roadway embankments) will receive a temporary seeding in combination with straw mulch or a suitable equivalent, at the rate of two (2) tons per acre, according to MassDOT Standards.

G. Permanent slopes shall be prepared per the drawings and finish seeded as specified in the planting specifications.

H. Any steep slopes receiving pipeline installation will be backfilled and stabilized daily, as the installation continues (i.e. slopes greater than 3:1).

I. A subbase course will be applied immediately following rough grading and installation of improvements to stabilize street, roads, driveways, and parking areas.

J. Unfiltered dewatering is not permitted. Take all necessary precautions during all dewatering operations to eliminate sediment transfer. The contractor shall employ the use of silt bags frac tanks or other sediment removal controls during dewatering operations. The discharge from the contractor's dewatering activities shall be clear and free of turbidity.

K. All soil washed, dropped, spilled, or tracked outside the limit of disturbance or onto public rights-of-way will be removed immediately. The paved surface, including sidewalks and roadways shall be swept clean.

L. The property owner shall not be responsible for any erosion or sedimentation that may occur below storm water outfalls or offsite as a result of construction of the project.

M. Provide permanent loaming and seeding of all exposed non paved areas within in ten (10) days after final grading. Hay mulching is required on all seeding. When hydro-seeding, mulch shall not be included in the tank with the seed.

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

PART 2 - MATERIALS

2.01 SEDIMENTATION FENCE

A. Sedimentation fence shall be biodegradable burlap silt fence with stakes pre attached. Prefabricated silt fence shall be as manufactured by Environmental Research Corps., Amoco Fabrics, DGI Industries or approved equivalent.

B. Stakes shall be spaced in accordance with the contract plans. All stakes shall be wood or steel, supplied with sharp machined tips to the required length.

2.02 STRAW WATTLES

A. Straw wattles are a HDPE photodegradable netting filled with an organic fill media consisting of agricultural straw. Each wattle will be 25’ in length and secures with hog ring staples or tied at each end. Wattle netting will consist of HDPE netting with a diamond shaped aperture measuring .5 inches x .5 inches, weighing .5 ounces per foot when fully expanded. Fill material will be 100% chopped agricultural straw weighing approximately 2 lbs. per foot.

B. Physical Specifications:

Diameter	12 inches (22.86cm)
Length	25.00 feet (7.62 meters)
Weight	50 pounds (22kilograms)

2.03 STRAW WATTLE STAKES

A. Wood stakes for straw wattles shall be two inch (2") square by thirty-two inches (32") long, hardwood stakes.

2.04 SILT SACKS

A. Silt sacks shall be made from biodegradable burlap similar to the material used in sedimentation fencing and shall be as manufactured by Environmental Research Corps., Amoco Fabrics, DGI Industries or approved equivalent.

B. All silt sacks shall be cut larger than the catch basin grate to allow removal.

C. Silt sacks shall be provided with sleeves attached along each side and lifting chains or cables to allow removal when the sacks are full. The contractor shall inspect the sacks weekly and after storm events to check the accumulated level inside the sack. When the sacks are approximately 1/3 full the contractor shall remove, clean and reinstall the sack or replace the sack with a new one.

2.05 CONSTRUCTION ENTRANCE

A. Materials provided will be as indicated on Construction documents. All construction entrances shall be comprised of crushed stone as detailed or track out matting material.

B. Construction entrances shall be inspected and cleaned periodically in frequency with the use of the entrance. Daily during excavation and backfill operations and weekly once the building construction is underway. The contractor is responsible for dust and debris being tracked out of

the site and onto the roadway and shall provide wet machine sweeping daily if needed or directed to clean the road surface.

PART 3 - EXECUTION

3.01 SEDIMENTATION FENCE AND STRAW WATTLE INSTALLATION

A. Sedimentation fences and Straw Wattles shall be positioned as indicated on the contract plans and as necessary to prevent off site movement of sediment produced by construction activities as directed by the engineer and as shown on the plans.

B. The contractor shall inspect the straw wattles that were installed by the preceding contract. The contractor shall clean out silts and debris accumulation along the existing line of wattles and replace sections of wattles that are opened or damaged.

C. Dig trench approximately six inches (6") wide and six inches (6") deep along proposed fence lines.

D. Install silt fence in accordance with manufacturer's requirements and as detailed on the contract plans.

E. Backfill trench with excavated material and install a single row of straw wattles, as indicated on the plans, against the sedimentation fence and stake with hardwood stakes 4 feet on center. Use additional stakes at overlapping ends.

F. Furnish, place and maintain sedimentation fence and straw wattles as specified and as shown on the plans. Remove upon completion of all work, clean out, rake and seed disturbed areas.

3.02 SILT SACK INSTALLATION

A. Silt Sacks shall be installed as indicated on the contract plans and as necessary to prevent off site movement of sediment produced by construction activities as directed by the engineer.

3.03 CONSTRUCTION ENTRANCE INSTALLATION

A. The Construction Entrance shall be located as indicated on the contract plans and as necessary to prevent off site movement of sediment produced by construction activities as directed by the engineer.

3.04 MAINTENANCE AND INSPECTIONS

A. Inspections:

1. Contractor shall make a visual inspection of all sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to off site areas Contractor shall promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Maintenance:

1. Sedimentation Fences and Straw Wattles
   a. Remove accumulated sediment once it builds up to one-half (1/3) of the height of the straw wattle.

b. Replace damaged fabric, or patch with a two foot (2') minimum overlap. Reset wattles that have raised above ground elevation and remove accumulated silts.
c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.
d. Replace straw wattles when saturated with silt or otherwise damaged.

3.05 RUBBISH REMOVAL

A. Once the site has been fully stabilized against erosion, remove all sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Grade all areas disturbed during this process and stabilize against erosion with surfacing materials and erosion control devices as directed by the Engineer until vegetation has sufficiently developed.

B. The General Contractor shall remove and dispose daily all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

END OF SECTION

SECTION 32 10 03

HOT MIXED ASPHALT PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

B. Sustainable Design Intent: The Work of this Contract and Section shall include compliance with all requirements to achieve a minimum of 170 points in accordance with NE-CHPS version 3.2 Criteria. Work shall include, but not be limited to, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation as described in, and in accordance with requirements of Section 01 33 15 – NE-CHPSv3.2 Requirements, Section 01 81 15 – Sustainable Materials Requirements, and the Contract Documents.

1.02 DESCRIPTION OF WORK

A. The work includes furnishing all labor, materials, equipment, and supervision to construct the bituminous concrete paving, preparing the gravel base course and new pavement, in accordance with the Drawings and Specifications.

B. The work includes cutting and removing temporary utility trenches. Saw cutting the asphalt along both sides of the trench, removing the existing material to the required depth, grading and compaction the base material, installing new asphalt in the trench to meet the existing pavement thickness and City of Worcester Requirements.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:

1. Section 31 20 00 - Earth Moving
2. Section 33 10 00 - Water Utilities
3. Section 33 30 00 - Sanitary Sewerage Utilities
4. Section 33 40 00 - Storm Drainage Utilities

1.04 STANDARD SPECIFICATIONS

A. Material and construction methods shall conform insofar as applicable, to the requirements of City of Worcester Department of Public Works standard Specifications, the Commonwealth of Massachusetts Department of Transportation (MassDOT), Standard Specifications for Highways and Bridges 2023 Edition which is hereinafter referred to as the MassDOT Standard Specifications.

B. Hot Mixed Asphalt Pavement shall comply with MassDOT Standard Specifications Subsection 460: Hot Mixed Asphalt for Street Locations for both 19.0 binder (intermediate) course and 12.5 surface course material.

C. Gravel used for base course shall be single sourced and conform to MassDOT Standard Specification Section M1.03.0.0 Gravel Borrow Type C

1.05 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Association of State Highway and Transportation Officials (AASHTO): M 20

	Penetration Graded Asphalt Cement
M 81	Cut-Back Asphalt (Rapid Curing Type)
M 140	Emulsified Asphalt

2. American Society for Testing and Materials (ASTM):

D 979	Sampling Bituminous Paving Mixtures
D 1557	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb. (4.54-kg) Rammer and 18-in. (475-mm) Drop
D 3549	Thickness or Height of Compacted Bituminous Paving Mixture Specimens
D 1188	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
D 2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
D 2726	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
D 2950	Density of Bituminous Concrete in Place by Nuclear Methods

3. Federal Specifications (Fed. Spec.):

SS-S-1401	Sealing Compound, Hot Applied, for Concrete and Asphalt Pavements

4. Commonwealth of Massachusetts Department of Transportation Highway Division (MassDOT): Specifications Standard Specifications for Highways and Bridges Latest Edition

1.06 QUALITY ASSURANCE

A. Unless otherwise specified, work and materials for construction of the asphaltic concrete paving shall conform to the applicable portions of the following:
   1. MassDOT Specifications Subsection 460 Hot Mixed Asphalt pavement shall be used for roadways, parking areas, and permanent utility trench patches. Subsection 702 Hot Mixed Asphalt for Sidewalks and Driveways, Subsection 401 for gravel base course using gravel borrow type c. Subsections 403 and 404 for reclaimed base course if used.
   2. MassDOT Specifications Section 472 for temporary repairs to existing pavements temporary patching after installation of utilities that abut existing pavement to remain. All temporary pavement shall be replaced with a final trench course as specified.

B. Paving work, base course etc., shall be done only after excavation and construction work which might injure them has been completed. Damage caused during construction shall be repaired before acceptance at the contractor's expense.

C. Repair and replace existing paving areas damaged and removed during this Project. Workmanship and materials for such repair and replacement shall match those employed in existing work, except as otherwise noted.

D. Pavement subbase shall not be placed on a muddy or frozen subgrade.

E. Existing pavement under state or local jurisdiction shall, if damaged or removed during the course of this project, be repaired or replaced under this section of the specification in conformance with applicable codes, standards, and practices.

F. Manufacturer Qualifications: A qualified manufacturer.
   1. Manufacturer shall be a paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located

G. The Owner reserves the right to retain an independent testing laboratory to perform inspection and testing of paving and associated work in accordance with Section 014325, TESTING AGENCY SERVICES.

H. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

I. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
   1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
   2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
   3. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

4. Asphalt Surface Course: Minimum surface temperature of 40 deg F and rising at time of placement.

1.08 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

B. Gravel for base course- submit certified gradation sheet from the supplier for approval. Gradation shall meet the standard specifications for gravel borrow type c. Include certification from the supplier that the gravel material used meets MassDOT standard specifications listed herein. Gradation sheet shall be recent, no older than one year.

C. Submit the intended supplier of all Asphalt Products along with mix design formulars and certifications that the material used meets MassDOT standard specifications listed herein.

D. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

E. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

F. Shop Drawings: Indicate pavement markings, cross walks, lane separations, and defined parking spaces. Indicate, with international graphics symbol, spaces dedicated to people with disabilities.

G. Qualification Data: For manufacturer.

H. Material Certificates: For each paving material, signed by manufacturers.

PART 2 - PRODUCTS

2.01 PAVEMENT BASE COURSE

A. Material for aggregate base course shall be a graded, granular, non-frost susceptible, free-draining material, consisting of either durable stone and coarse sand or of blast furnace slag, practically free from loam and clay, and which can be readily compacted to form a stable foundation.

1. Material shall be gravel borrow type c conforming to MassDOT Specifications Section M1.03.0.

2.02 HOT MIXED ASPHALT

A. Hot mixed asphalt for roads and parking lots and permanent trench patch shall be supplied by a MassDOT certified plant and all pavement courses shall be supplied in accordance with MassDOT Specifications Section 460 Hot Mixed Asphalt Pavement for Local Streets. Hot Mixed Asphalt for sidewalks and curbing shall be MassDOT Section 702 Hot Mixed Asphalt Sidewalks and Driveways.

B. Complete job mix formula, listing quantities and pertinent ingredient properties, shall be submitted to and approved by Architect at least two weeks before work is scheduled to begin.

2.03 ASPHALT EMULSION FOR TACK COAT

A. Approved asphalt emulsions suppliers will be on MassDOT's QCML.

B. Asphalt Emulsion shall meet MassDOT M3.03.1: Anionic Emulsified Asphalt. These materials shall conform to the requirements of AASHTO M 140. Anionic emulsion used for tack coat shall be grade RS-1h. When HMA paving takes place between November 1st and March 31st the use of RS-1 is acceptable. When supplied in 5-gallon buckets the anionic emulsion used for tack coat shall be grade RS-1.

2.04 HOT APPLIED PAVEMENT JOINT ADHESIVE

A. Hot Applied Pavement Joint Adhesive shall meet MassDOT M3.05.4 This material shall be a hot applied asphaltic product designed to adhere and seal HMA construction joints. The material shall meet the requirements of Table M3.05.4-1 of the MassDOT standard specifications. Qualified products will be listed on MassDOT's QCML.

PART 3 - EXECUTION

3.01 GRADING

A. Areas to be paved will be compacted and brought approximately to subgrade elevation under Section 31 20 00, EARTH MOVING before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to Section 31 20 00, EARTH MOVING.

C. Subgrade of areas to be paved shall be recompacted as required to bring top 8 in. of material immediately below gravel base course to a compaction of at least 95% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.

D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or subbase subsequent backfill and compaction shall be performed as directed by the Architect as specified in Section 31 20 00, EARTH MOVING. Completed subgrade after filling such areas shall be uniformly and properly graded.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing pavement.

F. Areas that have been graded with gravel base installed by a previous contract shall be scarified to a depth of 4-6 inches and reshaped using a motor grader mounted bedrock ripper or tiller. Supplemental gravel borrow type c shall be introduced evenly over the scarified surface.

G. The entire pavement base shall be compacted before finished pavement is applied. The contractor shall insure that the paving operation is closely scheduled after the grading is completed.

H. The contractor shall use water and calcium chloride as needed to insure proper compaction of the gravel base.

I. Materials shall not be stored or stockpiled on subgrade. Any ruts in the base grade shall be leveled off and recompacted prior to paving.

J. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this Section shall conform to the following:

1. Material shall be legally disposed of off-site.

K. Prepared subgrade will be inspected and tested by an independent testing agency, provided and paid for by the Contractor, prior to installation of paving base course. Disturbance to subgrade caused by inspection procedures shall be repaired under this Section of the specification.

1. Contractor shall submit a minimum of six (6) Proctor compaction test results indicating conformance to compaction density requirements specified herein.

3.02 GRAVEL BORROW SUB-BASE

A. Aggregate base course for paving and the spreading, grading, and compaction methods employed shall conform to standard requirements for gravel borrow base course of this type for first class road work, and the following:

B. MassDOT Specifications Section 401, using gravel borrow type c meeting M1.03.0.

C. Compaction of aggregate base course shall be to 95% of maximum density as determined by ASTM D 1557, Method D. Stone greater than 2-1/2 in. shall be excluded from course.

D. Width of base course shall be greater than or equal to the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend at least 2 x base thickness beyond edge of the course above, if not so supported.

E. Aggregate material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density, sidewalk areas shall be compacted using a 6-ton steel wheel roller or plate compactor sized to adequately compact the gravel to the specified proctor. Larger paved areas shall be compacted with a 12 ton pneumatic tire driven vibratory roller.

1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade and level.
2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
3. Surface irregularities which exceed 1/2 in. measured by means of a 10 ft. long straightedge shall be replaced and properly compacted.

F. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled outside pavement lines shall be removed and area repaired.

G. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

3.03 SURFACE PREPARATION

A. The prepared base surface shall be rolled as needed to eliminate any high spots or ruts that may have occurred due to minimal use.

B. Paving areas that have been milled or binder that has been previously installed shall be machine swept on the day of paving to eliminate and standing debris, dirt or sand on the surface.

3.04 HOT MIXED ASPHALT (HMA) PAVING

A. Hot Mixed Asphalt Paving, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base, etc., shall conform to MassDOT Specifications Section 460 Hot Mixed Asphalt for Local Streets for roadway and parking areas and Section 702 Hot Mixed Asphalt for Sidewalks and Driveways.

B. Complete job mix formula, listing quantities and pertinent ingredient properties, shall be submitted to and approved by Architect at least two weeks before work is scheduled to begin.

C. All paving equipment, pavers and rollers shall be sized so as to insure adequate and timely placement. Road pavers shall be used for parking areas and roadways and shall have a minimum (closed width of 8.5 feet capable of at least 15.5’ expanded width. Asphalt Rollers shall be two drum larger units 20,000 lbs. capacity designed for road work. Sidewalks and narrower utility trench areas shall be done with a sidewalk paver and compacted with a 6 ton roller were the available width permits access.

D. Hot Mixed Asphalt curb shall be machine molded to the shape as noted on the drawings. HMA curbing shall be placed on the binder course. The contractor shall grade and level the back of the curbing by either extending the binder or using compacted gravel so as to provide a firm and even support for the curbing machine to ride on.

E. HMA base, binder, and surface courses shall each be applied individually, in single lifts of full thickness indicated on the Drawings.

F. Pavement work shall not be performed during rainy weather or when temperature is less than 40° F.

G. Adjacent concrete work, etc., shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original condition. Concrete surfaces shall be swept clean after paving.

H. Existing paved surfaces to be milled shall be milled in accordance with MassDOT Subsection 415 Pavement Milling. The milled surfaces to be repaved shall be cleaned of foreign and

objectionable matter with vacuum sweepers and brooms immediately before applying HMA pavement. Cracks shall be cleaned and crack sealed with tack coat.

I. Milled surfaced shall be tack coated prior to paving as specified. Tack coat shall be applied at rate which will leave asphaltic residue of 7 to 10 gal./100 sq. yd. after surface evaporation. Milled surface shall be dry and clean when tack coat is applied. HMA paving material shall not be placed until tack coat has completely evaporated.

J. HMA Deliveries shall be timed to permit spreading and rolling all material during daylight hours, unless artificial light, satisfactory to Architect, is provided. HMA Loads which have been wet by rain or otherwise will not be accepted. Hauling HMA over freshly laid or rolled material will not be permitted.

K. Placing and rolling of the HMA mixture shall be as nearly continuous as possible. Rolling shall begin as soon after placing as mixture will bear the operation without undue displacement. Delays in rolling freshly spread mixture will not be permitted. Rolling shall proceed longitudinally, starting at edge of newly placed material and proceeding toward previously rolled areas. Rolling overlap on successive strips shall be greater than or equal to 1/2 width of roller rear wheel. Alternate trips of roller shall be of slightly different lengths. Corrections required in surface shall be made by removing or adding materials before rolling is completed. Skin patching of areas where rolling has been completed will not be permitted. Rolling of each course shall be continued until roller marks are eliminated. Roller shall pass over unprotected edge of course only when paving is to be discontinued for sufficient time to permit mixture to become cold.

L. In places not accessible to roller, mixture shall be compacted with hand tampers. Hand tampers shall weigh at least 50 lb. and shall have a tamping face less than or equal to 100 sq. in. Mechanical tampers capable of equal compaction will be acceptable in areas in which they can be employed effectively.

M. Portions of pavement courses which become mixed with foreign material or are in any way defective shall be removed, replaced, replaced with fresh mixture, and compacted to density of surrounding areas. Asphaltic material spilled outside lines of finished pavement shall be immediately and completely removed. Such material shall not be employed in the work.

N. Joints shall present same texture, density, and smoothness as other sections of the course. Continuous bond shall be obtained between portions of existing and new pavements and between successive placements of new pavement. New material at joints shall be thick enough to allow for compaction when rolling. Compaction of pavement, base, and subgrade at joints shall be such that there is no yielding of new pavement relative to existing pavement when subjected to traffic.

O. Contact surfaces of previously constructed pavement (if greater than or equal to seven days since binder placed), manholes, and similar structures shall be thoroughly cleaned and painted with a thin uniform coating of bitumen immediately before fresh mixture is placed. Tack coat shall be applied at rate which will leave asphaltic residue of 5 to 7 gal./100 yd.^{2} after evaporation. Base surface shall be dry and clean when tack coat is applied. Asphaltic paving material shall not be placed until vehicle has completely evaporated from tack coat.

P. Earth or other approved material shall be placed along pavement edges in such quantity as will compact to thickness of course being constructed, allowing at least 1 ft. of shoulder

width to be rolled and compacted simultaneously with rolling and compacting surface. Pavement edge shall be trimmed neatly to line before placing earth or other approved material along edge.

Q. After final rolling, vehicular traffic shall not be permitted on pavement until it has cooled and hardened, and in no case less than six hours.

R. Variations in smoothness of finished surface shall be less than or equal to the following tolerances when tested with a 10 ft. straightedge, applied both parallel to and at right angles to centerline of paved area.

1. For roadway and parking pavement surface course - 1/4 in. in 10 ft.
2. For sidewalk pavement surface course - 1/4 in. in 10 ft.
3. At joint with existing pavement, and at other locations where an essentially flush transition is required, pavement elevation tolerance shall not exceed 0.01 ft.
4. At other areas pavement elevation tolerance shall not exceed $\pm$ 0.05 ft.
5. Irregularities exceeding these amounts or which retain water on surface shall be corrected by removing defective work and replacing with new material conforming to this Section.

S. Sidewalk Paving shall be done using machine sidewalk pavers only.

3.05 PATCHING AND UTILITY TRENCHES

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

A. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

B. Utility trenches shall be saw cut to a finished width prior to finish paving. All debris and any temporary paving material shall be removed and discarded. The gravel base course shall be smooth and compacted, gravel shall be added as needed to provide an even graded base and pavement thickness.

C. Prior to installing new HMA, the saw cut edges of existing pavement shall be mopped with RS-1 as specified. During placement of the top course material the joints shall be raked over and cut back to increase the joint seal. After rolling the HMA top course material, the joints shall be poured with RS-1 and sanded.

D. Both binder and top courses shall be compacted using a sidewalk roller or plate compactor. The final thickness of each course shall be as noted on the drawings.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
   1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
   1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
   2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
      a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than 3 cores taken.
      b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.07 RUBBISH REMOVAL

A. The General Contractor shall remove and dispose daily all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

B. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow excavated materials to accumulate on-site.

END OF SECTION

SECTION 32 10 04

PORTLAND CEMENT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes furnishing all labor, materials, equipment, and supervision to construct the Portland cement concrete sidewalk paving work, including handicap ramps and detectable warning strips , in accordance with the Drawings and Specifications.

1.2 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that relate directly to work of this Section include, but are not limited to:
1. Section 014325, TESTING AGENCY SERVICES; Inspection and testing.
2. Section 31 20 00, EARTH MOVING; Establishment of subgrade elevations, subbase and base course.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. American Concrete Institute (ACI):

305R	Hot Weather Concreting
306R	Cold Weather Concreting
325.9R	Guide for Construction of Concrete Pavements and Concrete Bases.

2. American Society for Testing and Materials (ASTM):

A 185	Welded Steel Wire Fabric for Concrete Reinforcement
C 33	Concrete Aggregates
C 94	Ready-Mixed Concrete
C 143	Slump of Portland Cement Concrete
C 150	Portland Cement
C 171	Sheet Materials for Curing Concrete
C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
C 309	Liquid Membrane-Forming Compounds for Curing Concrete
C 494	Chemical Admixtures for Concrete
C 920	Elastomeric Joint Sealants
C 962	Guide for Use of Elastomeric Joint Sealants
D 1557	Moisture - Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb. (4.54-kg) Rammer and 18-in. (457 mm) Drop
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

3. Americans with Disabilities Act (ADA):
   Appendix to Part 1191 Accessibility Guidelines for Buildings and Facilities
4. Commonwealth of Massachusetts Highway Department (MASSDOT):
   Specifications Standard Specifications for Highways and Bridges Latest Edition
   Construction Standard Details Latest Edition

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. ACI Publications: Unless otherwise specified, work and materials for construction of the Portland cement concrete paving shall conform to ACI 325.9R.

C. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.
   1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete producer.

E. Work, materials, and color of the handicap ramp paving shall conform to applicable sections of Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

F. Paving work, base course etc., shall be done only after excavation and construction work which might injure them have been completed. Damage caused during construction shall be repaired before acceptance.

G. Existing paving areas shall, if damaged or removed during course of this project, be repaired or replaced under this section of the specification. Workmanship and materials for such repair and replacement, except as otherwise noted, shall match as closely as possible those employed in existing work.

H. Pavement, base, or subbase shall not be placed on a muddy or frozen subgrade.

1.5 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1.6 PRECONSTRUCTION MOCK-UP PANELS

A. General
1. Schedule mock-up casting for acceptance 30 days prior to casting of concrete surfaces represented by the mockups.
2. Locate mock-up panels in non-public areas accepted by the Architect.
3. Continue to cast mock-ups until acceptable mock-ups area produced. Accepted mock-ups shall be the standard for color, texture, and workmanship for the work.
4. Mock-up sequence of forming, placing, form removal, curing, and finishing shall be reviewed and accepted by the Architect.
5. Mock-up formwork shall be inspected and accepted by the Architect before placing of concrete.
6. Use the same concrete mixes and placement procedures, accepted in mock-ups, in the final work, unless otherwise directed by the Architect.
7. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
8. Remove mock-up panels from site at completion of project, as directed by the Architect.

B. Construct mock-up panels or areas as indicated to demonstrate the ability to cast concrete for concrete paving to achieve shape, color, jointing and textured finish required. Mock-ups shall include or meet the following requirements:
1. Provide mock-up panel 5 ft. x 5 ft. size, full depth.
2. Provide mock-ups simulating actual design and execution conditions for concrete mix materials, reinforcement, formwork, placing sequence, form removal, curing, finishing, and methods and materials of stain removal and correction of defective work.
3. On mock-ups were directed by the Architect, provide minimum of three variation of mix color to be used in the repair of defective work, to determine acceptable color and texture match.
4. Demonstrate in the construction of the mock-up formwork the sealer material, form release agent, and curing materials and methods to be used.
5. Include control joints and expansion joints with joint sealer.

C. Source of Materials. Utilize the same source, stock, or brand of concrete materials for each class or mix of concrete which is to be exposed. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity.

1.7 SUBMITTALS

A. Description of Methods and Sequence of Placement. For each type of specially finished concrete provide description of methods and sequence of placement.

B. Shop Drawings: Provide shop drawings clearly indicating all control joints, decorative saw cut joints and expansion joint layout.

C. Submit manufacturer's product data for the following:
   1. Admixtures
   2. Preformed expansion joint filler.
   3. Snap strips and backer rods.
   4. Welded wire fabric.
   5. Expansion Joint dowels and sleeves.
   6. Joint sealant color chart.

D. Submit samples of the following:
   1. Preformed joint filler.
   2. Joint sealant for color selection.

E. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

F. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Admixtures.
   4. Curing compounds.
   5. Bonding agent or epoxy adhesive.

G. Minutes of preinstallation conference.

1.8 TESTING AND INSPECTION

A. The Owner reserves the right to inspect and test paving and associated work in accordance with Section 014325, TESTING AGENCY SERVICES.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Welded wire fabric reinforcement shall conform to the applicable requirements of ASTM A 185. Fabric reinforcement shall be furnished in flat sheets. Welded wire fabric (WWF) reinforcement shall be 6”x6” pattern with No. 10 wire in both directions. Fabric reinforcement in rolls will not be permitted.

2.2 PORTLAND CEMENT CONCRETE

A. Portland cement concrete for pavements and slabs shall be air-entrained type with a maximum water-cement ratio of 0.45 conforming to ACI 325.9R. Minimum compressive strengths at 28 days shall be 4,000 psi.
   1. Concrete shall be air-entrained type, conforming to ASTM C 94.
   2. Air content by volume shall be 6% $\pm$ 1%, and shall be tested in accordance with ASTM C 231.
   3. Concrete slump shall be no less than 2 in. nor greater than 4 in., determined in accordance with ASTM C 143.

4. Cement shall be Portland cement, conforming to ASTM C 150, Type I or II. Only one color of cement, all of the same manufacturer, shall be used for the entire Project. Type III cement shall be used only with the prior approval of the Architect.
5. Fine and coarse aggregates shall conform to ASTM C 33.
6. Concrete shall contain a water reducing agent to minimize cement and water content of the concrete mix at the specified slump. Water reducing agent shall conform to ASTM C 494.
7. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixtures other than those specified shall be used in the concrete without the specific written permission of the Architect in each case.

2.3 CHEMICAL ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Set Accelerator: non-corrosive, non-chloride admixture for concrete for accelerating cement hydration resulting in shortened setting times and increased early compressive and flexural strengths. Shall not contain calcium chloride, formulated to comply with ASTM C494 Type C, and can be used at any dosage to comply with ACI 318 guidelines for chloride content of concrete.

2.4 ADA TACTILE PANELS FOR CONCRETE WHEELCHAIR RAMPS

A. ADA tactile panels shall be solid color, cast-in-place, replaceable panels as manufactured by ADA Solutions or approved equal. Panel Color shall be YELLOW.

2.5 EXPANSION JOINTS

A. Unless otherwise indicated on the Drawings, expansion joints shall be located 20 ft. o.c., maximum.

B. Where indicated, expansion joints shall be 1/2 in. wide. Expansion joint filler shall be lightweight flexible foam type joint filler conforming to ASTM D 1752, with the compression requirement modified to 10 psi, similar to Ceramar Flexible Foam Expansion Joint Filler, manufactured by W.R. Meadows, Inc., P.O. Box 338, Hampshire, IL 60140-0338; Tel. 847- 214-2100; Fax: 847-683-4544, or approved equal.
1. Joint filler shall be one piece for the full depth and width of the sidewalk transverse joint. Expansion joints longer than stock lengths can be made of multiple length with no piece shorter than 4 feet.
2. Use of multiple pieces of lesser dimensions to make up required depth and width of joint will not be permitted.
3. Except as otherwise noted on the Drawings, joint filler shall be 1/2 in. thick.
4. Expansion joints shall be installed with plastic snap caps to create void for the sealant.

C. Round Expansion Joint Dowels: ASTM A615, Grade 60, epoxy-coated, smooth, billet-steel bars, clean and free of rust and scale.

D. Dowel Caps for Round Dowels: Dowel caps shall be as noted on the drawings, designed and manufactured to fit over ends of expansion joint dowels to allow longitudinal movement of dowels after concrete has hardened.

E. Dowel Aligners for Round Dowels: PNA Dowel Aligners, or accepted substitute.

F. Expansion joint shall receive joint backer rod and shall be sealed with joint sealant as manufactured by W.R. Meadows, Inc., P.O. Box 338, Hampshire or equal.

2.6 JOINT SEALANT AND BACKER ROD

A. Sealant for sealing of expansion joints in concrete walks shall be a one component polyurethane based cold applied sealant Pourthane SL as manufactured by W.R. Meadows, Inc., P.O. Box 338, Hampshire or equal.

B. Backer Rods shall be 5/8" diameter cool rod as manufactured by W.R. Meadows or approved equal.

2.7 CONTROL JOINTS

A. Control joints indicated on the Drawings to be tooled to match the existing concrete sidewalks to remain. Tooled control joints shall be made by using a concrete grooving tool with a 3/8" depth and 1/4" radius.

B. Unless otherwise indicated on the Drawings, control joints shall be located 10 ft. o.c. maximum.

2.8 CONSTRUCTION JOINTS

A. Transverse construction joints shall be placed whenever placing of concrete is suspended for more than 30 minutes.
   1. Butt joint with dowels or thickened edge joint shall be used if construction joints occurs at location of control joint.
   2. Keyed joints with tiebars shall be used if the joint occurs at any other location.

2.9 SURFACE SEALANT

A. Surface sealant shall be Pencure OTC as manufactured by W.R. Meadows or equal.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Areas to be paved will be compacted and brought approximately to subgrade elevation under Section 31 20 00, EARTH MOVING before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to Section 31 20 00, EARTH MOVING.

C. Subgrade below sidewalk areas shall be smoothed and compacted as required to bring top 8 in. of material immediately below gravel base course to a compaction of at least 90% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.

D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or subbase subsequent backfill and compaction shall be performed as directed by the Architect as specified in Section 31 20 00, EARTH MOVING. Completed subgrade after filling such areas shall be uniformly compacted and properly graded.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing cement concrete pavement.

F. Materials shall not be stored or stockpiled on subgrade.

G. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this Section shall conform to the following:
   1. Material shall be legally disposed of off-site.

H. Prepared subgrade will be inspected by the Architect. Subgrade shall be approved by the Architect before installation of paving base course. Disturbance to subgrade caused by inspection procedures shall be repaired under this Section of the specification.

3.2 AGGREGATE BASE COURSE

A. Aggregate base course for paving and the spreading, grading, and compaction methods employed shall conform to standard requirements for usual base course of this type for first class road work, and the following:
   1. MASSDOT Materials Specification “M1.03.0 Type C Gravel Borrow".

B. Compaction of aggregate base course shall be to 95% of maximum density as determined by ASTM D 1557, Method D. Stone greater than 2 in. shall be excluded from course.

C. Width of base course shall be greater than or equal to the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend at least 2 x base thickness beyond edge of the course above, if not so supported.

D. Aggregate material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density as per the Section 31 20 00 Earth Moving.
   1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade and level.
   2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
   3. Surface irregularities which exceed 1/2 in. measured by means of a 10 ft. long straightedge shall be replaced and properly compacted.

E. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled outside pavement lines shall be removed and area repaired.

F. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

3.3 FORMING WORK

A. All form work shall be fabricated from sturdy materials and staked to the ground at intervals that will prevent movement of the forms when concrete is placed.

B. Forming stock shall be the same dimension as the thickness of the sidewalk being placed.

C. Set forms to grades that will meet the correct cross slope once the concrete is placed and finished.

D. Formwork used to to form radial sections shall be kerfed as needed to maintain a radial edge.

E. Formwork shall be sprayed or coated with a release agent prior to placing concrete.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Before being placed in position, reinforcing for reinforced concrete shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is a delay in placing concrete after reinforcement is in place, bars shall be re-inspected and cleaned when necessary.

C. Any bar showing cracks after bending shall be discarded.

D. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 in. of formwork and expansion joints. Reinforcing shall continue through control joints. Adjacent sheets of fabric reinforcing shall lap 6 in.

E. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Architect.

F. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 PORTLAND CEMENT CONCRETE PAVING

A. Cement Concrete Paving mix, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base etc., shall meet the requirements of ACI 325.9R. Pavement shall be constructed in accordance with the Drawings.

B. The Architect shall be notified of concrete placement sufficiently in advance of start of operation to allow his representative to complete preliminary inspection of the work, including subgrade, forms, and reinforcing steel, if used.

C. Normal concrete placement procedures shall be followed. Concrete shall arrive at the jobsite so that no additional water will be required to produce the desired slump. When conditions develop that required addition of water to produce the desired slump, permission of the Architect must be obtained. The concrete shall be transported from the mixer to its place of deposit by a method that will prevent segregation or loss of material.

D. Work shall not be performed during rainy weather or when temperature is less than 40^{o} F. (4.4^{o} C).

E. Adjacent work, etc., shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original conditions.

F. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall thoroughly damp when concrete is placed. There shall be no free water on surface.

G. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.

H. Concrete shall be thoroughly spaded and tamped to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

I. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned of foreign matter, and mortar scum and laitance shall be removed by chipping and washing. Clean, roughened base surface shall be saturated with water, but shall have no free water on surface. A coat of 1:1 cement-sand grout, approximately 1/8 in. thick, shall be well scrubbed into thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

3.6 FINISHING

A. Concrete flatwork surfaces shall be screeded off with a bull float, power or hand floated, troweled and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.

1. Finished concrete surface for subbases shall be finished with a wood float to a slightly rough surface. Surface shall not deviate more than 1/4 in. in 10 ft.

2. Finished concrete surface for exposed concrete walks, ramps and pads shall be wood-floated and steel troweled to a smooth surface. Surface shall not deviate more than 1/8 in. in 10 ft.

B. Unless otherwise indicated, horizontal surfaces of concrete surfaces which will be exposed shall be given a light broomed finish, with direction of grooves in concrete surface perpendicular to length of concrete band, slab, or pad. After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, brooms shall be drawn across it to produce a pattern of small parallel grooves. Broomed surface shall be uniform, with no smooth, unduly rough or porous spots, or other irregularities. Coarse aggregate shall not be dislodged by brooming operation.

C. Immediately following finishing operations, arises at edges of raised equipment pads shall be chamfered to a 1/2 in. radius.

D. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

3.7 CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure in accordance with manufacturer's printed guidelines and recommendations.

C. Once the concrete surface is dry and all concrete mix water has evaporated. Apply the sealant to the surface of the concrete as per the manufacturer's instructions.

3.8 CONSTRUCTION JOINTS

A. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
   1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
   2. Provide tie bars at sides of pavement strips where indicated.
   3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.9 EXPANSION JOINTS

A. Expansion joints (isolation joints) shall be 1/2 in. wide and unless otherwise indicated on the Drawings, shall be located 20 ft. o.c. and at places where pavement meets other structures. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full width and depth of the slab. Joint filler shall extend the full length of the expansion joint. Expansion joint material shall be supplied with 1" deep snap caps to allow for joints to be sealed after installation.
   1. Depth of joint filler shall be as required to form a 1 in. deep gap to be filled with 5/8" backer rod and sealant after the snap cap is removed to form a recess below finished concrete surface.

2. Doweled Joints: Install sleeves and dowel bars at expansion joints as indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.10 CONTROL JOINTS

A. Control joints indicated shall be marked before placement and formed during finishing using a grooving tool.

3.11 COLD WEATHER CONCRETING

A. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40^{O}F. or is expected to fall to below 40^{O}F. within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.

B. Details of handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Architect. Procedures shall be in accordance with provisions of ACI 306R.

3.12 HOT WEATHER CONCRETING

A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after arrival on the job.

B. During periods of excessively hot weather (95^{O}F., or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 95^{O}F., when ready for placement will not be acceptable, and will be rejected.

C. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. Records shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

3.13 SEALING EXPANSION JOINTS

A. Where indicated on the Drawings, expansion joints shall be sealed with joint sealant in accordance with approved sealant as specified. Joint sealant shall be applied in dry conditions with no surface water on the concrete or in the joint and on fully cured concrete sections. Joint sealers shall be applied according to the manufacturer's requirements.

B. Prepare joints by sweeping out all loose materials, remove the snap cap strip and install backer rod in a clean joint. Apply the sealant and tool the finished joint with a steel jointer. The joints shall be tooled such that the joints surface is smooth after the tool is used. Use manufacturer's recommended solvents to clean the tool face and prevent dragging the tool over the joint. Protect adjacent surfaces and other materials.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least 1 composite sample for each 100-cu.yd. or fraction thereof of each concrete mix placed each day.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
   4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
      a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3-consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.15 PROTECTION OF CONCRETE SURFACES

A. Concrete surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary 1/2 in. thick plywood sheets shall be used to protect the exposed surface.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

END OF SECTION

SECTION 32 16 40

GRANITE CURBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

B. Sustainable Design Intent: The Work of this Contract and Section shall include compliance with all requirements to achieve a minimum of 170 points in accordance with NE-CHPS version 3.2 Criteria. Work shall include, but not be limited to, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation as described in, and in accordance with requirements of Section 01 33 15 – NE-CHPSv3.2 Requirements, Section 01 81 15 – Sustainable Materials Requirements, and the Contract Documents.

1.02 DESCRIPTION OF THE WORK

A. The Work of this Section includes, but is not limited to, furnishing and installation of the following:

1. Vertical granite curbing

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 31 10 00 - Site Clearing
2. Section 32 10 03 – Hot Mixed Asphalt Pavement
3. Section 32 10 04 - Portland Cement Paving
4. Section 31 20 00 - Earth Moving

1.04 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Society for Testing and Materials (ASTM):

C 131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
C 615	Structural Granite

2. Commonwealth of Massachusetts Department of Transportation (MassDOT): Specifications Standard Specifications for Highway and Bridges.

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

1.06 SAMPLE SECTION

A. A sample curb section, full dimension, 6 ft. long minimum, shall be fabricated prior to start of granite curbing. The work will be inspected by the Architect. If the original sample is not acceptable, the Contractor shall construct additional sample sections until an accepted sample is obtained. The accepted sections shall become the standard for the entire job, and shall remain undisturbed until completion of all granite curbing.

1.07 QUALITY ASSURANCE

A. Unless otherwise indicated, granite curb materials and construction shall conform to the applicable portions of the following:
   1. MassDOT Specifications Section 500, "Curb and Edging."

1.08 DELIVERY, STORAGE, AND HANDLING

A. Granite curb units shall be delivered to the job adequately protected from damage during transit.

B. Curb shall be protected against staining, chipping, and other damage. Cracked, badly chipped, or stained units will be rejected and shall not be employed in the work.

PART 2 - PRODUCTS

2.01 GRAVEL BASE COURSE

A. Material for aggregate base course shall be a graded, granular, non-frost susceptible, free-draining material, consisting of either durable stone and coarse sand or of blast furnace slag, practically free from loam and clay, and which can be readily compacted to form a stable foundation.
   1. Material shall be gravel borrow conforming to MASSDOT Specifications Section M1.03.0 type c

2.02 GRANITE CURB

A. New granite curb required to complete the work of this Section shall be a structural granite conforming to ASTM C 615, Class I Engineering Grade, suitable for curbstone use. Curb shall be light grey, free from seams which impair structural integrity, and with percentage of wear less than 32%, as determined by ASTM C 131.

B. Granite Curb materials shall conform to MassDOT Specifications Section M9.04.1 and shall meet requirements specified in the following subsection of Division III, Materials of the MASSDOT Specifications:

Item	Section	Type
Vertical Granite Curb	M9.04.1	VA4

C. Provide 1' – 6" depth granite curb as indicated on the Drawings.

D. Provide sawn vertical faces on both sides for all curb sizes.

E. Provide curved curbing cut to the design radius. The maximum design radius allowed for straight curbing shall be as per the MassDOT standard.

F. All granite curbing, radial or straight shall be single sourced from the same supplier.

2.03 CEMENT MORTAR

A. Mortar for pointing joints between curbstones shall be a cement mortar composed of one-part Portland cement and two parts sand, by volume with sufficient water to form a workable, stiff mixture.

2.04 CONCRETE FOR CURB SETTING

A. Concrete for locking in curbing face shall be 3,000 psi, 520, ¾" max aggregate as per MassDOT M4.02.00 standard Specifications.

PART 3 - EXECUTION

3.01 SETTING CURB

A. Curbing shall be installed after the paving base material is graded and compacted.

B. The contractor may install granite curbing after the binder course has been paved. Curbing placed after the binder is in place or in areas that have been milled shall be backfilled with approved gravel and the face of curbing shall be locked in with cement concrete as specified.

C. Curb shall be set in aggregate base with continuous concrete haunch foundation, with trench bottom at minimum 6 in. below bottom of curb. Excavation shall be filled to required level with base course material as specified above.

D. Vertical face of vertical curb shall be plumb, with curb top parallel to adjacent surface.

E. Curb shall be set accurately to line and grade in continuous haunch. Curb units shall be fitted together as closely as possible. Curb shall not be field cut except at closures. The minimum length of a closure curb shall be not less than 2 feet.

F. Joints, between curb units shall be carefully filled with a cement mortar, and neatly pointed on the top and front exposed portions. After pointing, excess mortar shall be cleaned from curb surface.

G. Backfill material on each side of curb shall be as specified for adjacent surface and shall be thoroughly compacted by means of power tampers. Extreme care shall be taken not to

destroy alignment. Curb sections disturbed during backfilling or otherwise shall be reset to line and grade, and properly backfilled.

3.02 RUBBISH REMOVAL

A. The General Contractor shall remove and dispose daily all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

END OF SECTION

SECTION 32 30 00

SITE IMPROVEMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

B. Sustainable Design Intent: The Work of this Contract and Section shall include compliance with all requirements to achieve a minimum of 170 points in accordance with NE-CHPS version 3.2 Criteria. Work shall include, but not be limited to, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation as described in, and in accordance with requirements of Section 01 33 15 – NE-CHPSv3.2 Requirements, Section 01 81 15 – Sustainable Materials Requirements, and the Contract Documents.

1.02 DESCRIPTION OF THE WORK

A. The Work of this Section includes, but is not limited to, furnishing and installation of the following:

1. Traffic Control Devices
2. Signage
3. Pavement Striping
4. Removing and disposing of existing bollards as noted on the drawings.
5. Installing new steel bollards as noted on the drawings.
6. Installing PVC covers over bollards.
7. Installing RRFB footings as noted on the drawings.
8. Installing fencing sections as noted on the drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 31 10 00 - Site Clearing
2. Section 32 10 03 – Hot Mixed Asphalt Pavement
3. Section 32 10 04 - Portland Cement Paving
4. Section 31 20 00 - Earth Moving

1.04 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. MassDOT Standard Specifications for Highways and Bridges – latest edition.

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 WHEEL STOPS

A. Precast concrete Wheel stops shall be as detailed in the drawings as manufactured by Shea Precast or equal.

B. Wheel stops shall be cast from 4,000 p.s.i. concrete.

2.02 TRAFFIC CONTROL DEVICES (TRAFFIC DELINEATORS)

A. Traffic Delineators shall be Removable Flexible Traffic Delineators with fixed bases as manufactured by Melba Swintex Bumper Bollard or equal.
   1. Removable Bollard bases shall be fix mounted to the pavement with 3 Bolt Hold SP10-38 Stainless Asphalt Anchors.
   2. Bollard Bases shall be recycled PVC (Polyvinyl chloride).
   3. Bollards shall be Virgin PVC (UV Stabilized Low Density Polyethylene).
   4. Reflective tape on the bollards shall be Micro Prismatic Retro-Reflective PVC Sheeting
   5. Bollard to base connection shall be keyed to allow removal of the bollard by twisting the bollard out of the base.

2.03 RECTANGULAR RAPID FLASHING BEACON (RRFB) FOOTINGS

A. The footings located on Sunderland Road at the crosswalk (station 11+50) shall be installed in accordance with City of Worcester standard 520 lbs footings.

B. All precast concrete footings shall be manufactured in NPCA National Precast Concrete Association certified plant.

C. Concrete for pole bases shall be minimum 5,000 p.s.i. type III cement concrete with epoxy coated reinforcement.

2.04 DECORATIVE ALUMINUM FENCE

A. The decorative aluminum fence sections shall be the Classic Series A Two Channel Fence System as manufactured by Aluminum Fence Supply or approved equal.

B. All fence components and hardware shall be supplied by the same manufacturer.

C. All fence components shall be powder coated black. Powder coating application and colors shall meet AAMA 2604-13 and ASTM B-117 specifications.

D. Fence posts shall be 4” x 4” x .250” thick with standard post caps.

E. Rails and pickets shall be sized and spaced as detailed on the drawings.

F. Concrete for fence post footings shall be MassDOT standard mix 3,000 P.S.I. 520,3/4".

2.05 STEEL BOLLARDS

A. Steel bollards shall be standard 6" nominal diameter schedule 40 pipe bollards with an outside diameter of 6 5/8" and precut into 7 foot lengths and hot dipped galvanized.

B. Bollards shall be hot dip galvanized to meet ASTM A123 specifications.

C. Concrete for bollard footings and filling bollards shall be MassDOT standard mix 3,000 P.S.I. 520,3/4".

D. Bollard covers shall be 1/4 inch nominal wall thickness High Density Polyethylene plastic with ultraviolet and antistatic additives as manufactured by Bollards and Sleeve LLC or equal. Covers shall be sized to fit the pipe bollard snug.

2.06 TRAFFIC SIGNS

A. All traffic and regulatory signs shall be standard signs in accordance with MassDOT Subsection 828 Traffic signs.

1. Reflective sheeting shall be in accordance with M9.30.0 Diamond Grade per 3M specification or equal.

B. 2. Aluminum sign panels shall be either Type A Sign mounting hardware shall be
As specified herein. Sheeting shall be 0.125 in. thick, ASTM B209, Alloy 3033-H18.

3. Retroreflective sheeting shall be applied in accordance with the Standard Specifications.

4. All signs shall be prefabricated with mounting holes prepared by the supplier.

2.07 CONCRETE FOOTINGS AND MOUNTING POSTS FOR SIGNS

A. Cement concrete for signposts shall be MassDOT standard mix 3,000 P.S.I. 520,3/4". Footing shall be placed against smooth excavated material or using forms in loose excavated material. Dimensions shall be in accordance with the drawings.

B. Signposts located on the site (refer to Typical Sign Post Detail) shall be 2 3/8" outside diameter, schedule 10, galvanized steel pipe with acorn caps. Signposts and caps shall be painted with one coat of primer and two coats of gloss black paint. All paint shall be made by the same manufacturer and shall be formulated for steel applications exterior use.

C. Signposts located on City of Worcester Right of Way (refer to Typical City of Worcester Sign Post Detail) shall be 2"x 2" Telespar Steel posts, 7 gauge, galvanized steel with square caps or top mount brackets as required. Signposts and caps shall be painted with one coat of primer and two coats of gloss black paint. All paint shall be made by the same manufacturer and shall be formulated for steel applications exterior use.

2.08 MOUNTING HARDWARE FOR SIGNS

A. Mounting hardware for signs shall be cast aluminum tamper resistant brackets with tamper resistant stainless steel mounting hardware.

B. Mounting hardware, brackets, u-straps with nuts and sign mounting bolts shall be complete in "kit form" with all hardware needed to mount one sign as supplied by Traffic Signs, Inc. or equal.

C. One Way signs shall be top mounted using 12″ Street Name Sign Brackets for square or round posts and omitting the post cap at those locations. Top mount brackets shall be installed with stainless steel vandal resistant set screws.

2.09 PAVMENT MARKINGS

A. Thermoplastic for pavement markings shall conform to MassDOT Standard Specifications Section M7.01.3 Liquid Thermoplastic Striping Material applied in either white or yellow based on location.

B. The ADA Symbol on Blue background and the pavement arrows and legends shall be in accordance with MassDOT standard specifications for M7.01.18 Preformed Permanent Plastic Pavement Markings or Legends. Manufacturers of thermoplastic markings shall be pre-certified by MassDOT.

PART 3 - EXECUTION

3.01 WHEEL STOPS

A. Install wheel stops in locations with flush curbing as noted on the drawings.

B. Wheel stops shall be aligned squarely with the curbing and centered in the parking space.

C. Wheel stops shall be pinned to the hardened asphalt with reinforcement dowels as per the details and the dowels shall be driven flush with the top of the wheel stop.

3.02 RECTANGULAR RAPID FLASHING BEACON (RRFB) FOOTINGS

A. The contractor shall layout the locations of the RRFB footings in the field for City approval prior to installation.

B. The excavation for the footing shall be deep enough to accommodate the footing with enough room to firmly compact the back fill all around the footing.

C. The footing shall set on compacted gravel and plumb. The footing shall project above finished grade as noted in the details.

D. All mounting bolts shall be protected from damage by using two galvanized mounting nuts with a washer between and locked together.

3.03 DECORATIVE ALUMINUM FENCE

A. The contractor shall layout the fence post locations for approval prior to excavating.

B. Post excavations shall be clean and vertical to the depth required. If the excavation sides are loose and collapsing the contractor shall install forming tubes to prevent dirt from mixing with the concrete.

C. Fence post shall be set plumb and temporarily braced with a brace that will not mar or damage the posts. Posts shall be held to the proper dimension, plumb and aligned during concrete placement.

D. All rails, pickets, and caps shall be installed per the manufacturer's specifications in proper alignment with even spacing.

3.04 STEEL PIPE BOLLARDS NEW OR REPLACED

A. Excavate holes for new bollards to the dimensions noted on the plans. If the soil is firm and note caving into the excavation, the concrete may be poured directly onto the excavated hole around the bollard. If the earth around the excavation is falling into the hole use a sonotube around the bollard to ensure that the concrete does not mix with the soil.

B. If an existing bollard is noted to be replaced, extract and dispose of the existing bollard and excavate to the depth as noted for a new bollard installation as specified. Backfill and compact around the bollard footing as required.

C. New pipe bollards shall be set plumb and in line with the existing bollards. Used temporary bracing to support the bollards until the concrete is placed and set.

D. Concrete shall be placed evenly and compacted around the bollards with the bollards filled with concrete. Clean off excess concrete to allow the bollard covers to fit properly.

E. Install the bollard covers after the sidewalks have be placed, sealed and hardened.

F. Bollard covers shall be cut to length to fit over the top of the bollard and be flush with the sidewalk. Install bollard covers using the sealing tape supplied by the manufacturer.

3.05 TRAFFIC CONTROL DEVICES (TRAFFIC DELINEATORS)

A. Install traffic delineators in accordance with the drawings. Premark the locations in the field for approval of the owner’s representative for approval prior to final installation.

B. Traffic delineators shall be bolted to the hardened asphalt pavement using the specified fastener.

C. The bases shall be firmly attached to the pavement surface using all installation holes.

D. Orientate the location of the bases aligning the keyway that the post fits in the line.

E. Install the removable posts per the manufacturer’s instructions to ensure proper fit.

3.06 SIGN INSTALLATION

A. Install signposts in the locations noted on the drawings. Premark the locations in the field for approval of the owner’s representative for approval prior to final installation.

B. Excavate to the correct depth and diameter for sign post base and set the signpost to the correct height using temporary bracing to keep the posts plumb in all directions and bracing that will note mare the painted surfaces.

C. Concrete footings shall be placed in round forms, or against undisturbed soil provided the soil is stable against collapse. The footings shall be set below grade. The footing shall remain set until the concrete has set hard enough to prevent cracking or loosening.

D. Signs shall be installed in accordance with the details. Using care to scratch or mare the surface of the posts. Sign clearances in opening and foot traffic areas shall be followed to prevent

injury as results of head contact. Handicapped Signs shall be set lower as noted to be able to be viewed from close distances.

E. All sign hardware shall be torqued to meet manufacturer's specifications, and the signs shall be mounted firm enough to prevent movement.

3.07 PAVEMENT MARKINGS APPLICATION

A. Pavement marking shall be applied in accordance with the MassDOT Standard Specifications Subsection 460 and the following.

B. Apply pavement markings in the locations as noted on the drawings. The contractor shall pre-mark the line and symbol locations for approval by the owner's representative before applying the paint.

C. The contractor shall ensure that no pavement marking applications take place until at least 48 hours after the top course of pavement is installed to avoid bleeding.

D. The contractor shall sweep the pavement as needed to remove dust and debris before the pavement markings are applied. The pavement shall be clean and dry before application.

E. The contractor shall have the entire area available for striping by removing and clearing out any lay down areas to allow the striping to be performed in one operation.

F. Pavement marking shall be applied using a commercial grade machine designed for the purpose. The machine shall apply the thermoplastic evenly without leaving any light or heavy areas.

G. In areas where striping is boxed, such as the gore areas or cross walks, application shall be done in steps to allow ample drying time and eliminate wheel tracking.

H. Crosswalk striping on Sunderland Road shall be done in stages as needed to complete one side of the road at a time. The contractor shall employ police details to control traffic movements around the work zone.

I. All handicapped symbols shall be completed using the appropriate preformed thermoplastic symbol for handicapped spaces, arrows and letters, etc.

3.08 GENERAL CLEANUP

A. The General Contractor shall remove and dispose daily all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

END OF SECTION

SECTION 32 92 00

LAWNS AND PLANTINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including Drawings, General Conditions and Supplementary Conditions and all Sections of Division 1 - General Requirements, apply to the Work of this Section.

B. Sustainable Design Intent: The Work of this Contract and Section shall include compliance with all requirements to achieve the Collaborative for High Performance Schools (CHPS) Verified Leader status as measured in accordance with the Northeast Collaborative for High Performance Schools (NE-CHPS v3.1) Criteria. Work shall include, but not be limited to: Integration & Innovation; Operations & Metrics; Indoor Environmental Quality, Energy, Water, Sites, Materials and Waste Management, as describe, and in accordance with requirements of, Sections 01 33 15 – NE-CHPS v3.1 Requirements, 01 81 15 – Sustainable Material Requirements, and the Contract Documents.

Sustainable design intent is not required for the administration building (Alternate No. 1) but shall meet the minimum requirements of the current energy code.

1.01 DESCRIPTION OF WORK

A. The Work of this Section includes, but is not limited to, furnishing and installation of the following:

1. All materials, equipment, labor and services required for all lawn and planting work, including all items incidental thereto, as specified herein and as shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all of the Contract Documents for requirements which affect the Work of this Section.

B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following Sections:

1. Section 31 20 00 – Earth Moving
2. Section 31 25 00 - Sedimentation and Erosion Control
3. Section 32 12 16 - Paving and Surfacing
4. Section 32 12 10 - Site Improvements
5. Section 32 84 00 – Planting Irrigation

1.03 REFERENCE SPECIFICATIONS

A. A.S.T.M. - American Society for Testing and Materials.

B. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials.

C. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.

D. Department of Food and Agriculture, Children's and Families' Protection Act

1.04 QUALTIY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 –
NE-CHPS v3.1 Requirements, and in accordance with requirements of the Contract Documents.

B. Submit the following test reports:

1. Loam Analysis
2. Seed analyses
3. Fertilizer, lime and superphosphate analysis

C. Submit the following samples:

1. Loam
2. Shredded bark mulch
3. Organic Compost
4. Sphagnum Peat Moss
5. Humus
6. Manure
7. Shredded bark mulch
8. Planter Box mix

1.06 PREPARATION AND INSPECTION OF AREAS TO BE SEEDED AND PLANTED

A. All areas to be seeded and planted shall be inspected by the Lawns and Planting Contractor before starting work. Any defects, such as incorrect grading, etc., shall be reported to the Architect prior to beginning this work. The commencement of Work of this Section shall indicate acceptance of the areas to be seeded and planted by the Contractor, who shall assume full responsibility for the Work of this Section.

1.07 SAMPLES, TESTS AND INSPECTIONS

A. Samples of all loam to be used shall be submitted to the Architect for approval and to determine whether or not it meets the requirements specified. At the time of submission, the Contractor will take representative soil samples of the loam, and tests shall be made by a State or commercial soil testing laboratory using methods approved by the Association of Official Agricultural Chemists (AOAC) or the State Agricultural Experiment Station. The Contractor shall select the testing laboratory with the approval of the Owner and bear all costs for soil testing. Loam shall be tested for soluble salts (1:2 soil water ratio), Nitrogen (including nitrate and ammonium Nitrogen), Phosphorous, Potassium, Sulfate, Calcium, Magnesium, Aluminum and Ferric Iron concentrations. Loam shall also be tested for heavy metals concentrations, including Boron,

Cadmium, Zinc, Chromium, Copper, Lead, Manganese, and Nickel. Test results shall be forwarded to the Architect at least one (1) month prior to expected loam installation and shall state whether the material is acceptable as a planting medium, whether it needs to be amended, or if it fails to meet accepted requirements. Test results shall also include soil amendment and fertilizing requirements. No loam may be installed until specific approval of samples has been given by the Architect.

B. Seed Analyses - Prior to the time of sowing the seed mixtures, certifications shall be submitted to the Architect for approval from the supplier certifying that the seed was obtained for this Contract and stating the formula of the mixtures.

1.08 GUARANTEE AND CERTIFICATION OF ACCEPTABILITY

A. Guarantee - Planting shall be guaranteed for one (1) full year after Certification of Acceptability by the Architect and shall be alive and in satisfactory growth at the end of the guarantee period except for damage resulting from causes beyond the responsibility of the Contractor.

B. Certification of Acceptability

1. Inspection of the work of Lawns and Planting to determine completion of the work under this Section will be made at the conclusion of the maintenance period upon written notice requesting such inspection submitted by the Contractor at least five days prior to the anticipated date. The condition of landscaping will be noted and determination made by the Architect whether maintenance shall continue in any part.
2. After inspection by the Architect, the Contractor will be notified in writing by the Architect of acceptability of all work of this Section, or if there are any deficiencies of the requirements for completion of the work. Lawn maintenance or other work remaining to be done shall be subject to re-inspection before being certified acceptable.

1.10 CLEAN UP

A. A. Any soil or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times.

B. Upon completion of work under this Section, all excess stones, debris and soil resulting from work under this Section which have not previously been cleaned up shall be cleaned up and removed from the project site.

PART 2 - PRODUCTS

2.01 LOAM AND ADMIXTURES

A. Loam.

1. The Contractor shall screen and place loam in accordance with the Drawings and Specifications and as directed by the Architect.

2. Material shall consist of fertile, friable natural topsoil, typical of productive soils in the site vicinity, obtained from naturally well drained areas. Loam shall be of uniform quality, free from subsoil hard clods, stiff clay, hardpan, sods, partially disintegrated stone, lime, cement, ashes, slag, concrete, chips, sticks, noxious weeds, or any other undesirable material.
3. Loam shall be amended to contain between 5.5 and 7.5 per cent organic matter determined by loss on ignition of moisture-free sample dried in accordance with the current method of the Association of Official Agricultural Chemists (AOAC). The acidity range shall be amended to pH 5.0 to pH 7.0 inclusive, adjusted for plants which require low soil pH. Loam shall not contain any phytotoxic materials or unacceptable concentration levels of any substance harmful to plant growth, as determined by the soils testing laboratory. Maximum soluble salt index shall be 100. The Electrical conductivity (EC2) of a 1:2 soil-water suspension shall be less than or equal to 1.0 millimhos/cm. Aluminum concentration levels shall be less than 200ppm. The mechanical analysis of the soil shall be as follows after screening:

Passing	Retained On	Percentage
1" screen	--	100%
3/4" screen	sieve (sand)	49% - 60%
#100 U.S.S. Mesh sieve	(very fine sand, silt and clay)	40% - 60%

4. The Contractor shall furnish to the Architect for approval representative samples of all the loam he proposes to use. The Contractor shall submit three representative samples of loam both on site stripped loam and off- site borrow to a testing laboratory approved by the Architect to test for grain analysis, pH and organic content. The results of this testing shall be submitted to the Architect for review.
5. The Contract Price shall include inspection and laboratory charges. No loam shall be spread until approval of samples by the Architect, but such approval shall not constitute the final acceptance. The Architect reserves the right to reject any material that does not, in his opinion, meet these Specifications.
6. The Architect reserves the right to reject loam in which more than sixty (60) per cent of the material passing No. One Hundred (100) U.S.S. mesh sieve consists of clay as determined by the Bouyoucus Hydrometer or by the Decantation Method. All percentages are to be based on dry weight of sample. If the Architect directs, loam that varies only slightly from the Specifications may be made acceptable by such corrections, as the Architect deems necessary

B. Existing loam

1. The Contractor shall be required to add to the loam such admixtures as may be necessary to bring it into conformance with the requirements of Paragraph 2.01 above. All admixtures shall comply with the requirements of the Contract Documents.

2. Lime shall be ground limestone, uniform in composition, dry and free flowing, containing not less than eighty-five
   (85) per cent of total carbonates. Lime shall be ground to such fineness that fifty (50) per cent will pass through a one hundred (100) mesh sieve and ninety (90) per cent will pass through a twenty (20) mesh sieve. Coarser material shall be acceptable provided specific rates of application are increased proportionately on the basis of quantities passing the one hundred- (100) mesh sieve.
3. Superphosphate shall be composed of finely ground phosphate rock, as commonly used for agricultural purposes, and shall contain not less than twenty (20) percent available phosphoric acid.
4. Commercial fertilizer shall be a complete, standard commercial fertilizer, homogenous and uniform in composition, dry and free-flowing, and shall be delivered to the site in the manufacturer's original sealed containers, each bearing the manufacturer's guaranteed analysis and marketed in compliance with State and Federal laws. Any fertilizer that becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted. Fertilizer analysis for lawn areas shall have a ratio of Nitrogen (N) – Phosphorous (P) – Potassium (K) of approximately 4 – 1 – 2 and shall be applied to deliver one (1) pound of Nitrogen per 0ne thousand (1000) square feet, or as directed by the Architect. At least fifty (50) per cent by weight of the nitrogenous elements of the fertilizer shall be Urea-form or derived from organic materials and contain not less than three (3) percent water soluble Nitrogen. Fertilizer for tree, shrub and groundcover plantings (exclusive of lawn areas) shall contain all major plant nutrients and minor trace elements essential to sustain plant growth and shall have the analysis 10 – 10 – 10. (As approved by the Architect, a slow release root contact fertilizer, installed at the time of planting, may be used in place of the above.) \
5. Water used in this work shall be furnished by the Contractor and will be suitable for irrigation and free from ingredients harmful to plant life. Hose and other watering equipment required for the work shall be furnished by the Contractor.
6. Organic Compost shall be a standard commercial product comprised of fully decomposed, one hundred (100) percent plant derived, natural organic matter and shall have an acidity range of 4.5 to 7.0 pH. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Compost shall be free of sticks, stones, weed seeds, roots, minerals, or other foreign matter and shall be delivered air dry. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, or substances harmful to plant growth.
7. Sphagnum Peat Moss shall be a standard commercial product and shall have an acidity range of 3.5 to 5.5 pH. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Sphagnum Peat Moss shall be free of sticks, stones, weed seeds, roots, minerals, or other foreign matter and shall be delivered air dry in standard bales. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, or substances harmful to plant growth. Samples and certification shall be submitted to the Architect for approval prior to installation.

8. Humus shall be one hundred (100) percent organic, natural reed or sedge peat, ground or shredded and shall have been stockpiled for at least one (1) year prior to its use. The acidity range for humus shall be 5.5 to 7.5 pH and delivered air dry. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Humus shall be low in wood content, free of hard lumps, sticks, stones, weed seeds, roots, minerals, or other foreign matter. It shall be free from excessive amounts of zinc, soluble salts, heavy metals, phytotoxic compounds, or substances harmful to plant growth. Samples and certification shall be submitted to the Architect for approval prior to installation.
9. Manure shall be well-rotted, unleached cow manure not less than eight (8) months old and not more than two (2) years old. It shall be free from sawdust, shavings or refuse of any kind and shall not contain more than twenty-five (25) percent straw. It shall contain no substance harmful to plant growth. Furnish information to the Architect as to the kind of disinfectant or chemicals, if any, that may have been used in storage of (or otherwise in connection with) the manure. A composition of peat humus or peat moss to which has been incorporated dehydrated manure, such as Bovung or Spurzon in the proportion of one hundred (100) pounds of dehydrated manure per cubic yard or peat, may be substituted for manure as specified above. Samples and certification shall be submitted to the Architect for approval prior to installation. No manure may be used until found satisfactory after sampling and testing.

2.02 MULCH

A. Mulch shall be native fibrous, pliable shredded mulch, not exceeding ½-inch in width. It shall be one hundred (100) percent organic, with a pH range between 3.5 and 4.5 and have a moisture content not to exceed forty (40) percent. It shall be free from any diseases, insects, or ingredients harmful to plant growth. Mulch shall be aged no longer than 2 years. Samples and certification shall be submitted to the Architect for approval prior to installation.

2.03 SEED

A. Seed mixture shall be an approved variety mixture, high in germinating value, composed of fresh, clean, new crop seed. Weed Seed content shall be less than 0.5 percent and include no noxious weeds. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates of compliance relative to mixture purity and germinating value. Seed shall be furnished and delivered in new, clean, sealed and properly labeled containers, and shall comply with all State and Federal laws. It may be mixed by an approved method on the site or may be mixed by the dealer. Seed that has become wet, moldy or otherwise damaged shall not be accepted.

B. Grass seed shall be composed of the following varieties that shall be mixed in the proportions and shall test to minimum percentages and germination specified:

1. Seed for slope shall be New England Native Grass Seed Mixture as produced by Applewood Seed Company, 5380 Vivian Street, Arvada, “CO 80002 (Tel 303-431-7333) or approved equivalent and shall be applied at the rate of 38 pounds per acre1.

2. Lawn Seed Mix:

Botanical Name	Common Name	By Weight	Proportion %P	% G
Festuca rubra commutate	Chewings Fescue	30%	98	70
Festuca arundinacea	Kentucky 31 Tall Fescue	30%	98	90
Poa pratensis	Kentucky Bluegrass	20%	85	80
Lolium perenne	Perennial Ryegrass	20%	98	90

3. Play Field Seed Mix

ion Botanical Name	Common Name	By Weight	Proport %P	
	%G Lolium perenne 'Palmer III'		Palmer	
III Perennial	20% Ryegrass	90	90	
Poa pratensis 'Baron'	Baron Kentucky Bluegrass		80%	90 90

Application rate for grass seed for lawns and playfields shall be six pounds (6#) per 1,000 square foot or 261#/acre, or as approved by the Architect. Seed shall be planted between April 1st and May 31st or August 16 and October 15th.

2.04 HYDROSEED MULCH, TACKIFIERS AND WATER RETENTION AGENTS

A. Wood fiber mulch for Hydroseed application shall be a manufactured product of natural wood cellulose fibers with a non- toxic green marking dye incorporated to ensure uniform distribution. Mulch shall be packed in sealed original containers, clearly labeled with brand name and manufacturer. It shall have delivered moisture content less than twelve (12) percent.

B. Hydroseed tackifier shall be a powdered starch-based product approved by the Architect. Tackifier shall be applied in conjunction with the hydroseed slurry in accordance with the manufacturer's recommendations.

C. Moisture retention agent shall be a powdered starch-based product, approved by the Architect and shall be capable of retaining up to 400 times its weight in water. Moisture retention agents shall be added to the hydroseed slurry in accordance with the manufacturer's recommendations. Moisture retention agent shall be 'Hydro-Gel', as manufactured by Finn Corporation, Fairfield, OH, or approved equal.

2.05 SLOPE EROSION PROTECTION

A. Erosion control blankets shall be composed of 100 percent biodegradable mesh with 100 percent biodegradable straw or straw/coconut fill and shall be installed parallel to the direction of water flow. Fill shall be held together by biodegradable fastening. Weight shall be 0.50 pounds per square yard. Erosion control blankets be as manufactured by North American Green, Evansville, IN or approved equal. For slope 2:1 or greater, erosion control blanket shall be composed of 70 percent straw and 30 percent coconut fiber, Model SC150. For slopes less than 2:1, erosion control blanket shall be high velocity straw matting, Model S150.

B. Six-inch wire staples shall be placed in accordance with the manufacturer's recommendations to the anchor the mesh
material. Staples shall be biodegradable.

2.06 TREES, SHRUBS AND GROUNDCOVERS

A. A. Nomenclature - Attention is called to the fact that the botanical and common names used for the plants required under this Contract are generally in conformity with the approved names given in the STANDARDIZED PLANT NAMES published by the American Joint Committee on Horticultural Nomenclature. The names of varieties not included therein are generally accepted in conformity with the names accepted in nursery trade.

B. Plants shall be true to species and variety and shall conform to the varieties specified in the Plant List. No substitutions will be permitted. Plants shall be true to the botanical names and standards, as adopted by the American Association of Nurserymen, Inc., in the American Standard for Nursery Stock, ANSI Z60.1, latest edition. All plants shall be legibly tagged with their proper botanical name. Unless specifically noted otherwise, all plants shall be typical of their species or variety, well-branched or densely foliated when in leaf, of selected specimen quality, exceptionally heavy, symmetrical tightly knit, so trained or favored in its development and appearance as to be unquestionably and outstandingly superior in form, number of branches, compactness and symmetry.

C. Plants shall conform to the measurements specified in the Plant List. Larger sized plant materials may be used if approved by the Architect. Use of such plants shall not increase the Contract Price. If larger plants are approved, the ball or each shall be increased in proportion to the size of the plant.

D. The Contractor shall supply all plants in quantities sufficient to complete the work shown on the Drawings. Any discrepancies between quantities shown on the Plant List and those required by the Drawings shall not entitle the Contractor to additional remuneration.

E. Plants shall be certified to have passed all required State and Federal inspection laws and shall be free from plant diseases and insect infestations. The Contractor shall obtain clearance from applicable governing agencies, as required by law, before planting any plants delivered from outside the State in which they are to be planted. Certificates of inspection of plant materials shall be furnished as may be required by State, Federal or other authorities to accompany shipments.

F. All plant materials shall have healthy, well-developed root systems. All parts shall be moist and show active green cambium when cut. Plants shall not be pruned prior to delivery.

G. All plants shall be nursery grown. All plants shall have been grown for at least two (2) years in climatic conditions similar to those in the locality of the project. All plants shall originate from nurseries that are no more than one (1) Hardiness Zone higher (as established by the Arnold Arboretum, Jamaica Plain, MA) than where the plant is to be installed.

H. All plants shall be balled and burlapped or container grown prior to moving as hereinafter specified.

I. Balled and burlapped plants shall be freshly dug and shall have solid unbroken ball of earth of sufficient size to encompass all fibrous feeding roots necessary to ensure successful recovery and development of the plants. No heeled- in plants or plant materials from cold storage will be accepted. Balls shall be firmly wrapped in untreated biodegradable burlap and tied securely with wire cages and/or jute twine. Rootballs of plants shall be adequately protected at all times from sun or drying winds. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during planting, or after burlap, staves, wire cage, rope, or platform in connection with transplanting have been removed. Soil characteristics (i.e., composition, texture, pH, etc.) of all field grown plants shall closely match those of on-site soils.

J. Container grown plants shall have been grown in their container long enough for the root system to have developed sufficiently to hold its soil together, firm or whole, after removal from the container. No plant shall be loose in their container. Container grown plants shall have no girdling roots and shall not be in a root-bound condition. Plants shall remain in their container until planted.

K. Trees - The height of the trees, measured from the crown of the roots to the tip of the top branch, shall be not less than the minimum size designated in the Plant List. Caliper measurements for tree trunks shall be taken at 6 inches above ground for tree up and including 4-inch caliper size and at 12 inches above ground for larger sizes. The branching height for all deciduous trees installed adjacent to or within pedestrian walkways shall be seven (7) feet minimum, having been pruned at least one (1) year prior to transplanting. Except when a clump is designated, the trunk of all trees shall be a single trunk growing from a single un-mutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks or wounds resulting from abrasions, fire, or other cause. No pruning wounds shall be present having a diameter exceeding one (1) inch, and such wounds must show vigorous bark on all edges. Evergreen trees shall be branched to within one (1) foot of the ground. No tree that has had its leader cut shall be accepted.

L. Shrubs shall meet the requirements for spread or height stated in the Plant List. The measurements for height are to be taken from the crown or root flare to the average height of the top of the shrub (not the longest branch). The fullness of each shrub shall correspond to the trade classification "No. 1". Single stemmed or thin plants will not be accepted. The side branches must be generous, well twigged, and the plant as a whole must be well bushed to the ground. Shrubs must be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.

M. Herbaceous Plants, vines and groundcovers shall be of the size, age and or condition specified in the Plant List.

N. Plants shall be delivered only after preparations for planting have been completed. Plants shall be handled and packed in a horticulturally approved manner and all necessary precautions shall be used to ensure that plants arrive on-site in a healthy vigorous condition. Trucks used to transport plants shall be equipped with covers to protect plants from windburn, desiccation and overheating during transport. Plants that have not been thoroughly watered prior to shipment shall not be accepted at the planting site. Any plants delivered to the site in a dry or wilted condition shall be immediately rejected and replace at no expense. All plants shall be protected, watered and otherwise maintained prior to, during and after delivery to the site.

O. Plants shall be subject to inspection and approval by the Architect or his representative at the place of growth, upon delivery, or both, for conformity to specification requirements regarding quality, size, variety, and condition. Inspection and selection of plants prior to digging shall be at the option of the Architect. The Contractor, or his representative, shall be present, if requested by the Architect, for inspection of plants at the nursery. The Contractor shall pay all hourly fee rates, travel and related expenses incurred by the Architect for plant inspection. The rate for travel by private automobile shall be at current IRS-approved rate for mileage reimbursement. Other travel means shall be at cost. The Architect's right of inspection and/or rejection of any plant materials shall not be impaired upon any prior approval of plant materials.

P. The Architect reserves the right to reject any plant material that, in his opinion, does not comply with these Specifications. Rejected plants shall be removed immediately from the site.

2.07 PLANTER BOX MIXTURE

A. Planting Box mixture shall consist of seven- (7) parts loam to one (1) part organic compost, humus, sphagnum peat moss or manure, thoroughly blended.

2.08 STAKING, GUYING AND WRAPPING

A. Wood stakes for supporting trees shall be of sound untreated wood of uniform size not less than two and one-half (2- 1/2) inches by two and one-half (2-1/2) inches actual dimension. No paint or stain shall be used in conjunction with tree stakes. Tying material shall be flexible nylon webbing, ¾-inch wide and have a tensile strength of 900 pounds. Webbing shall be 'ArborTie', or approved equal.

B. Guying drive anchors and guy wire assemblies shall be suitable for protecting tree and shall be sized in accordance with the manufacturer's recommendations. Turnbuckles shall be zinc-coated and shall have four and one-half (4-1/2) inch lengthwise openings and in each end five-sixteenths (5/16) inch diameter threaded openings fitted with screw eyes. Wire guys for turnbuckles shall be No. Twelve- (12) gauge (0.1055 inches) pliable, galvanized steel wire. Flags for tree guying wires shall be one-half (1/2) by three (3) by twelve (12) inches hard wood painted white. No materials shall be used for guying that will girdle, chafe, or otherwise injure trees.

C. Wrapping material for tree trunks shall be duplex Kraft paper crinkles to 33-1/3 percent stretch, 4 to 6-inch wide strips. Tying materials shall be jute twine, 2-ply for shrubs (as required) and trees less than 3-inch caliper; 3-ply for larger plants.

2.10 ANTI-TRANSPIRANT/ANTI-DESSICANT

A. Anti-transpirant (anti-desiccant) shall be 'Wilt-Pruf' as manufactured by Nursery Specialty Products, Inc., Groton Falls, NY, or approved equal. It shall be delivered in original manufacturer's containers and used in accordance with the manufacturer's instructions.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. Personnel - Seeding and planting shall be performed by personnel familiar with these operations and under the supervision of a qualified experienced foreman.

3.02 LOAM INSTALLATION

A. The Landscape Contractor shall be notified in writing by the General Contractor when other sections of the work have progressed sufficiently to commence work including placing of loam to the finished grade.

B. Preparation of Subgrade - The subsoil shall be graded and uniformly compacted so that it will be a true, smooth slope parallel and six (6) inches below the finished grade in lawn areas, twelve (12) inches in parking islands and twenty-four (24) inches in plant beds and free of all large stones and debris.

4. 1. Prior to spreading of loam, the subgrade shall be loosened and mixed to a depth of four (4) inches. All stones over two (2) inches in size, all sticks and rubbish shall be removed. No heavy objects except lawn rollers shall be moved over the lawn areas after the subgrade soil has been prepared unless the subgrade soil is again graded as specified above, before topsoil is spread.

5. 2. There must be sufficient grade stakes, as determined by the Architect, to insure correct line and grade.

C. Finish Grading - After the subgrade soil has been prepared, loam shall be spread evenly and spread to the required depths and lightly compacted. After the loam has been spread, scarifying or harrowing and hand raking shall carefully prepare it. All large stiff clods, lumps, brush, roots, stumps, litter, other foreign material and stones over one (1) inch in diameter shall be removed from the aforesaid loam and disposed of by the Contractor. The areas shall also be free of smaller stones in excessive quantities as determined by the Architect. The whole surface shall then be rolled with a hand roller weighing not more than one hundred (100) pounds per foot of width. During the rolling all depressions caused by settlement of rolling shall be filled with additional loam, and the surface shall be regraded and rolled until presenting a smooth and even finish and is up to the required grade, giving a total depth of six (6) inches of compacted loam.

1. The Contractor shall supply at his own expense as much loam as may be needed to give the specified depths over and above the quantities available from existing stockpiles.
2. Allowance for settlement shall be made.

D. Lime – Furnish and spread lime uniformly in accordance with the soils testing laboratory recommendations, or as directed by the Architect, at a maximum rate of 100 pounds per 1000 square feet per application, in necessary quantities to achieve the pH range requirements.

E. Superphosphate – Apply Superphosphate at the rate of forty (40) pounds per one thousand (1,000) square feet to the finished surface of the topsoil, in accordance with the recommendations of the soils testing laboratory or as directed by the Architect. It shall be thoroughly worked into the surface.

F. Fertilizer – Apply fertilizer in two (2) uniform applications in accordance with the soils testing laboratory recommendations or as directed by the Architect. The first application shall be applied within one (1) week prior to seeding and then harrowed into the top two- (2) inches of the loam. The second application shall be applied after the first cutting of the grass, at the rate of fifteen (15) pounds per one thousand (1,000) square feet, and shall be thoroughly watered in immediately. Fertilizer shall not be applied between June 15 and August 31.

3.03 SEEDING

A. Seeding of Lawns. Time of Seeding –After placing of loam to the finished grade, seeding operations shall be conducted when soil and weather conditions permit during the seasons that are normal for such work as determined by accepted practice in the locality of the project. At the option, and on the full responsibility, of this Contractor, seeding operations may be conducted under unseasonable conditions without additional compensation.

B. Seeding shall consist of soil preparation, seeding, raking, rolling, weeding, watering, soil stabilization and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf. Immediately before any seed is to be sown, the topsoil shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly fine texture. Seedbed preparation, including lime but excluding the Superphosphate and fertilizer, shall conform to the requirements of the lawn areas.

C. Moistening the Soil - During periods of higher than optimal temperature for species being specified and after all unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to seeding.

D. Broadcast Seeding for Lawn and Athletic Fields – Broadcast seeding, shall not begin less than 4 days after the application of lime and fertilizer. Lawn areas shall be seeded evenly with a mechanical spreader at the rate of six (6) pounds per one thousand (1,000) square feet of area, lighting raked, rolled with a two hundred (200) pound roller and watered with a fine spray. Take necessary precautions to keep the area undisturbed until the grass germinates.

E. Hydroseeding for Slopes – (2:1. Horizontal/Vertical or Steeper) The application of lime, fertilizer, grass seed and mulch may be accomplished in a single operation with the use of approved hydroseeding equipment. Hydroseeding materials shall be mixed with water and kept in an agitated state so that materials remain uniformly suspended in the water. The resulting slurry shall be of such consistency that it can be sprayed from a hydroseed gun or through at least 200 feet of 1-1/2 inch diameter hose. The spraying equipment shall be so designed that when the solution is sprayed over the area, the resulting deposit of lime, fertilizer, grass seed and mulch shall be equal to the specified quantities.

1. Prior to commencing hydroseed operations, the Contractor shall furnish the Architect in writing the weights of limestone, fertilizer, grass seed, mulch, tackifier (as required) and moisture retention agent (as required) per 100 gallons of water to be used. This statement shall also specify the area that the seeding solution will cover in square yards.
2. Seed shall be incorporated with the mulching material to obtain a minimum hydroseeded sown coverage of 261 pounds of the specified seed mix per acre, as recommended by the seed suppliers, or as directed by the Architect.

3. Wood fiber mulch shall be uniformly spread over selected seeded areas at the minimum rate of 1400 pounds per acre unless otherwise directed.
4. The Contractor shall immediately clean up all hydroseed oversprays from plant materials, pavements, furnishings, etc., to the satisfaction of the Architect.
5. Erosion control blankets shall be installed parallel to the direction of water flow. Fill shall be held together by biodegradable fastening. Six-inch wire staples shall be placed in blankets to hold them in place.

3.04 3.05 PLANTING OF TREES, SHRUBS, GROUND COVERS AND PERENNIALS

A. One (1) or more loam stockpiles of approved quality loam for shrub beds and tree pits shall be maintained at all times during the planting operations.

B. The locations for all plants and outlines for planting beds shall be staked on the ground by the Contractor and shall be approved by the Architect before any excavation is made. Adjustments in locations and outlines shall be made as directed by the Architect. In the event that pits or areas to plant are prepared and backfilled with loam to grade prior to commencement of lawn operations, they shall be so marked that when the work of planting proceeds, they can readily be located. In case underground obstructions, such as ledge, are encountered locations shall be changed under the direction of the Architect without extra charge. Where locations cannot be changed, the obstruction shall be removed, subject to the Architect's approval, to a depth not less than 3 feet below finished grade and lot less than 6-inches below the bottom of the rootball when the plant is set at proper grade.

C. Planting Season
1. Planting season for evergreen trees and shrubs shall extend from the time the soils becomes workable in the spring, until new growth appears, and from September 15 until November 30 in the fall.
2. Deciduous trees and shrubs may be planted only when dormant, either prior to bud break and/or before leaves appear in the spring, or subsequent to their leaf drop in the fall.
3. Groundcovers and herbaceous materials shall be planted only after the last frost in the spring through mid-May.
4. Planting seasons may be extended if weather and soil conditions permit only with the written approval of the Architect. Extended or out of season planting requirements shall include application of anti-transpirant and extra water as needed.
5. No planting shall be done in frozen ground except with special permission.

D. Planting
1. All plant roots and earth balls must be kept damp and thoroughly protected from sun or drying winds at all times from the beginning of the digging operations, during transportation and on the ground until the final operation of planting.
2. All planting holes shall be excavated with sloped walls, wider at the top than at the bottom, and scarified to eliminate glazing. Holes for trees shall be at least two (2) feet greater in diameter than the spread of the root system. Holes for shrubs shall be at least one (1) foot greater than the diameter of the rootball. Planting holes shall not be dug deeper than the height of the rootball.

3. When excavation occurs in areas of heavily compacted earth, stones, concrete chunks or other foreign matter, planting holes shall be dug at least three (3) times the diameter of the rootball. Excavated material from planting holes shall be disposed of as directed by the Architect.
4. Container plants shall be removed from their growing container before planting. If roots are densely matted, the outer root mass shall be scored, sliced vertically, with a sharp knife to separate roots. All herbaceous plants and groundcovers shall be evenly spaced to produce a uniform effect and staggered in rows at intervals designated in the Drawings.
5. Shrubs and trees shall be placed in the center of planting holes, set plumb and straight and at such a level that after settlement the crown of the roots will be 1" above the surrounding finished grade. Rootball masses shall not be loosened broken or damaged. When balled and burlapped plants are set, planting mixture shall be compacted around the bases of rootballs to fill all voids. All tying materials twine and rope shall be cut and removed. Biodegradable burlap shall be laid back or cut away from the top half of the rootball. If a wire basket is present, the upper 2/3 of the basket shall be cut away and removed. Do not remove the entire basket. Roots of bare root plants shall be properly spread out and planting mixture carefully worked in among them. Broken or frayed roots shall be cleanly cut.
6. Backfill planting holes with planting mixture in layers of not more than 9 inches and firmly tamp each layer and water to sufficiently settle the backfill soil before the nest layer is put in place. When the planting hole is 2/3 backfilled, the hole shall be flooded and watered thoroughly so that the water level reaches the top of the planting hole. Allow water to soak in, and then complete the backfilling operation. Immediately after the planting hole is backfilled, a shallow basin 6 inches deep and slightly larger than the hole shall be formed with a ridge of soil for water retention. Form a common basin for plant materials throughout mass planting beds. After planting, lightly till the soil in the planting beds between the plant holes and rake smooth to eliminate compaction of soils.
7. All planting hole basins shall be flooded with water twice within the first twenty-four (24) hours
8. Planting and watered not less than twice per week thereafter until the final acceptance of the work.

E. Wrapping – The trunks of all thin barked deciduous trees shall be wrapped after they are planted and before they are staked. Wrap all trees spirally with tree wrap from bottom to top to the height of the second branch (or to the height directed) and secure at the top and bottom at 2-foot intervals with jute twine. Remove and dispose of all tree trunk wrapping at the end of one (1) growing season.

F. Staking and Guying –All trees shall be staked immediately after planting in accordance with the Drawings. All staking apparatus shall be adequate to hold the tree in a vertical condition under severe weather conditions. Remove and dispose of all staking apparatus at the end of one (1)-growing season.

G. Mulching – Provide a three (3) inch minimum layer of shredded bark mulch over the entire area of each shrub and/or tree bed. Do not cover the root flare/crown of trees and/or shrubs.

H. Pruning – The pruning of trees and shrubs shall be only be permitted to remove dead or dying branch limbs, sucker growth, water sprouts, crossing or rubbing branches, broken or damaged branches, diseased or insect infested limbs, and/or to preserve the natural character of the plant. Plant materials shall be pruned in accordance with American Nursery and Landscape Association Standards and as directed by the Architect. Questionable weak limbs and branch removals that may disfigure the plant shall be left to the Architect's discretion. Pruning shall be done with clean sharp tools. All pruning cuts that are ½-inch diameter or larger shall be made along the branch bark ridge. Pruning cuts shall not breach or otherwise interfere with the branch collar. All pruning cuts less than ½-inch diameter shall be made with hand pruners as close to the main stem as possible without damaging the cambium or bud. Tree paint shall not be used.

3.05 MAINTENANCE AND REPLACEMENT

A. Maintenance shall begin immediately after each portion of lawn area and each plant is planted and shall continue in accordance with the following requirements:

B. Lawns – The Contractor shall be held responsible for maintenance of lawns, including watering, weeding, and cutting for at least sixty (60) days after seeding and as much longer as is necessary to establish a uniform stand of the specified grasses and until Certification of Acceptability. No bare spots will be allowed. After the grass has been seeded, all areas and parts of areas which fail to show a uniform stand of grass, for any reason whatsoever, shall be re-seeded repeatedly until all areas are covered with a satisfactory growth of grass. At the time of cutting, keep mower blades not less than two and one-half (2-1/2) inches high. Mowing intervals shall be spaced so that not more than one
(1) inch of leaf blade is removed at any one time. The maintenance period shall continue after seeding and until the lawns are certified acceptable by the Architect, which certification shall not be earlier than the date of substantial completion of the entire work of this Contract or as otherwise indicated on the Drawings and as specified herein.

C. New plantings shall be protected and maintained until the end of the lawn maintenance period, or if installed after the lawn maintenance period, until installation of plantings are certified acceptable by the Architect. Maintenance shall include watering, mulching, replacement of diseased, dead or dying plants, resetting plants to proper grades or upright position, and restoration of the planting saucer and all other care needed for proper growth of the plants. If planting is done after lawn preparation, proper protection to lawn areas shall be provided and any damage resulting from planting operations repaired promptly.

D. Pesticides – No fungicides, insecticides, or herbicides shall be used on-site without the Contractor notifying the Architect in writing and obtaining his prior approval. If approved by the Architect, pesticide use shall be governed by EPA regulations. All pesticides shall be EPA registered and approved for use in public open spaces and shall be handled by State licensed applicators only, delivered in their original sealed manufacturer's containers and used in accordance with the manufacturer's instructions. The law requires that parents and staff be notified in writing of all outdoor pesticide applications.

E. Protection - Planting areas and plants shall be protected against trespassing and damage of any kind. If any plants become damaged or injuries occur, they shall be treated or replaced as directed. No work shall be done within or over the planting areas or adjacent to plants without proper safeguards and protection.

F. Damage resulting from erosion, gullies, washouts or other causes shall be repaired by filling with topsoil, tamping, re- fertilizing and seeding by this Subcontractor at his expense if such damage occurs prior to Certification of Acceptability of lawns and planting by the Architect.

G. The Contractor's responsibility for maintenance shall cease at the time of Certification of Acceptability by the Architect. During the guarantee period the Contractor shall be held responsible for making replacements, but no maintenance will be required other than spraying and dusting.

H. At the end of the guarantee period, inspection will be made by the Architect after receiving written notice by the Contractor requesting such inspection at least ten (10) days before the anticipated date. Any plant required under this Contract that is dead or not in satisfactory growth, as determined by the Architect, shall be removed from the site. These and any plants missing due to the Contractor's negligence shall be replaced as soon as conditions permit during the normal planting season. In case of any question regarding the condition and satisfactory establishment of a rejected plant, the Architect may elect to allow such a plant to remain through another complete growing season at which time the rejected plant, if found to be dead, in an unhealthy or badly impaired condition, shall be replaced. All replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified under LAWNS AND PLANTING. The cost shall be borne by the Contractor.

3.06 DISPOSAL AND CLEAN UP

A. All waste and debris caused by the Work of this Section shall be removed and disposed daily by the General Contractor in accordance with requirements of Section 01 50 00 - Temporary Facilities and Controls and Section 01 74 19 - Construction Waste Management and Disposal.

END OF SECTION

SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

A. Section includes, without limitation, providing:
   1. The contractor shall furnish all labor, materials, tools, and equipment necessary to perform all operations in connection with excavating bedding, placing and backfilling drainage structures and piping.
   2. As part of his work the Contractor shall verify the inverts of existing drainage and verify all proposed pipe slopes and inverts at crossings with existing utilities subsequent to ordering or installing any proposed drainage.
   3. The work includes the excavation, grading, and installation of the infiltration field complete with crushed stone, infiltration units, cross connectors and inspection ports at detailed in the drawings.
   4. The work includes the outlet control structure and flared end structures and rock lined outlet protection as detailed in the drawings.
   5. The work includes the installation of a Stormceptor 450ci unit as detailed and noted in the drawings.

B. Extent:
   1. As noted on the drawings and specified.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:
   1. Section 31 10 00 - Site Clearing
   2. Section 31 20 00 - Earth Moving
   3. Section 31 21 00 - Site Preparation
   4. Section 31 21 01 - Site Utilities Preparation

1.04 REFERENCES

A. Applicable sections of the City of Worcester Permit Manual, latest edition.

B. City of Worcester Department of Public Works & Parks, Standard Specifications & Details, latest addition.

C. City of Worcester Standards and Drain Layer Requirements.

D. City of Worcester Conservation Commission Order of Conditions # CC-2024-016.

E. Material and construction methods not covered by City of Worcester Requirements shall conform insofar as applicable, to the requirements of the Commonwealth of Massachusetts Department of Transportation (MassDOT), Standard Specifications for Highways and Bridges Latest Edition which is hereinafter referred to as the MassDOT Standard Specifications.

F. MDEP Stormwater Regulations and water quality regulations.

G. ASTM American Society of Testing Materials – Various standards for drainage pipe, fittings connection points, drain manholes, catch basins, drainage control structures, frames and covers or grates, brick, mortars, grouts.

H. NPCA National Precast Concrete Association

I. ANSI American National Standards Institute

1.05 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Precast Concrete Drainage Structures – Shea Concrete Products, Phoenix Precast, Scituate Concrete Products or approved equal.
2. Joint Sealant for drainage structure sections- EZ-Stik butyl rubber by Press-Seal Corporation, Butyl-Rubber Joint Sealants by Locke Solution, Con-N-Seal Concrete Sealants Inc. CS-101 Butyl Rubber Sealant
3. (HDPE) High Density Polyethylene drainpipe in the parking area shall be manufactured by ADS dual wall N-12 pipe or equal. All connections shall be watertight.
4. (HDPE) High Density Polyethylene drainpipe used for the outfall shall be manufactured by ADS single wall heavy duty pipe or equal. All connections shall be watertight.
5. The flared end for the outlet pipe shall be HDPE as manufactured by ADS, designed with a clamping system made to connect to corrugated HDPE pipe.
6. PVC pipe connections to catch basins shall be SDR-18 as manufactured by JM Eagle “Blue Brute” or equal. All connections shall be watertight.
7. PVC SDR-35 drainpipe shall be manufactured by JM Eagle or approved equal. All connections shall be watertight.
8. The (WQI) Water Quality Inlet shall be manufactured by Contech Stormceptor model 450ci designed for in-line operation. Any substitutions proposed to the WQI specified shall meet or exceed the TSS removal rate approved by the Conservation Commission for the project.
9. The infiltration field shall be assembled using CULTEC Recharger 280HD stormwater chamber units and end units in the configuration and spacing as detailed in the drawings.

10. Cross connectors shall be CULTEC HVLV FC-24 feed connectors spaced as noted on the drawings. Cross connectors shall be installed over a continuous roll of woven geotextile fabric meeting CULTEC No. 4800 woven geotextile fabric as noted on the drawings.
11. Crushed Stone for the infiltration field bedding, sides, end walls, and cover shall be double washed crushed rock meeting MassDOT M2.01.0 Crushed Stone and graded in according to M2.01.1.
12. Inspection ports shall be CULTEC 12" Universal Inline Drain kits with frame and solid cover (only). The inspection ports shall be cut into the top of the 280 HD units as per the manufacturer's recommendations, set up and spaced as detailed in the drawings.
13. Filter fabric used for separation of crushed stone shall be non-woven geotextile fabric composed of polypropylene fibers, formed into a stable fabric. Fabric shall meet AASHTO M288-15 Class 3 for elongation. Fabric shall be manufactured by CULTEC No. 410, Mirafi 140 N or equal.
14. Filter fabric used under the cross connectors shall be non-woven geotextile fabric composed of polypropylene fibers, formed into a stable fabric. CULTECH 4800 or equal.
15. Drain Manhole frames and covers shall be per City of Worcester Standard.
16. EJ Co. EJIW 1056Z/1056A or LeBaron LC239/L23C-1 or equal. Frames and Covers shall be by the same manufacturer.
17. Catch basin frames and grates shall be per City of Worcester Standard, Frames and Grates shall be by the same manufacturer.
18. Frames shall be EJ Co. EJIW 7288Z1-3 flange or Lebaron LF288 or Equal. Catch Basin Grates shall be EJIW 7288M or LeBaron L28SG1 or equal.
19. Geotextile Fabrics – Erosion Control Products, Hanes Geo Components, Dewitt Landscape fabrics, or approved equal.
20. Catch Basin Green Traps shall be manufactured by Tolman Manufacturing to meet the City of Worcester Standard Specifications.
21. Bricks and cement mortars- meet City of Worcester standard specifications for mortar and clay brick, cement brick shall not be used.

2.02 SUBMITTALS

A. Provide complete catalog cuts, shop drawings and/or samples for all items called for in the above section of this Specifications or on the Drawings in accordance with the applicable requirements of Division 1.

B. Shop drawings for the items listed above shall be submitted for approval. The Engineer, however, reserves the right to require submission of shop drawings on any other equipment not specifically listed herein.

2.03 QUALITY OF MATERIALS DELIVERED AND STORED ON SITE

A. All materials shall be new and shall be procured by the contractor for this project.

B. Materials shall be shipped directly to the site or stored by the contractor until they are ready for use. In either event all materials delivered to the site will be inspected and approved at that time only.

C. Materials shall be in complete form and be free of defects including cracks, chips, fractures, and deformations.

D. The contractor shall have all equipment needed to off load and move pre-cast concrete manhole, catch basin and other precast sections, piping, castings, bricks, mortar materials, and infiltration system products without damage to the material.

E. All materials shall be clean and free of salt and organics. Clay bricks shall be new only. All water used for mixing shall be potable and clear. Sand for mortar shall be clean washed sand.

F. All masonry materials shall be covered with plastic or tarps. Bricks shall be placed/stored on pallets to avoid ground contact. Sand shall be placed on plastic tarps to avoid ground contact.

PART 3 - EXECUTION

3.01 EASEMENTS AND RIGHT OF WAY

A. The contractor shall be familiar with the limits-of-work, easements, and Right-of-Way noted on the contract plans. All work shall be performed inside the construction limits-of-work, easements, and Right-of-Way noted.

B. Any additional lay-down areas procured by the contractor shall be the sole responsibility of the contractor. The City of Worcester will not be responsible for obtaining any additional work areas for the contractor.

3.02 PERSONNEL REQUIREMENTS AND SAFETY

A. All drainage work shall be done using safe methods meeting all OSHA and state safety requirements. All the contractor’s employees and subcontractors shall be properly equipped with the appropriate safety equipment and apparel.

B. The contractor shall employ individuals who are certified in the City of Worcester to lay storm drainpipe and are experienced with utility construction in trenches.

C. Invert construction in manholes and the placement and adjusting of casting on structures shall be performed by workers that are proficient and experienced in masonry work of this type.

3.03 DRAINAGE SYSTEM INSTALLATION

A. Drainage work shall be done beginning at the connection or lowest invert connection point on-site and proceed to the highest point on-site.

B. The existing storm drains within the project site shall be maintained by the contractor throughout the project.

C. Trenching, backfilling, and dewatering operations shall be done in accordance with Section 31-20-00 Earth Moving, dewatering shall be in accordance with Section 31 21 01 Site Utilities Preparation.

D. All storm drains shall be set to an even and continuous slope from pipe section to pipe section and structure to structure as noted on the contract drawings. The contractor shall provide surveying equipment or pipe laying laser equipment to establish grades and inverts.

E. Storm drains shall be temporarily supported or placed on crushed stone during installation until bedding material is placed and compacted. Pipes shall be continuously supported over the length of each pipe section. All pipe sections shall be chinked under the pipe to insure complete bedding of the pipe invert.

F. Drainage Structure base sections shall be set level on a full bed of crushed stone as noted on the contract drawings. Openings for storm drain shall be set at the correct angle and elevation to establish the pipe inverts as shown on the contract plans. Riser and cone sections shall be set plumb with the manhole steps properly aligned to form a straight vertical alignment. All drain manhole sections shall have sealant placed completely around the circumference before the sections are together. Lifting holes shall be plugged with non-shrink grout or mortar.

G. Mortar meeting the type and mixture specified shall be used to connect pipes to structures. All mortar joints shall be packed firmly to produce a continuous smooth solid collar of mortar around each pipe connection.

H. Drain manhole inverts shall be constructed from the base of the invert following the shape of the pipes. All brick joints shall be completely packed with mortar. The invert shelves shall brick and be pitched toward the invert at a minimum of ¼" per foot. Material used to fill the void below the shelves shall be masonry materials only, broken brick and mortar or concrete.

I. Manhole frames and covers and catch basin frames and grates shall be set to the proposed finished grade. Frames shall be set on mortared rows of brick as per the drawings and City of Worcester Standards. The bricks shall be set on a full mortar bed and all the joints between the bricks shall be filled. The outside of the completed frame installation shall be coated with ¾" of mortar or set in a concrete collar of 3000 psi cement concrete.

J. Catch basin green traps shall be installed on all catch basin outlets. The green trap collars shall be mortared into place per City of Worcester Standards.

K. The contractor shall dig the test pits for the infiltration field prior to installation to confirm that the depth to top of the rock line is adequate to install the infiltration units with a minimum of 2 feet below the bottom of the crushed stone bedding.

L. The subbase of the infiltration field shall be smooth and graded and compacted level in both directions to the elevations noted on the drawings.

M. Placed filter fabric over the compacted subbase extending the fabric up the sides of the excavation and overlapping the fabric rows a minimum of 6 inches.

N. Placed a layer of the specified crushed stone compacted to the thickness as noted on the drawings and level to the bottom elevation of the infiltrators.

O. The infiltrators shall be installed per the manufacturer's recommendations. Ensure the installation of the various components follows a normal sequence. The CULTEC 4800 geotextile fabric shall be installed under the feed connectors in a single row.

P. All cuts made into the chambers for inspection ports feed connectors and pipes shall be done with care with the openings fitting snug to the pipe or connector leaving no gaps wider than the manufacturer recommends.

Q. The completed infiltration field assembly shall be inspected before back filling the installation with crushed stone. Once inspected and approved, the infiltration field can be backfilled with

crushed stone to the level noted on the drawings, installing the stone evenly row to row in accordance with the manufacturer's instructions and recommendations to ensure that the chamber rows do not shift or become deformed while being backfilled.

R. Once the crushed stone has been installed to the top elevation noted on the drawings, wrap the top of the field in filter fabric and complete back filling and compacting in 12-inch layers with suitable and approved material from the excavation or gravel borrow.

3.04 RUBBISH REMOVAL

A. The General Contractor shall remove and dispose daily of all waste and debris in accordance with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.

END OF SECTION

SECTION 33 70 00

ELECTRICAL UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, Supplementary Conditions, and all Sections of Division 01 - General Requirements, apply to the Work of this Section.

B. Sustainable Design Intent: The Work of this Contract and Section shall include compliance with all requirements to achieve a minimum of 170 points in accordance with NE-CHPS version 3.2 Criteria. Work shall include, but not be limited to, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation as described in, and in accordance with requirements of Section 01 33 15 – NE-CHPSv3.2 Requirements, Section 01 81 15 – Sustainable Materials Requirements, and the Contract Documents.

1.02 DESCRITPTION OF WORK

A. Section includes, without limitation, providing:

1. Electric lighting trenches and backfill for proposed lighting conduits, handholes, and light pole bases. Removing and disposing of existing light pole foundations, installing new light pole foundations. Including trench excavation, backfill, and marking tape for all conduits installed.

2. All installed in accordance electrical service provider and all applicable National Electric Codes (NEC) and as noted on the drawings.

B. Coordinate inspections with the electric inspector and owner’s representative and obtain approvals.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related sections, without limitation, include:

1. Section 31 10 00 - Site Clearing
2. Section 31 20 00 – Earth Moving
3. Section 31 21 00 - Site Preparation
4. Section 31 21 01 – Site Utilities Preparation
5. Section 32 10 03 - Hot Mixed Asphalt Paving
6. Section 33 40 00 – Storm Drainage Utilities

1.04 SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures, Section 01 33 15 - NE-CHPSv3.2 Requirements, and in accordance with requirements of the Contract Documents.

B. Submit samples of sand used for conduit backfill per Section 31 20 00 Earth Moving specification

C. Submit warning tape sample per Section 31 20 00 Earth Moving specification.

PART 2 - PRODUCTS

2.01 ELECTRICAL CONDUIT AND LIGHTING MATERIALS

A. Refer to Section 26 00 00 Electrical Specifications for all lighting system related materials.

PART 3 - EXECUTION

3.01 CONTRACTOR'S COORDINATION

A. The contractor shall coordinate with the electrical contractor and electric inspector before the installation of the lighting conduits. The contractor will pre-mark the proposed locations of the light poles, handholes and conduits. For review by the owner's representative. The contractor shall also coordinate all inspections needed throughout the process of the installation of the underground electrical system.

B. The contractor shall excavate and prepare the trenches to meet NEC trench depth requirement with the bottom compacted and smooth. The conduit trench shall be wide enough to accommodate the electrical duct based on the electrical drawings.

C. Install light pole bases as noted and detailed on the drawings.

D. Conduits, pull boxes, light poles and luminaires shall be installed by the electrical contractor.

E. Backfill completed and inspected lighting conduits with sand. All conduit trench backfill shall be compacted to 95% proctor.

F. Warning tape shall be used over the conduit set at 12" below grade.

G. The remaining trench shall be back filled with suitable excavated material or gravel borrow per the Earth Moving Specifications.

END OF SECTION