PROJECT COORDINATION

PART 1 – GENERAL

1.01 MEETINGS & PROJECT ACCESS

A. The Owner shall be notified five (5) days prior to commencement of Work by the Contractor.

B. The Contractor will coordinate with the Owner to arrange an on–site pre–construction meeting prior to commencement of any work. Job superintendents and subcontractors shall be included in this meeting.

C. The Contractor will coordinate all phases of the Work, so as not to interfere with the normal work procedures in the area.

D. The Contractor shall conduct his work in such a manner as to not interfere with or endanger work or traffic in areas adjacent to the construction area, except as permitted by the Owner. The Contractor shall so arrange his construction operations as to provide access for emergency vehicles and equipment to the work site at all times.

1.02 LABOR

A. The Contractor and subcontractors will employ mechanics skilled in their respective trades.

B. All labor will be performed in a neat and workmanlike manner.

1.03 PROTECTION OF PERSONS AND PROPERTY

A. The Contractor shall be responsible for initiating, maintaining, and supervising all O.S.H.A. safety precautions in connection with the Work.

B. Fire Protection: The Contractor shall take all necessary precautions to prevent fires adjacent to the Work and shall provide adequate facilities for extinguishing fires. The Contractor shall also prevent fires in project related buildings and shall prevent the spread of fires to areas outside the limits of the Work.

C. Safety Precautions: Prior to commencement of Work, the Contractor shall be familiar with all safety regulations and practices applicable with construction operations. No additional payments will be made for equipment and procedures necessitated by these safety precautions.

1.04 CORRECTION OF WORK

A. The Contractor shall promptly correct all Work rejected by the Owner as defective or as failing to conform to the Contract Documents. The Contractor shall bear all cost of correcting such rejected Work.

1.05 WEATHER CONDITIONS

A. No Work shall be done when, in the opinion of the Owner, the weather is unsuitable. No concrete, earth backfill, embankment, or paving shall be placed upon frozen material. If there is delay or interruption in the Work due to weather conditions, the necessary precautions must be taken to bond new Work to old.

B. Protection Against Water and Storm: The Contractor shall take all precautions to prevent damage to the Work by storms or by water entering the site of the Work directly or through the ground. In case of damage by storm or water, the Contractor, at his own expense, shall make repairs or replacements or rebuild such parts of the Work as the Engineer may require in order that the finished work may be completed as required by the Drawings and Specifications.

1.06 DISPOSAL OF DEBRIS

A. All debris and excess materials, other than that which is authorized to be reused, become the property of the Contractor and shall be promptly removed from the property. The Contractor shall receive title to all debris and/or excess material. The Owner will not be responsible for any loss or damage to debris or excess material owned by the Contractor.

1.07 PROJECT LAYOUT

A. The Contractor shall be responsible for providing all necessary survey staking.

1. Locate and protect control points before starting work on the site.

2. Preserve permanent reference points during progress of the Work.

3. Establish a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.

a. Record locations, with horizontal and vertical data, on Project Record Documents.

1.08 TESTING

A. The Contractor is responsible for obtaining testing and inspection services.

SITE EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. All excavation (unless covered in other sections of these specifications), removal and stockpile of topsoil, stabilization fabric, and other miscellaneous and appurtenant works.
2. Site filling.
3. Roadway structural sections.

1.02 PROTECTION

A. Protect bench marks and existing structures.

B. Protect above or below grade utilities which are to remain.

1.03 SUBMITTALS

A. Testing laboratory reports indicating that material for backfill meets requirements of this Section.

B. Field density test reports of site fill in place.

C. Field density test reports for roadway structural sections in place.

D. Stabilization Fabric: Submit copies of manufacturer's specifications and installation instructions.

PART 2 – PRODUCTS

2.01 STRUCTURAL FILL – CRUSHED GRAVEL (AOT SPEC. 704.05, FINE)

A. All materials shall be secured from approved sources. This gravel shall consist of angular and round fragments of hard durable rock of uniform quality throughout, reasonably free from thin elongated pieces, soft or disintegrated stone, dirt, organic or other objectionable matter. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
2"	100
1 1/2"	90 – 100
No. 4	30 – 60
No. 100	0 – 12
No. 200	0 – 6

2.02 CRUSHED GRAVEL (AOT SPEC. 704.05, COARSE)

A. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
4"	95 – 100
No. 4	25 – 50
No. 100	0 – 12
No. 200	0 – 6

At least 50% by mass (weight) of the material coarser than the No. 4 sieve shall have at least one fractured face.

2.03 COMPACTED FILL/GRANULAR BORROW

A. This material shall be free of shale, clay, friable material, debris, and organic matter, graded in accordance with ANSI/ASTM C136 within the following limits:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
3"	100
¾"	75 – 100
No. 4	20 – 100
No. 100	0 – 20
No. 200	0 – 6

2.04 DRAINAGE COURSE (AOT SPEC. 704.16)

A. Rock for drainage applications shall be produced from natural gravels or crushed quarried rock and shall consist of clean, hard, sound, and durable material. It shall be obtained from approved sources and shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1"	100
¾"	90 – 100
¾"	20 – 55
No. 4	0 – 10
No. 8	0 – 10

2.5. DENSE GRADED CRUSHED STONE

A. Dense Graded Crushed Stone should consist of a well graded crushed run stone and should meet the requirements for Vermont AOT Standard Specifications Item 704.06 Dense Graded Crushed Stone for Subbase and the gradation requirements shown in Table 704.06A of the Vermont AOT Standard Specifications.

Sieve Designation	Percent Finer by Weight
3½"	100
3"	90 – 100
2"	75 – 100
1"	50 – 80
½"	30 – 60
No. 4	15 – 40
No. 200	0 – 6

2.1. RECYCLED ASPHALT PAVEMENT (RAP) 1½" MINUS CRUSHED ASPHALT

A. This material shall be free of Portland Cement and approved by the engineer prior to installation. This material shall not be mixed with gravel and shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
2"	100
1½"	90 – 100
No. 4	30 – 60
No. 100	0 – 12
No. 200	0 – 6

2.07 GEOTEXTILE

A. Subsurface Drainage Geotextile: Nonwoven needle–punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
4. Tear Strength: 56 lbf; ASTM D 4533.
5. Puncture Strength: 56 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.5 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 200 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 75 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
9. Weight: 4.0 oz/yd2 minimum.

PART 3 – EXECUTION

3.01 PREPARATION

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

B. Identify known below grade utilities. Stake and flag locations.

C. Maintain and protect existing utilities remaining which pass through work area.

D. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Engineer.

3.02 EROSION CONTROL

A. Erosion control must be installed prior to beginning any earthwork operations.

3.03 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be excavated, re–landscaped or regraded and stockpile in areas designated on site or as directed by the Engineer.

B. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.

1. Maintain stockpile free from debris and trash.

2. Keep the topsoil damp to prevent dust and drying out.

3.04 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be regraded in accordance with plans.

B. Excavate subsoil required to accommodate site structures, construction operations, roads, and parking areas.

C. Grade top perimeter of excavation to prevent surface water from draining into excavation.

D. Notify engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

E. Correct areas over–excavated by error as directed by the Engineer.

3.05 DITCHES

A. Cut accurately to the cross–sections, grades, and elevations shown.

B. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the work.

C. Dispose of excavated materials as shown on the drawings or directed by the Engineer; except do not, in any case, deposit materials less than three feet from the edge of a ditch.

3.06 ROADWAY EMBANKMENTS AND BERMS

A. When embankments are to be made on a hillside, the slope of the original ground on which the embankments are to be constructed shall be stepped and properly drained as the fill is constructed so that adverse movements of the slopes do not occur.

B. Any excavated rock, ledge, boulders, and stone, except where required in the construction of other items or otherwise directed, shall be used in the construction of embankments to the extent of the project requirements and generally shall be placed so as to form the base of an embankment.

C. Frozen material shall not be used in the construction of embankments, nor shall the embankments or successive layers of the embankments be placed upon frozen material. Placement of material other than rock shall stop when the sustained air temperature, below 32 degrees Fahrenheit, prohibits the obtaining of the required compaction. If the material is otherwise acceptable, it shall be stockpiled and reserved for future use when its condition is acceptable for use in embankments.

D. When an embankment is to be constructed across a swamp, muck, or areas of unstable soils, the unsuitable material shall be excavated to reach soils of adequate bearing capacity and the embankment begun. Alternative methods, such as use of a stabilization fabric in place of excavation and backfill, may be utilized only after approval of same by the Engineer.

E. Material being placed in embankments shall be placed in horizontal layers of uniform thickness across the full width of the embankment. Stumps, trees, rubbish, and other unsuitable material shall not be placed in embankments.

F. Embankment areas shall be placed in eight–inch maximum lifts. Effective spreading equipment shall be used on each layer to obtain uniform thickness prior to compaction. Each layer shall be kept crowned to shed water to the outside edge of embankment and continuous leveling and manipulating will be required to assure uniform density. The entire area of each layer shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors, or a combination thereof. Earth–moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment.

G. All fill material shall be compacted at a moisture content suitable for obtaining the required density. In no case shall the moisture content in each layer under construction be more than three percent above the optimum moisture content and shall be less than that quantity that will cause the embankment to become unstable during compaction. Sponginess, shoving, or other displacement under heavy equipment shall be considered evidence for an engineering determination of lack of stability under this requirement, and further placement of material in the area affected shall be stopped or retarded to allow the material to stabilize.

H. When the moisture content of the material in the layer under construction is less than the amount necessary to obtain satisfactory compaction by mechanical compaction methods, water shall be added by pressure distributors or other approved equipment. Water may also be added in excavation or borrow pits. The water shall be uniformly and thoroughly incorporated into the soil by disc, harrowing, blading, or by other approved methods. This manipulation may be omitted for sands and gravel. When the moisture content of the material is in excess of three percent above optimum moisture content, dry material shall be thoroughly incorporated into the wet material, or the wet material shall be aerated by disking, harrowing, blading, rotary mixing, or by other approved methods; or compaction of the layer of wet material shall be deferred until the layer has dried to the required moisture content by evaporation.

3.07 COMPACTION REQUIREMENTS

A. All backfills and fills shall be compacted in even lifts (12" maximum) to attain the required densities as follows:

Location	Modified Proctor ASTM D–1557
Subgrade (8") and Gravel for Roads and Parking Lots	95%
General Embankments	90%

UTILITY TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities.

1.02 QUALITY 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.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

C. Comply with all requirements of governmental agencies having jurisdiction.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. Fill and backfill materials:

1. Provide backfill materials free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension.

2. Fill material is subject to the approval of the Engineer, and is that material removed from excavations or imported from off–site borrow areas, predominantly granular, non–expansive soil free from roots and other deleterious matter.

3. Do not permit rocks having a dimension greater than 2" within 2' of the outside of pipe.

4. Cohesionless material used for backfill: Provide sand free from organic material and other foreign matter, and as approved by the Engineer.

PART 3 – EXECUTION

3.01 PROCEDURES

A. Existing Utilities:

1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.

2. When existing underground utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage. Any damage to utilities shall be repaired promptly at no additional cost to the Owner.

3. If the service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.

4. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Engineer and secure his instructions.

5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

B. Protection of persons and property:

1. Barricade open holes and depressions occurring as part of the work, and post warning lights on property adjacent to or with public access.

2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this section.

C. Dewatering: The Contractor, at all times, shall conduct his operations so as to prevent the accumulation of water, ice, and snow in excavations or in the vicinity of excavated areas, and to prevent water from interfering with the progress of quality of the work. Under no conditions shall water be allowed to rise in open trenches after pipe has been placed.

D. Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means. Disposal shall be carried out in a manner which will not create a hazard to public health, nor cause injury to public or private property, work completed or in progress, or public streets, nor cause any interference in the use of streets and road by the public. Pipes under construction shall not be used for drainage of excavations.

E. Maintain access to adjacent areas at all time.

3.02 TRENCHING

A. Care shall be exercised by the Contractor to avoid disrupting the operation of existing facilities without prior written approval of the Engineer.

B. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel.

1. Sheeting and bracing required for trenches shall be removed to the elevation of the pipe, but no sheeting will be allowed to be pulled, removed, or disturbed below the pipe.

C. A trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe and compaction of the bedding and backfill material under and around the pipe. Where feasible, trench walls shall be vertical.

D. The completed trench bottom shall be firm for its full length and width.

E. If indicated on the plans or directed by the Engineer, poor foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with granular backfill.

F. Where pipes are to be placed in embankment fill, the excavation shall be made after the embankment has been completed to a height of 3 feet plus the diameter of the pipe above the designed grade of the pipe.

G. Excavating for appurtenances:

1. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.

2. Over–depth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the Owner.

H. Excavation shall not interfere with normal 45° bearing splay of foundations.

I. All trenching shall be in accordance with the latest OSHA requirements.

J. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.

K. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.

3.03 BEDDING

A. Pipe Bedding Area: Prior to laying pipe, bedding material shall be placed to the limits of the excavation and to a depth beneath the pipe as specified. This material shall be either sand, gravel, or crushed stone and shall not contain large lumps and stones over one inch in diameter. As the pipe is laid, bedding material shall be extended to 6" above the pipe and leveled along the width of the trench.

3.04 BACKFILLING

A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.

B. Unless otherwise specified or indicated on the plans, material used for backfilling trenches above the bedding area shall be suitable material which was removed during excavation or obtained from borrow and when compacted shall make a dense stable fill. The material shall not contain vegetation, porous matter, masses of roots, individual roots more than 18 inches long or 1/2 inch thick, or stones greater than 50 pounds or larger than six inches in the widest dimension.

C. If additional material is required, it shall be furnished from approved sources.

D. Backfill material shall be evenly spread and compacted in lifts not more than 12 inches thick or as approved by the Engineer. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction.

E. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.

F. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work and, after approvals have been made, refill and compact as specified, all at no additional cost to the Owner.

G. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.

H. No compacting shall be done when the material is too wet to be compacted properly. At such times the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction, or such other precautions are taken as may be necessary to obtain proper compaction.

I. Backfill material shall be compacted to the following percentages of maximum dry density and the in–place moisture content shall not be more than 2% above the optimum moisture content, as determined by Modified Proctor ASTM D1557.

1. Around all structures, under roadway paving, shoulder and embankments – 95%.

2. All other areas – 90%.

SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.cea-vt.com

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DRAWN BRR

CHECKED DSM

APPROVED DSM

STATE OF VERMONT DAVID S. MARSHALL No. 6019 CIVIL REGISTERED PROFESSIONAL ENGINEER

OWNER:

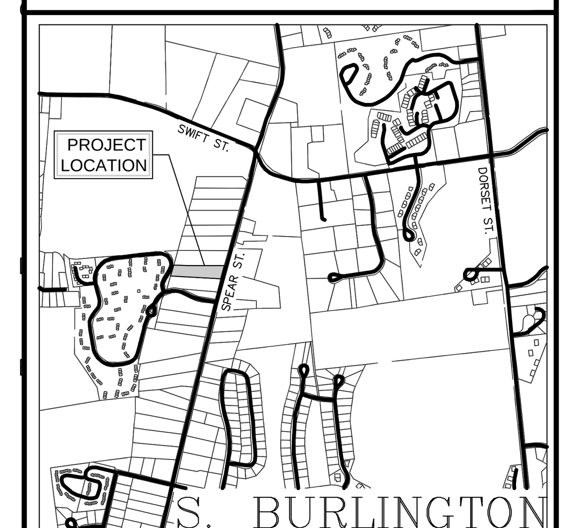
ANDREW AND ERIN ROSS

720 DORSET ST
CHARLOTTE
VERMONT 05445

PROJECT:

PROPOSED SEWER CONNECTION

720 DORSET ST
CHARLOTTE, VT



LOCATION MAP

1" = 2000'

DATE	CHECKED	REVISION

SPECIFICATIONS

DATE 09/09/2017

SCALE NONE

PROJ. NO. 16191.01

DRAWING NUMBER C3.0