Part 1 - General

1.1 Related Documents

A. All of the Contract Documents including General Conditions, and Division 01 General Requirements apply to work of this section.

B. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 Description of Work

A. Extent of earthwork as indicated on the Contract Drawings and as specified herein.

B. Furnish labor, materials, equipment, transportation and services required to complete all earthwork requirements as specified herein or indicated on the Contract Drawings. The work includes, but is not limited to the following:

   1. Clearing and removing existing surface improvements within the footprint of the landfill cap, structures, roadways, and other site improvements, except improvements indicated to be preserved and protected.

   2. Providing, placing, and compacting all fill materials required to complete the project.

   3. Preparing and grading subgrades for placement of geosynthetic clay liner.

   4. Temporary protection of adjacent public and private property.

   5. Legal off-site disposal of unsuitable or surplus excavated materials including fill and natural outwash soil deposit and material resulting from on-site culling and screening operations.

   6. Rough Grading.

   7. Segregating, culling and all screening operations, stockpiling and handling of on-site material required to render the material suitable for reuse on-site as indicated.

   8. Preparation and submittal of a Health and Safety Plan prior to initiating earthwork related activities.

1.3 Related Work Specified Elsewhere
A. Related sections:

1. Section 31 1000, SITE CLEARING
2. Section 31 2500, EROSION AND SEDIMENT CONTROL
3. Section 32 9000, LOAM AND SEEDING

1.4 STANDARDS AND DEFINITIONS

A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:

1. MDPW Specifications: The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, including latest revisions.


4. AASHTO: American Association of State Highway and Transportation Officials.

5. MCP: Massachusetts Contingency Plan, 310 CMR 40.0000

6. Trench Excavation: Excavations 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.

7. Open Excavation: All excavations not conforming to the definition of Trench Excavation shall be defined as Open Excavation.

8. Invert or Invert Elevation: The elevation at the inside bottom surface of the pipe or channel.


10. Un-Regulated Soil: Excavated material consisting of natural subsoil, or natural glacial outwash which is completely segregated from existing fill material, and is not impacted by contaminants which may be disposed of off-site without restriction.

11. Regulated Soil: Excavated material consisting of existing fill material which, if transported off-site, must be disposed of at a landfill or similar facility.

12. The words "finished grade" as used herein shall mean the required final grade elevations indicated on the Contract Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the building shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
13. The word "subgrade" as used herein, means the required surface of natural glacial outwash deposit, or compacted Structural Fill. This surface is immediately beneath the site improvements, specially dimensioned fill, paving, loaming or other surfacing material.

1.5 EXAMINATION OF SITE CONDITIONS AND DOCUMENTS

A. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, 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 except as otherwise provided herein.

1.6 SUBSURFACE CONDITIONS

A. It is the CONTRACTOR's sole responsibility to make interpretations and draw conclusions with respect to the character of the materials to be encountered and their impact upon his work based on his expert knowledge.

1.7 PERMITS, CODES AND SAFETY REQUIREMENTS

A. Work shall conform to the Contract Drawings and Specifications and shall comply with applicable codes and regulations. Present in writing to the ENGINEER, all conflicts between the Contract Drawings, Specifications, and applicable codes and regulations, for resolution before commencing the Work.

B. Comply with all rules, regulations, laws and ordinances of the Town of Concord and the Commonwealth of Massachusetts, and of all other authorities having jurisdiction. All labor, materials, equipment and services necessary to make the work comply with such requirements, shall be provided without additional cost to the OWNER.

C. The CONTRACTOR shall not close any street, sidewalk or passageway except as indicated on the Contract Drawings. The CONTRACTOR shall so conduct his operations as to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks or other facilities near enough to the work to be affected thereby.

D. The CONTRACTOR shall procure and pay for all permits and licenses required for the complete work specified herein and shown on the Contract Drawings at no additional cost to the OWNER. Arrange and pay for legal off-site disposal of all waste materials.

E. Notify "Dig Safe" and the OWNER before starting work; comply fully with utility company requirements.

1.8 LAYOUT AND GRADES

A. The CONTRACTOR shall maintain and/or re-establish benchmarks and survey monuments shown on the Contract Drawings or found to exist on the site to provide a base reference for the construction. Replace any that may become destroyed or disturbed. The CONTRACTOR shall employ and pay all costs for a registered Civil Engineer or Surveyor who is licensed within the jurisdiction of the project site to lay out
all lines and grades in accordance with the Contract Drawings and Specifications, and as necessary or required for the construction.

1.9 DISPOSITION OF EXISTING UTILITIES

A. Active utilities existing on the site shall be carefully protected from damage and relocated or removed by others as specified in the Contract Documents. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record Contract Drawings and both the ENGINEER and Utility Owner notified in writing.

B. Inactive or abandoned utilities encountered during construction operations shall be left in place. The location of such utilities shall be noted on the record Contract Drawings and reported in writing to the ENGINEER.

1.10 DISPOSAL

A. The CONTRACTOR shall re-use specific topsoil excavated on-site as indicated herein. Solid waste consisting of brick, concrete, asphalt, cobbles, and boulders that measure less than 1 cubic yard in volume, shall become the property of the CONTRACTOR and be legally disposed of off-site at no additional cost to the OWNER.

B. Solid waste resulting from site clearing, preparation, screening or culling operations shall become the property of the CONTRACTOR and be legally disposed of off-site at no additional cost to the OWNER.

1.11 MEASUREMENT AND PAYMENT

A. The base bid lump sum price shall include all costs of whatever nature associated with the content of this specification section and earthwork shown on the Contract Drawings including, but not limited to: demolition and removal of existing abandoned utilities and associated structures and appurtenances as indicated on the Contract Drawings, excavation for site drainage, segregating and all screening operations, stockpiling, handling and re-use of excavated materials, earthwork for site improvements, off-site disposal of all solid waste, placement and compaction of the specified fill materials in accordance with procedures documented herein, loading of all materials to be disposed of off-site and trucking and disposal of all soil and solid waste.

B. The Contractor shall include in his lump sum price all costs associated with segregating, culling and screening operations required for rendering the on-site fill material suitable for reuse on this project as Ordinary or Structural Fill material as defined herein.

C. If any part of the excavation is carried through error beyond the depth directed by the ENGINEER and the dimensions indicated on the Contract Drawings, or called for in the Specifications, the Contractor, at his own expense, shall manage, test, and dispose of excess soils that are unsuitable for use in the final soil cap. CONTRACTOR shall then furnish and install compacted Gravel Borrow as directed by the ENGINEER up to the required level and/or dimensions.
D. Compensation for all work required under this Section and not specifically covered elsewhere, shall be included in the Contract Lump Sum Price.

1.12 FIELD QUALITY CONTROL

A. The ENGINEER shall monitor preparation of subgrades, and placement of cover materials.

B. The CONTRACTOR shall allow the Soils Engineer sufficient time to make the necessary observations and if necessary, compaction tests.

C. The Engineer's presence does not include supervision or direction of the actual work by the CONTRACTOR, his employees or agents. Neither the presence of the ENGINEER 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.

1.13 SUBMITTALS

A. Submit, as specified in Division 01, GENERAL REQUIREMENTS, the following, and as specified in this Section.

1. A detailed construction sequence plan for project excavation indicating temporary stockpile areas, side slopes of excavations, and sequence and procedures for subgrade protection, excavation, moisture conditioning of on-site excavated soils used as fill, filling, backfill and compaction.

2. No backfill materials shall be brought to the site without prior approval of the OWNER. Submit the following information to the OWNER for review at least two (2) weeks prior to use:
   a. Location of the borrow site, including a street map with the limits of the borrow pit property and the location of the borrow source on the site clearly illustrated.
   b. Present and past usage of the source site and material.
   c. Any previously existing report(s) associated with an assessment of the source site as relates to the presence of oil or other hazardous materials.

3. Manufacturer's product data for specified geosynthetic materials to be used in the Work and their intended function.

4. Results of the sampling and monitoring program as specified herein for the manufactured topsoils.

5. Rock Excavation Report:
   a. Certification of rock quantities excavated.
   b. Excavation method.
   c. Labor.
   d. Equipment.
6. Soil samples.
   a. A sample of each soil material proposed to be imported for use as backfill cover.
   b. Classification in accordance with ASTM D2487 for each on-site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
   c. Laboratory compaction curve in accordance with ASTM D698 for each on site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
   d. Test reports for compliance with ASTM D2940 requirements for subbase material.
   e. The CONTRACTOR shall submit a scale plan daily that defines the location, limits, and depths of the area excavated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. 1 ½-inch Crushed Stone: Shall consist of inert angular material derived from a stone quarry that is hard, durable, washed stone, free of deleterious materials. Gradation shall conform to MHD Specification Designation, M2.01.1, and the following:

<table>
<thead>
<tr>
<th>U.S. Sieve No.</th>
<th>Percent Passing by Weight</th>
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<tbody>
<tr>
<td>2&quot;</td>
<td>100</td>
</tr>
<tr>
<td>1 ½&quot;</td>
<td>95-100</td>
</tr>
<tr>
<td>1&quot;</td>
<td>35-70</td>
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<tr>
<td>¾&quot;</td>
<td>0-25</td>
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</tbody>
</table>

B. Gravel Borrow: Suitable off-site gravel, sandy gravel, or gravelly sand, obtained from a natural, bank-run source, free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material conforming to MHD specification M1.03.0 (Type B) and the following limits:

<table>
<thead>
<tr>
<th>U.S. Sieve No.</th>
<th>Percent Passing By Weight</th>
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<tbody>
<tr>
<td>3&quot;</td>
<td>100</td>
</tr>
<tr>
<td>½&quot;</td>
<td>50-85</td>
</tr>
<tr>
<td>#4</td>
<td>40-75</td>
</tr>
<tr>
<td>#50</td>
<td>8-28</td>
</tr>
<tr>
<td>#200</td>
<td>0-8</td>
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C. Ordinary Fill: Well-graded, natural inorganic soil approved by the ENGINEER and meeting the following requirements:
1. It shall be substantially free of organic or other weak or compressible materials, of frozen materials, and of particles larger than 4 inches maximum dimension.

2. It shall be of such nature and character that it can be compacted to the specified density 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 non-soil materials.

4. The CONTRACTOR shall take precautions to maintain suitability of on-site fill and natural soil materials, particularly in regard to moisture maintenance and freezing prevention. Costs associated with screening, additional material handling, and protection of stockpiled on-site fill and glacial outwash from freezing or wet environments shall be included in the lump sum price.

D. 1 ½-inch Washed Gravel: Shall consist of inert rounded material derived from a stone quarry that is hard, durable, double-washed stone, free of deleterious materials, and conforming to the following, or approved equal:

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<td>35-70</td>
</tr>
<tr>
<td>¾”</td>
<td>0-25</td>
</tr>
</tbody>
</table>

1. 1 ½-inch Washed Gravel intended for use in conjunction with the installation of the geosynthetic clay liner, as shown on the Contract Drawings, shall be clean or double washed crushed stone in accordance with 310 CMR 15.247. Angular crushed stone will not be allowed as a substitution.

E. Filter Fabric: Shall consist of Mirafi 140N non-woven filter fabric, or approved equal.


F. Drainage Pipe: Shall consist of 6-inch diameter perforated PVC SCH 40 pipe, or approved equal.

2.2 UNSUITABLE MATERIAL

A. Material containing organic matter, frozen materials, debris, materials subject to decomposition, silts too wet to be stabilized and existing fill, and solid waste debris that in the opinion of the ENGINEER, do not satisfy the design requirements, shall be unsuitable material.

B. Unsuitable material shall be removed and disposed of off-site by the CONTRACTOR at no additional cost to the Owner.
2.3 EQUIPMENT

A. Provide sufficient equipment units of suitable types to spread, level, and compact fills promptly upon delivery of materials.

B. The ENGINEER retains the right to disapprove equipment, which, in his opinion, is of inadequate capacity or unsuited to the character of material being compacted.

2.4 SOURCE QUALITY CONTROL

A. Fill materials shall be subject to quality control testing. Test results and laboratory recommendations will be available to the CONTRACTOR.

B. Provide samples of each fill material from the proposed source of supply including on-site sources. Allow at least two (2) weeks for testing and evaluation of results before material is needed.

C. All fill material that is imported onto the site shall be substantially free of contamination. The concentrations of contaminants in imported fill material shall not exceed one-half of the Massachusetts Department of Environmental Protection’s RCS-1 reporting thresholds.

D. The CONTRACTOR shall perform chemical analysis on the actual soil proposed for use as cover material. One sample for each 500 cubic yards shall be analyzed at a Massachusetts certified laboratory for Extractable Petroleum Hydrocarbons (EPH), Volatile Petroleum Hydrocarbons (VPH), Volatile Organic Compounds (VOC’s) by 8260, Polynuclear Aromatic Hydrocarbons (PAH’s) by 8270, Total RCRA-8 Metals, Pesticides/Herbicides, Polychlorinated Biphenyls (PCB’s), and pH.  

E. Samples of proposed fill material exhibiting concentrations of contaminants in excess of the limits discussed above will be rejected for use on the site by the ENGINEER.

F. ENGINEER will be sole and final judge of suitability of all materials.

G. Materials in question may not be used, pending test results. CONTRACTOR to remove rejected materials and replace with new, whether in stockpiles or in place.

PART 3 - EXECUTION

3.1 GENERAL EXCAVATION

A. All excavation shall be performed in the dry. Excavation shall be accomplished by methods that preserve the undisturbed state of subgrade soils.

B. When excavations have reached the prescribed depths, the ENGINEER shall be notified and will make an inspection of the conditions. After inspection, the CONTRACTOR will receive approval to proceed if conditions meet design requirements.

C. Should an excavation be carried beyond the depth indicated on the Contract Drawings or as specified herein as a result of CONTRACTOR’s error, the CONTRACTOR shall
provide and place Gravel Borrow or lean concrete, as directed by the ENGINEER, to the required level at no additional cost.

3.2 PLACEMENT OF FILL

A. Provide all specified fill materials.

B. Areas to be filled shall be undisturbed stable soil and shall be free of trash, construction debris, compressible or decayable materials and standing water. Do not place fill when subgrade or layers below it are unsuitable.

C. Notify the ENGINEER when excavations are ready for inspection. Filling shall not be started until conditions have been approved by the ENGINEER.

D. Furnish approved materials. Place fill in layers not exceeding 6 inches in compacted thickness and compact as specified below for various fill conditions.

E. Place Ordinary Fill in uniform lifts not exceeding 6 inches (compacted thickness) and compact to 92 percent of its maximum dry Proctor density.

F. Within lawns and planting areas:
   1. All fills to within eighteen inches (18") of finished grade shall be compacted to 90 percent of its maximum modified dry Proctor density.
   2. All fills within eighteen inches (18") of finished grade shall be compacted to between 88 percent and 90 percent of its maximum modified dry Proctor density.

G. In the case of lawn and planting areas, compaction requirements for subgrades and fills shall be considered minimums and maximums within the density percentages called for, and any over compaction of subgrades or fills which would be detrimental to lawn or planting objectives shall be corrected by loosening subgrades or fills through tilling or other means and recompacting to specified compaction limits.

H. The CONTRACTOR shall notify the ENGINEER three (3) days in advance when the rough grades are established and ready for formal inspection.

3.4 TRENCHING AND BACKFILLING

A. Remove all material of whatever nature encountered to establish subgrades for site utilities, storm drainage lines, walls, and miscellaneous site features.

B. Remove unsuitable material encountered at subgrade elevations, backfill with material as otherwise indicated on the Contract Drawings, specified or directed. Compact as specified.

C. Where utility pipes are to be laid in screened gravel bedding, the trench may be excavated by machinery to, or just below the designated subgrade, provided that the material remaining in the bottom of the trench is not disturbed.

D. Coordinate utility trench backfilling with other trades involved.
3.5 ROUGH GRADING

A. Rough grading shall include the shaping, trimming, rolling, and refinishing of all surfaces of the subbase, shoulders, and earth slopes, and the preparation of grades as shown on the Contract Drawings. The grading of shoulders and sloped areas may be done by machine methods. All ruts shall be eliminated. Traffic of workers and equipment across the soil subgrade areas shall be prohibited following excavation to the required lines and grades.

B. If, during the progress of work, any installed pipe, drain, wall, membrane, pavement surface or other construction is damaged due to operations under the Contract, the CONTRACTOR shall repair all damage at no additional cost to the OWNER and restore damaged areas to their original conditions.

C. Cutting, filling and grading shall be to the lines and limits indicated on the Contract Drawings. Grade evenly to within the dimensions required for grades shown on Contract Drawings and specified herein. No stones larger than four inches (4") in largest diameter shall be placed in upper six inches (6") of fill. Fill shall be left in a compacted state at the end of the workday and sloped to drain.

D. The CONTRACTOR shall bring all areas to grades as shown on the Contract Drawings and in the details. The OWNERS Representative however, may make such adjustments in grades and alignments as are found necessary to avoid special conditions encountered.

E. No rubbish of any description shall be allowed to enter fill material. Such material shall be removed from the site.

F. Wherever streets, lawns, sidewalks, or other items contained within or outside of Limits of Contract lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all materials necessary to bring finished surfaces level with the existing adjacent surfaces.

G. Placed fill materials that become disturbed shall be regraded and recompacted. Fill materials that become contaminated shall be removed and replaced, as directed by the OWNERS Representative.

END OF SECTION