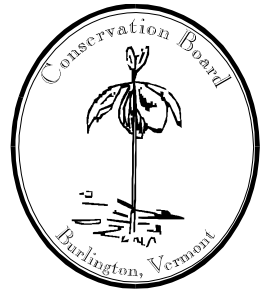


## **Burlington Conservation Board**

149 Church Street  
Burlington, VT 05401  
<http://www.burlingtonvt.gov/planning/>  
Telephone: (802) 865-7188  
(802) 865-7195 (FAX)

*Matt Moore, Chair  
Will Flender, Vice Chair  
Scott Mapes  
Don Meals  
Jeff Severson  
Miles Waite  
Damon Lane  
Zoe Richards  
Stephanie Young*



### **Conservation Board Special Meeting Public Notice**

December 19, 2016 at 5:30 PM  
Main Meeting Room – Burlington Electric Department  
585 Pine Street

#### **Agenda**

#### **I. Project Review**

- 1. 17-0614CA/MA; 329-375 North Avenue (Ward 4N, NAC-CR) Eric Farrell**  
Proposed development consisting of 11 buildings containing 733 residential units, approximately 45,000sf of non-residential support/amenity space, approximately 45,000sf of neighborhood commercial spaces, and 1,093 parking spaces.

#### **II. Adjournment**

The City of Burlington will not tolerate unlawful harassment or discrimination on the basis of political or religious affiliation, race, color, national origin, place of birth, ancestry, age, sex, sexual orientation, gender identity, marital status, veteran status, disability, HIV positive status or genetic information. The City is also committed to providing proper access to services, facilities, and employment opportunities. For accessibility information or alternative formats, please contact Human Resources Department at 865-7145.

## **Cambrian Rise Narrative**

We are pleased to submit our proposal for 733 mixed income residential units in approximately 10 mixed use structures surrounded by a public park on 3 (mostly) undeveloped parcels totaling 33.65 acres.

This submission punctuates a 2+ year process that included:

- negotiations with the City of Burlington and the Vermont Land Trust to purchase approximately 12 acres to be used as a public park;
- concurrence on up to 160 units (146 currently planned) of affordable and senior rental housing (which exceeds our 25% Inclusionary Zoning Requirement for rental units);
- multiple meetings held for the input and edification of all city residents, Wards 2/3 and Wards 4/7 NPAs;
- neighbor meetings to inform of progress and encourage input/discussion;
- 2 sketch plans apiece with both the Design Advisory Board and the Development Review Board; and
- thousands of hours of design, revisions and consulting with experts and City departments to refine the building designs, site plan and engineering.

The intent of Cambrian Rise is to create a dynamic new mixed income, mixed use, inclusive, pet-friendly neighborhood in the City of Burlington. The site is less than .5mile from businesses and services on North Street (and within easy walking distance to the Church Street marketplace) and will be directly connected to the bike path and one of the most highly traveled bus corridors (#7 bus). It is intended to support a healthy lifestyle that embraces various transportation alternatives to the single family car – biking, walking and taking the bus, as well as fitness and community gardening in a neighborhood that is not quite downtown, but far from the suburbs.

The Cambrian Rise site is extremely complex, with a 70' grade change between North Avenue and the lowest part of the site, necessitating teamwork and collaboration between our architects, landscape architects and engineers. Each building has been carefully considered and designed to be attractive and usable to the residents, as well as to integrate seamlessly into the site, maximizing accessibility to and connections with the public realm. To a great degree, extensive swaths of retaining walls and structured parking have been bermed and covered by greenhouses and other natural design features. The site was designed to welcome and balance movement through it by the larger Burlington population (ADA accessible path, 8' rec path and both walking and biking connections to the Burlington Bike Path), while offering various scales of private space (stoops, balconies, roof decks, community gardens, etc.) for the residents of each building. The engineering tackled the difficulty of our commitment to retaining and treating all stormwater onsite, such that the community will notice no change to current conditions during 10 and 25 year storms. We will be capturing and storing stormwater, where possible, for use in the greenhouses, community gardens and potentially on-site water features.

Finally, special attention has been given to the “activation” of North Avenue, with a restaurant and public seating, patios and main entrances and commercial spaces proposed along part of the streetscape, complementing the beautifully landscaped parklet/green that highlights and celebrates the historic former Orphanage.



All of the buildings will meet or exceed the highest State of VT codes for energy efficiency, with some solar panels, geothermal heating, maximized solar orientation, and balconies (where possible). Most of the buildings will contain bike storage and repair rooms, laundry, common rooms (some with phenomenal views), professional pet wash rooms, adjacent grilling areas. A range of unit sizes from micro units to studios to 1, 2 and 3 bedrooms will be offered. Most buildings will also contain secure, climate-controlled storage cages.

Some of the amenities being considered at Cambrian Rise are:

- a centralized fitness center with half court gymnasium (available by membership), which could double as a community gathering space;
- an off-leash dog park;
- community greenhouses and community gardens;
- centralized storage cages;
- a larger “community” bike repair facility;
- daycare center;
- scattered tot lots;
- centralized recycling and (soon to be required) composting facilities;
- structured parking;
- an ADA accessible path from North Avenue through the site to the waterfront;
- surface parking areas stamped with a pattern to host outdoor events like farmer’s markets and food truck events/rallies/gatherings.

Approximately 40,000 square feet of commercial space will support neighborhood needs including small office spaces, restaurant/café, bakery, daycare and services.

A centralized compactor facility for garbage, recycling and composting, which will be collected by our property management from smaller facilities in each market-rate rental building (we are still working out the details).

The types of units in each building are broken out as follows (approximately):

- Building A (Liberty House): 17 studios, 48 one-bedrooms – TOTAL: 65
- Buildings B+G: 26 studios, 5 one-bedrooms, 19 two-bedrooms – TOTAL: 50
- Building C: 6 studios, 61 one-bedrooms, 6 two-bedrooms, 8 three-bedrooms – TOTAL: 81
- Building D: PARKING GARAGE
- Buildings E+F: 23 micros, 60 studios, 14 one-bedrooms, 26 two bedrooms, 1 three-bedrooms – TOTAL: 124
- Building H: 3 studios, 18 one bedrooms, 36 two bedrooms – TOTAL: 57
- Building I: 20 two bedrooms, 8 three bedrooms – TOTAL: 28
- Building J: GREENHOUSE
- Building K: 63 one bedrooms, 7 two bedrooms, three bedrooms – TOTAL: 70
- Building L: 36 one bedrooms, 33 two bedrooms, 7 three bedrooms – TOTAL: 76
- Buildings M+N: 4 studios, 7 one bedrooms, 44 two bedrooms, 18 three bedrooms – TOTAL: 79
- Buildings O+P: 24 one bedrooms, 28 two bedrooms – TOTAL: 52
- Building Q: 34 two bedrooms, 17 three bedrooms – TOTAL: 51

## **Inclusionary Zoning, Parking Summary + Transportation Alternatives**

### **Proposed Rental Units:**

547 Total Rental Units, less 70 senior housing units, equals 477 rental units subject to IZ requirements

Rental IZ Requirement: 119 units (excludes senior housing in the calculation due to exemption)

Rental IZ units to be developed: 146

Required Parking: 547 spaces

Parking supplied for rental units: 494 garage spaces, 115 surface spaces, 609 total spaces

### **Proposed Non-Profit and Condo Units:**

328 Total Condominium (182) + Non-Profit (146) Units

Condo IZ Requirement: 46 units (182 x 25%)

Condo IZ units to be developed: 46

Parking supplied for condo units: 540 garage spaces + 123 surface spaces

### **Public Art:**

We are in the early stages of discussion with City Arts to discuss possibilities for public art to be incorporated into buildings and the project site. A public art project has already been engaged to honor the (former) Orphanage Building.

### **Transportation Initiatives:**

Our transportation initiatives include:

- Superior site design (including sufficient connections to City sidewalks) and lighting to encourage walking
- Accessible walking/wheelchair route through the site at a grade of no more than 5%
- Indoor bike storage, on-site bike repair rooms and bike washes in most buildings
- Ample outdoor bike racks and potential host of future bike share pod
- Enhanced Green Mountain Bus shelter, proposed to be in a stand-alone conditioned structure in an accessible location
- Connection to Burlington Bike Path with 8' shared rec path connecting North Avenue and the city's trail
- CarShare pod(s)
- Member of CATMA, allowing us access to their profound body of knowledge on transportation issues
- CATMA membership allows residents to receive a 28% discount on bus passes (10-ride, monthly and commuter) + CATMA's guaranteed ride home and prize opportunities
- Upgrade of City sidewalks along the entire North Avenue portion of the project site

- Enhancement of primary intersection of North Avenue, as directed by DPW as buildings are developed and occupied

We have been working extensively to create a less car-dependent atmosphere at this site, by providing options to driving on the part of our future residents. From the beginning of the process, the design team incorporated such elements as bike storage at a rate of one bike per unit, common bike repair and bike wash rooms in each building, in addition to the provision of standard outdoor bike racks.

In June of this year Farrell Real Estate (on behalf of Thayer Commons and Cambrian Rise) joined CATMA as its first non-employer member. Since then we have been working with CATMA to strategize how to lessen car-dependence at our properties, including surveying residents at Thayer Commons (further down North Avenue) to understand more about their travel/commuting needs, and extending CATMA's 28% passes to residents. We have provided discounts on 10 ride passes to introduce residents to taking the bus and held a tabling event to get feedback from residents on car/vanpooling. We'll hopefully be rolling the carpool option out to residents at Thayer to use as a prototype and work out the kinks for applying the same principles at the Cambrian Rise site.

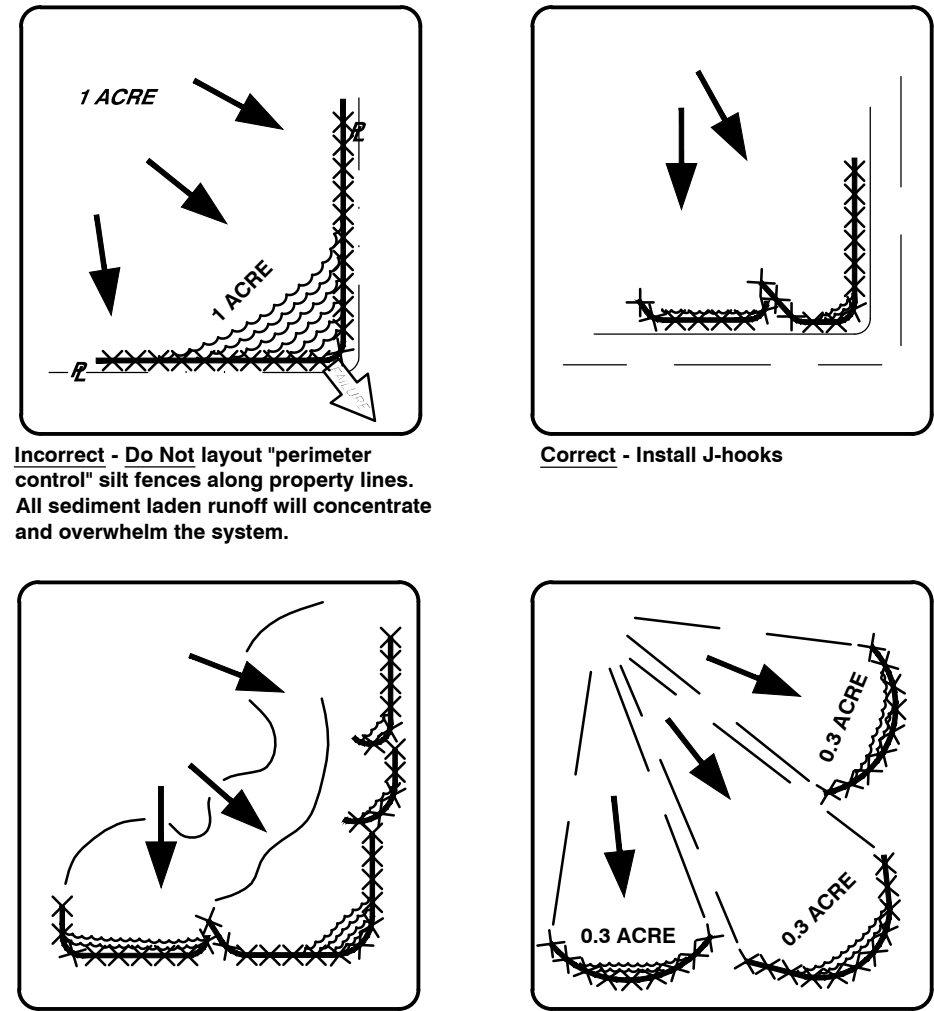
Additionally, we have had multiple conversations with Annie Bourdin of CarShare VT and will be incorporating a CarShare car into Phase I of our development at the Orphanage, with the understanding that early exposure and marketing will be a key to educating and informing future residents on the various transportation options available as alternatives to owning multiple vehicles. We have had various conversations about bike storage and locations in buildings with Jason Dreische at Local Motion and have met and notified the coordinator of UVM's impending bikeshare program that we are very interested in hosting a bikeshare pod on our site.

Our efforts are ongoing to generate and incorporate ideas that will make this development one of the most special places in Burlington – whether through programming, design features or public art.







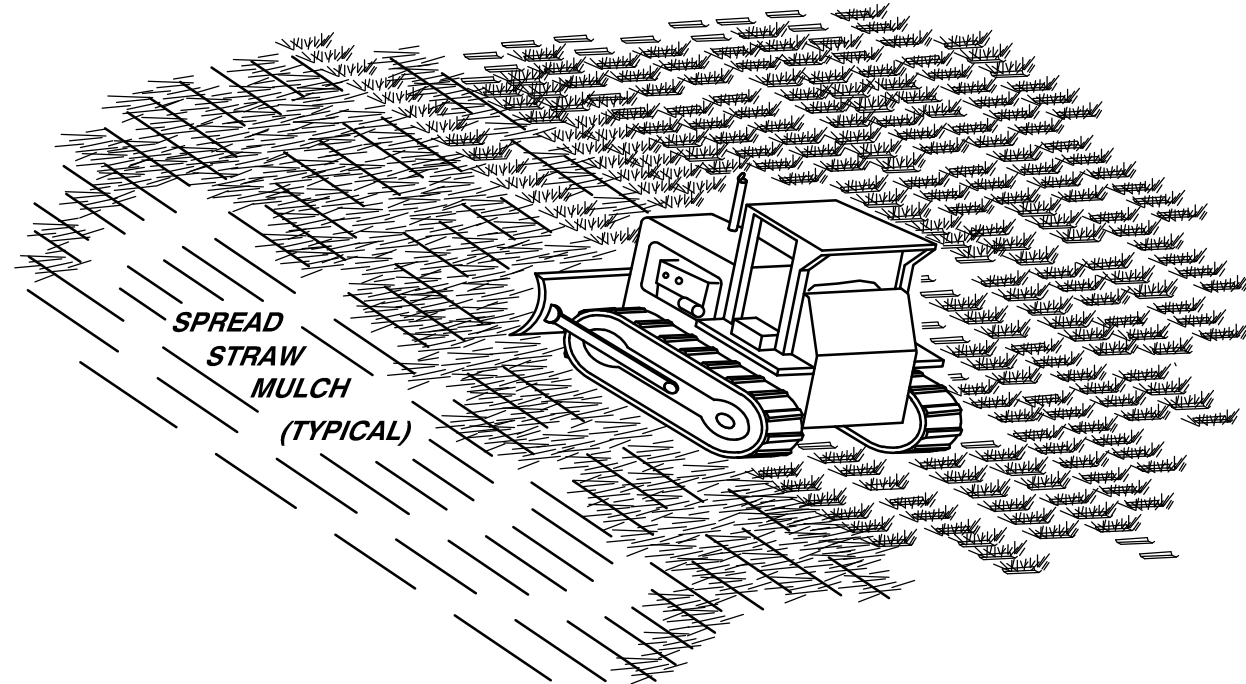


### SILT FENCE PLACEMENT FOR PERIMETER CONTROL

E-010

REVISED 12/19/2014

N.T.S.



#### NOTES:

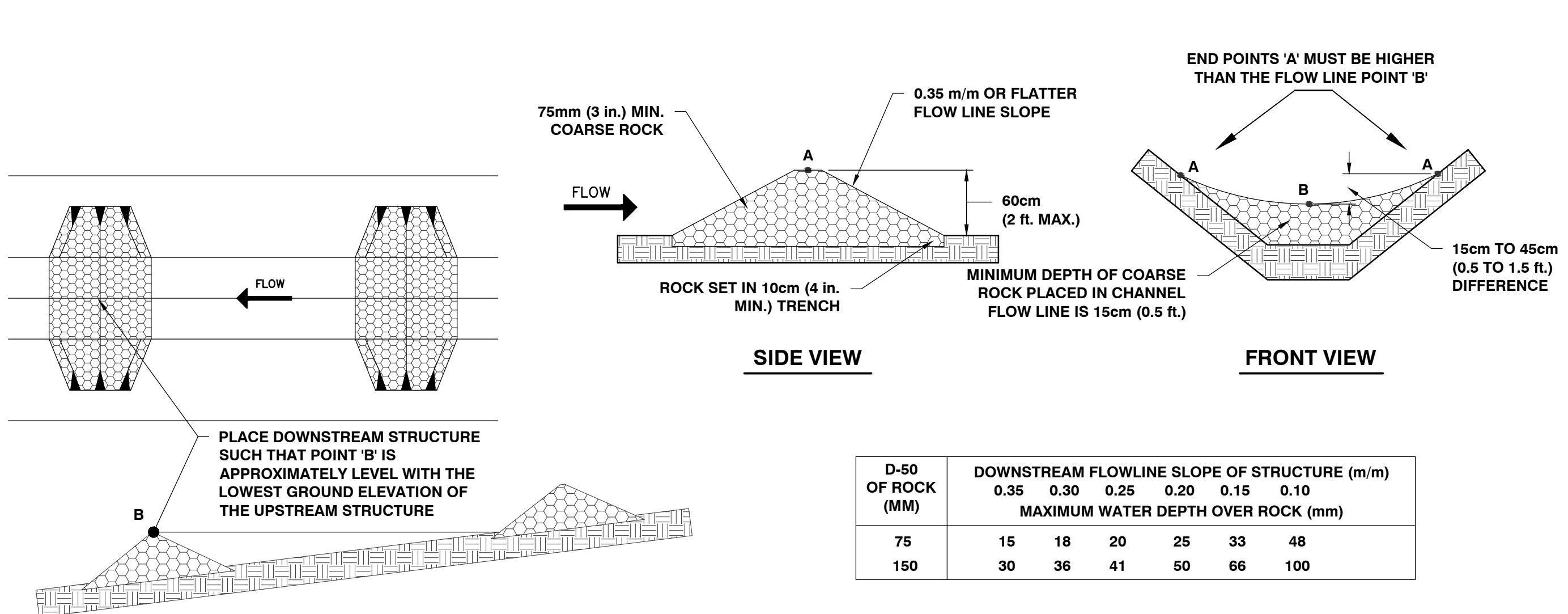
1. ROUGHEN SLOPE WITH BULLDOZER.
2. BROADCAST SEED AND FERTILIZER.
3. SPREAD STRAW MULCH 3" (2½ TONS PER ACRE)
4. PUNCH STRAW MULCH INTO SLOPE BY RUNNING BULLDOZER UP AND DOWN SLOPE.

### STRAW ANCHORING

N.T.S.

E-012

REVISED 12/19/2014

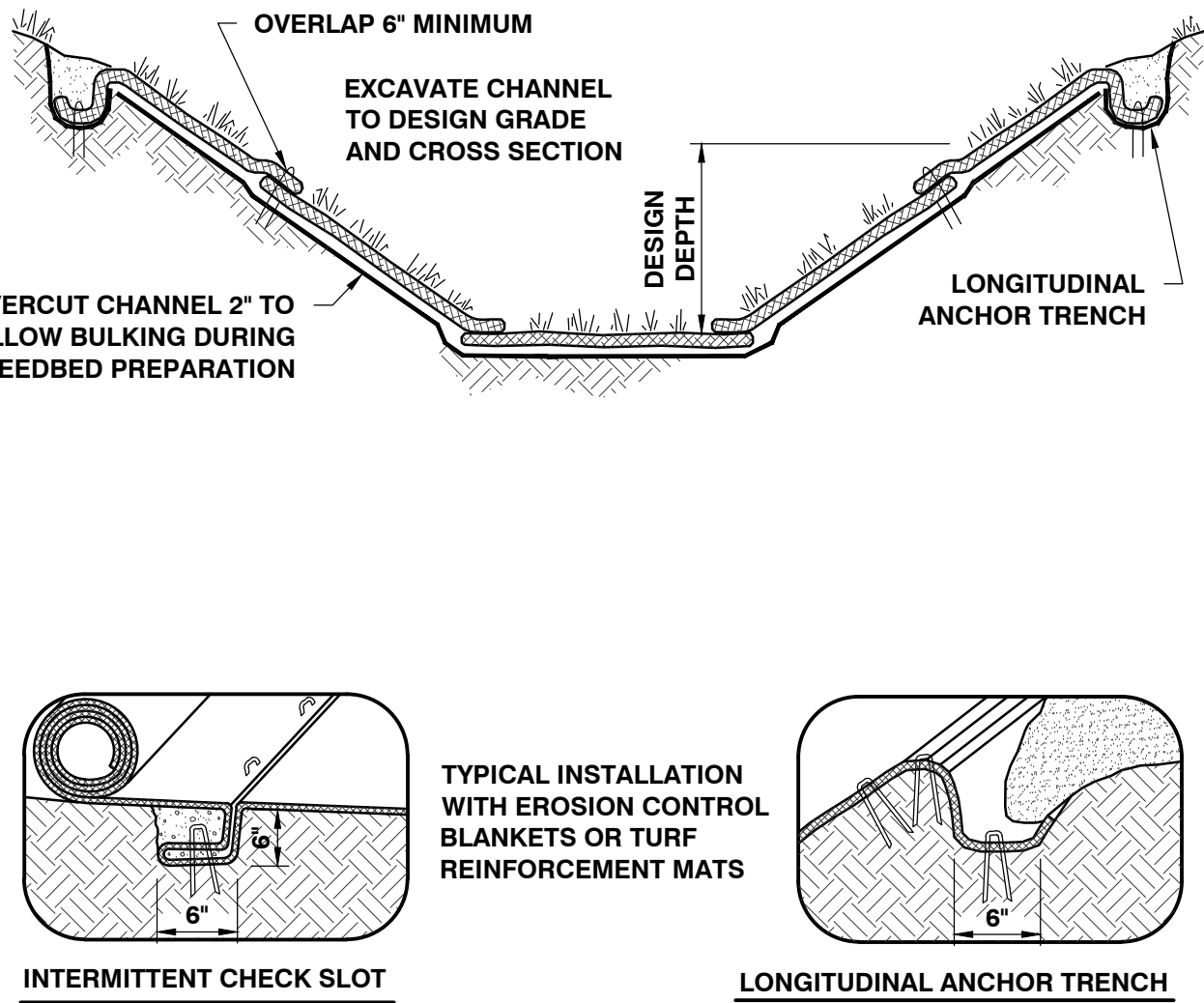


### STONE CHECK DAM STRUCTURE

| D-50 OF ROCK (MM) | DOWNSTREAM FLOWLINE SLOPE OF STRUCTURE (m/m) |      |      |      |      |      |
|-------------------|----------------------------------------------|------|------|------|------|------|
|                   | 0.35                                         | 0.30 | 0.25 | 0.20 | 0.15 | 0.10 |
| 75                | 15                                           | 18   | 20   | 25   | 33   | 48   |
| 150               | 30                                           | 36   | 41   | 50   | 66   | 100  |

N.T.S.

REVISED 08/01/2014

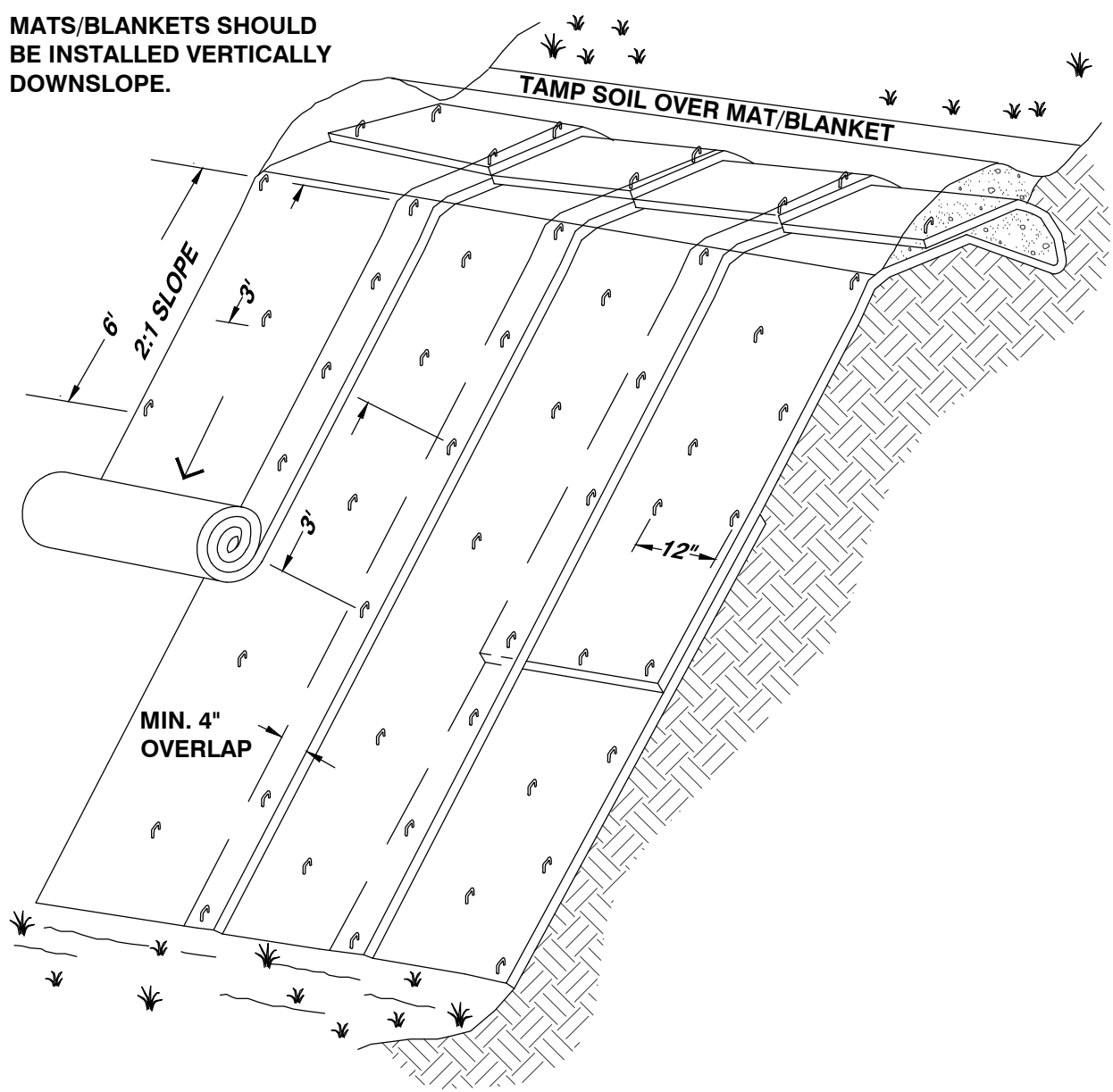


### GRASS-LINED CHANNEL TYPICAL INSTALLATION

N.T.S.

E-011

REVISED 12/19/2014



#### ISOMETRIC VIEW

#### TYPICAL SLOPE SOIL STABILIZATION

#### NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLOUDS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

### EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

N.T.S.

E-009

REVISED 08/01/2014

SITE ENGINEER:



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

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CLIENT:

**BC COMMUNITY HOUSING, LLC**

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

**CAMBRIAN RISE**

311 & 329 NORTH AVE.  
BURLINGTON, VT

DATE CHECKED REVISION

**EPSC DETAILS & SPECIFICATIONS**

DATE

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SCALE

NONE

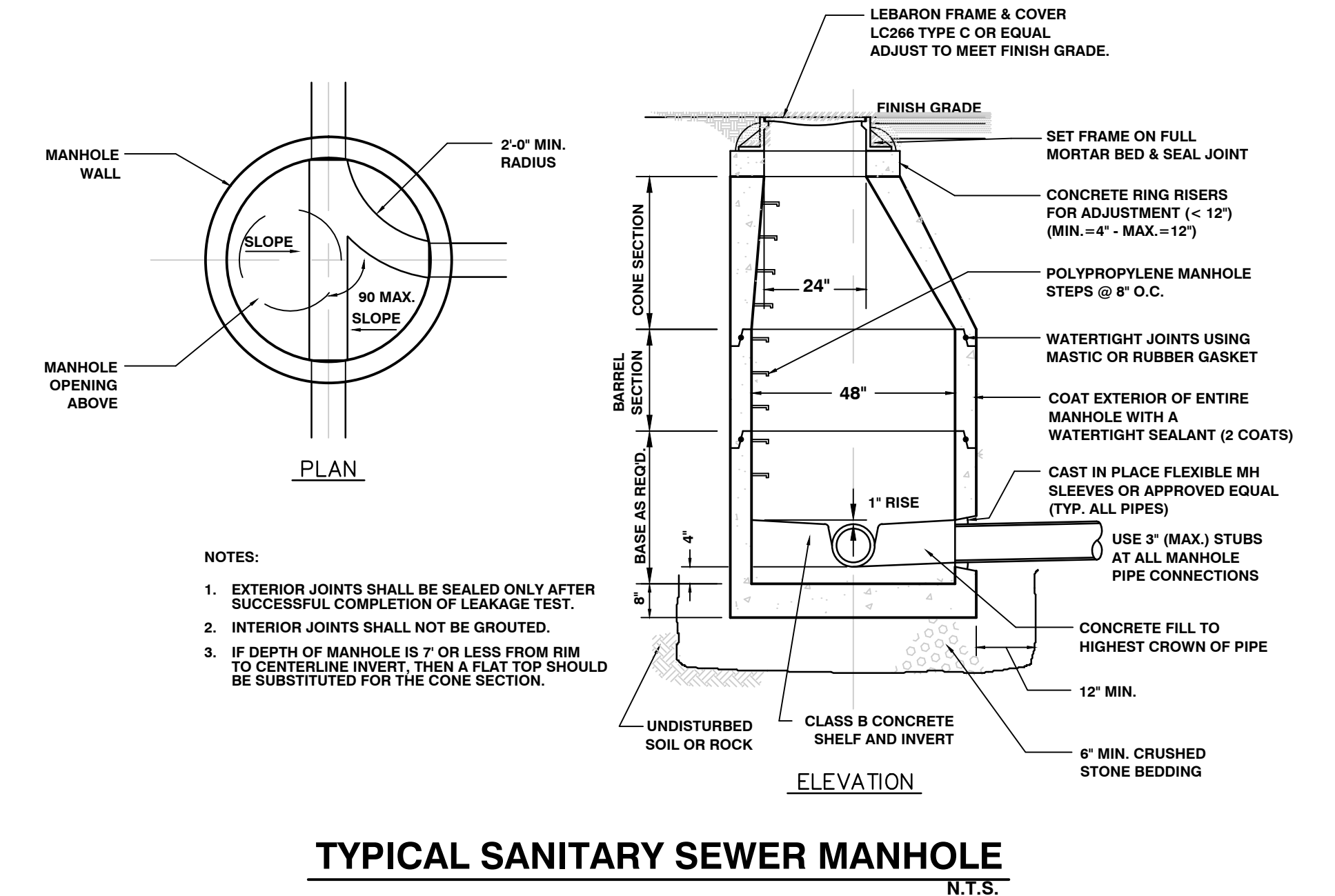
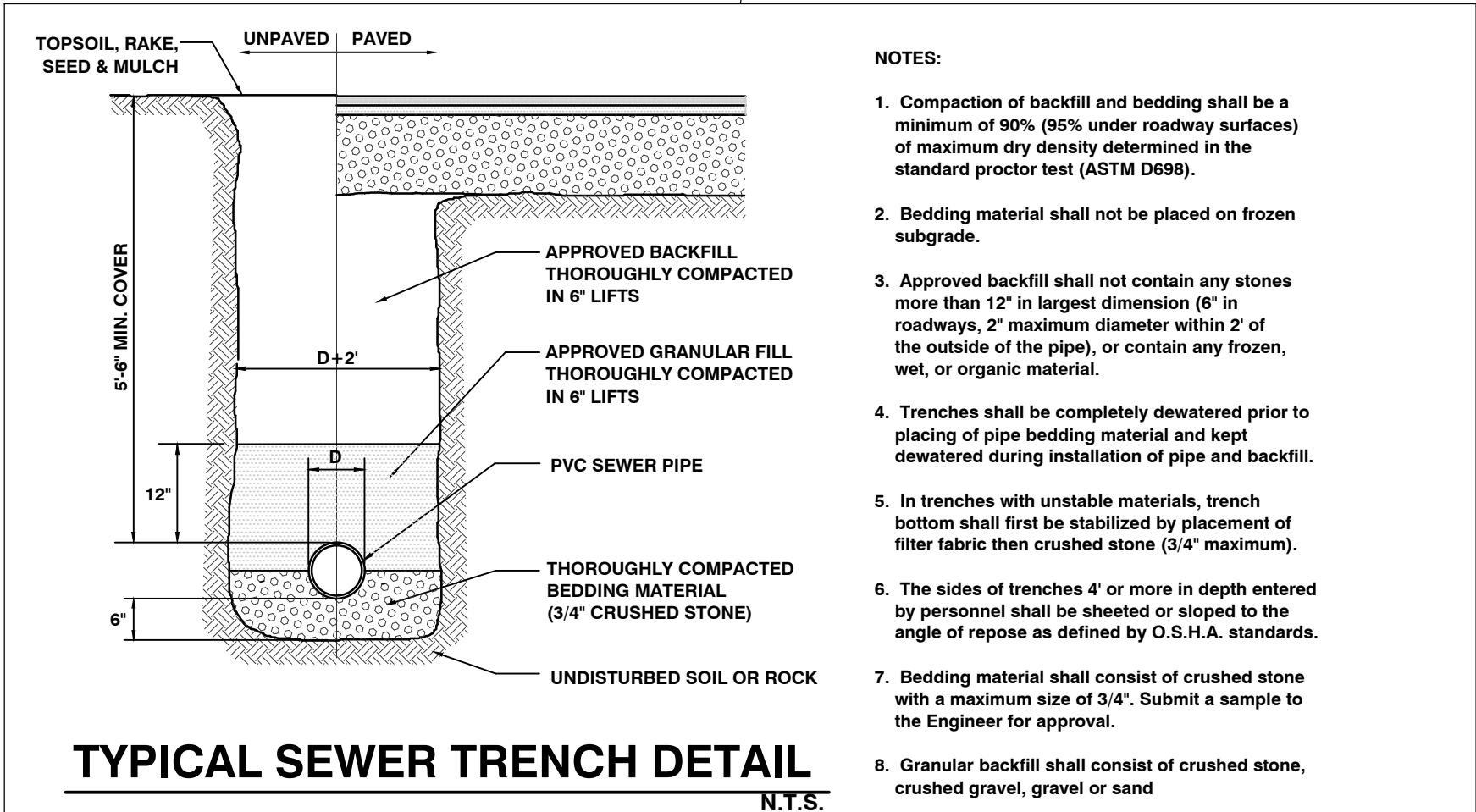
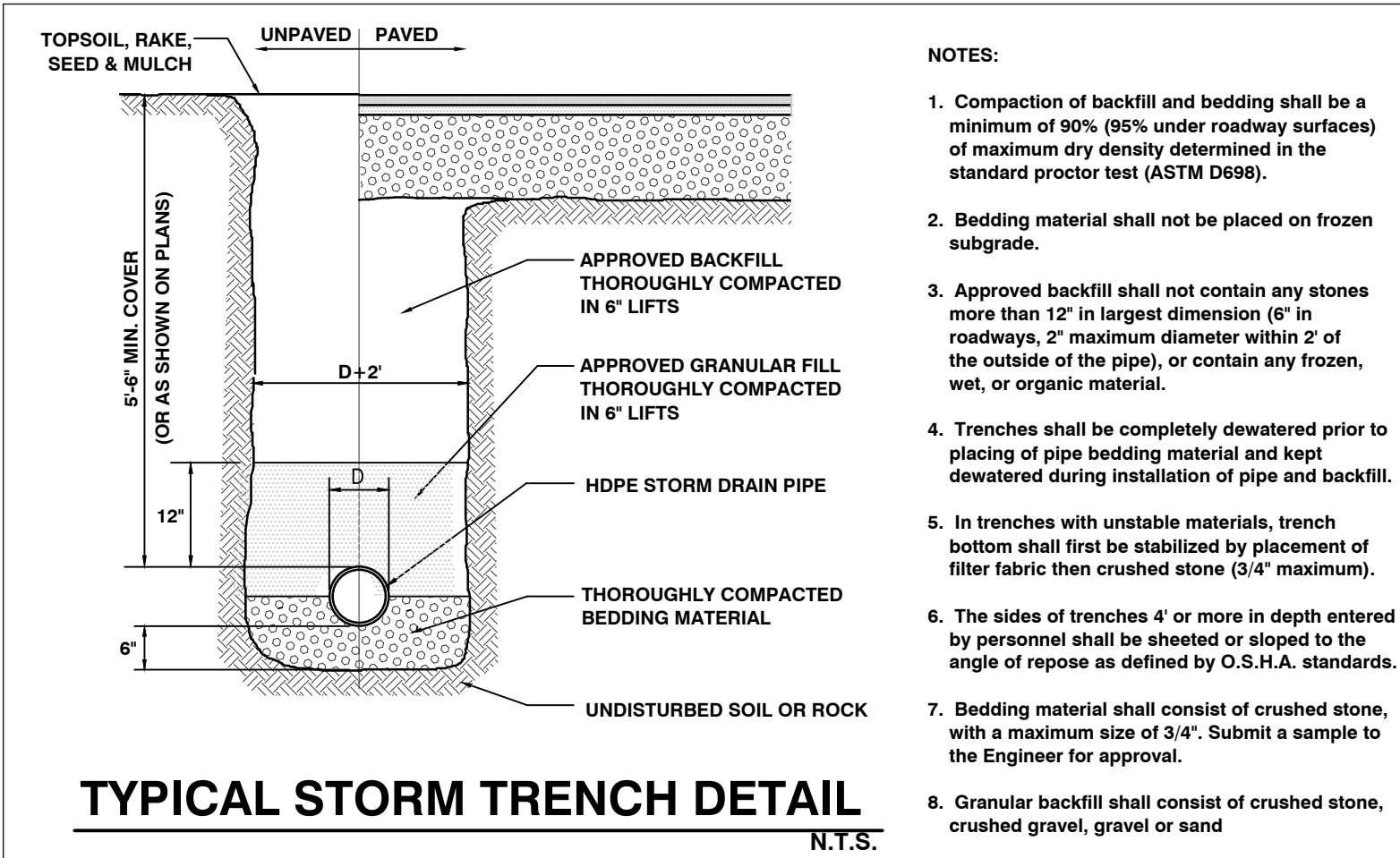
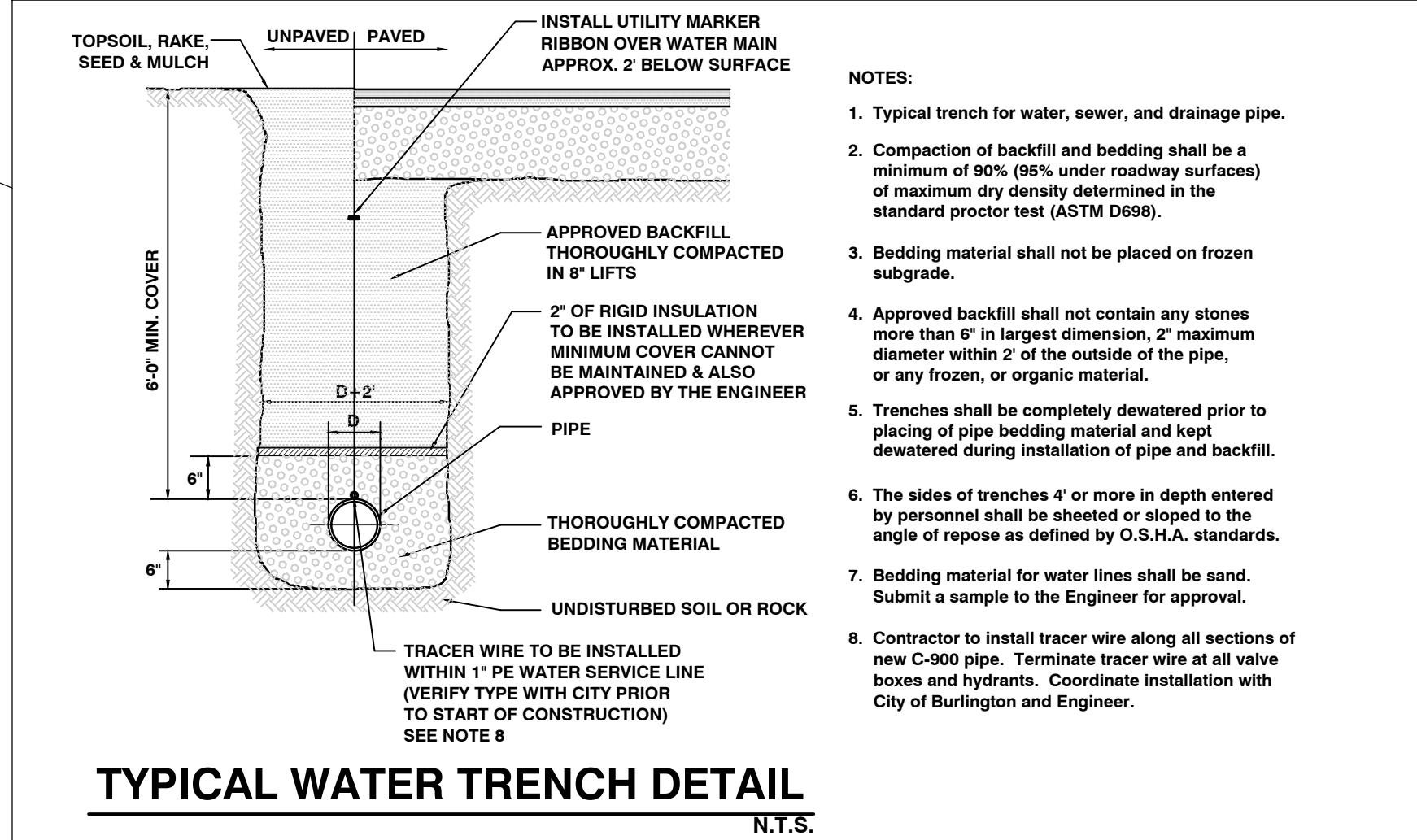
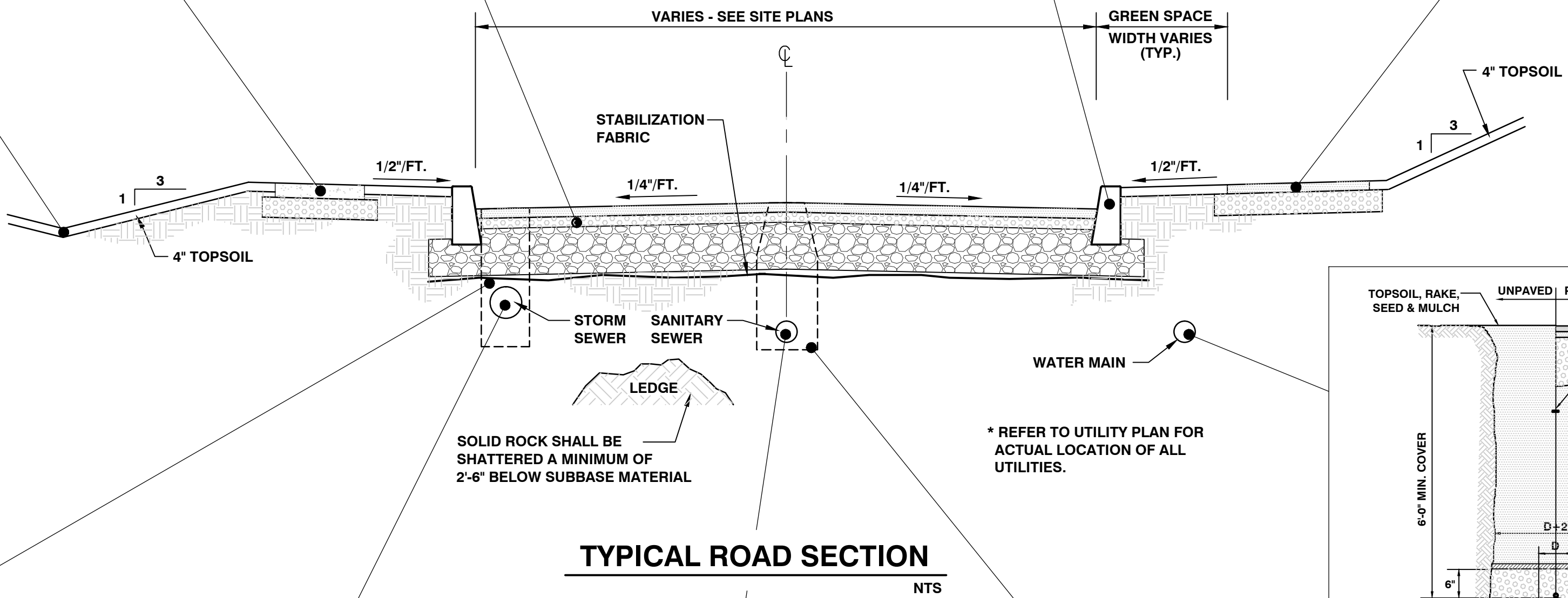
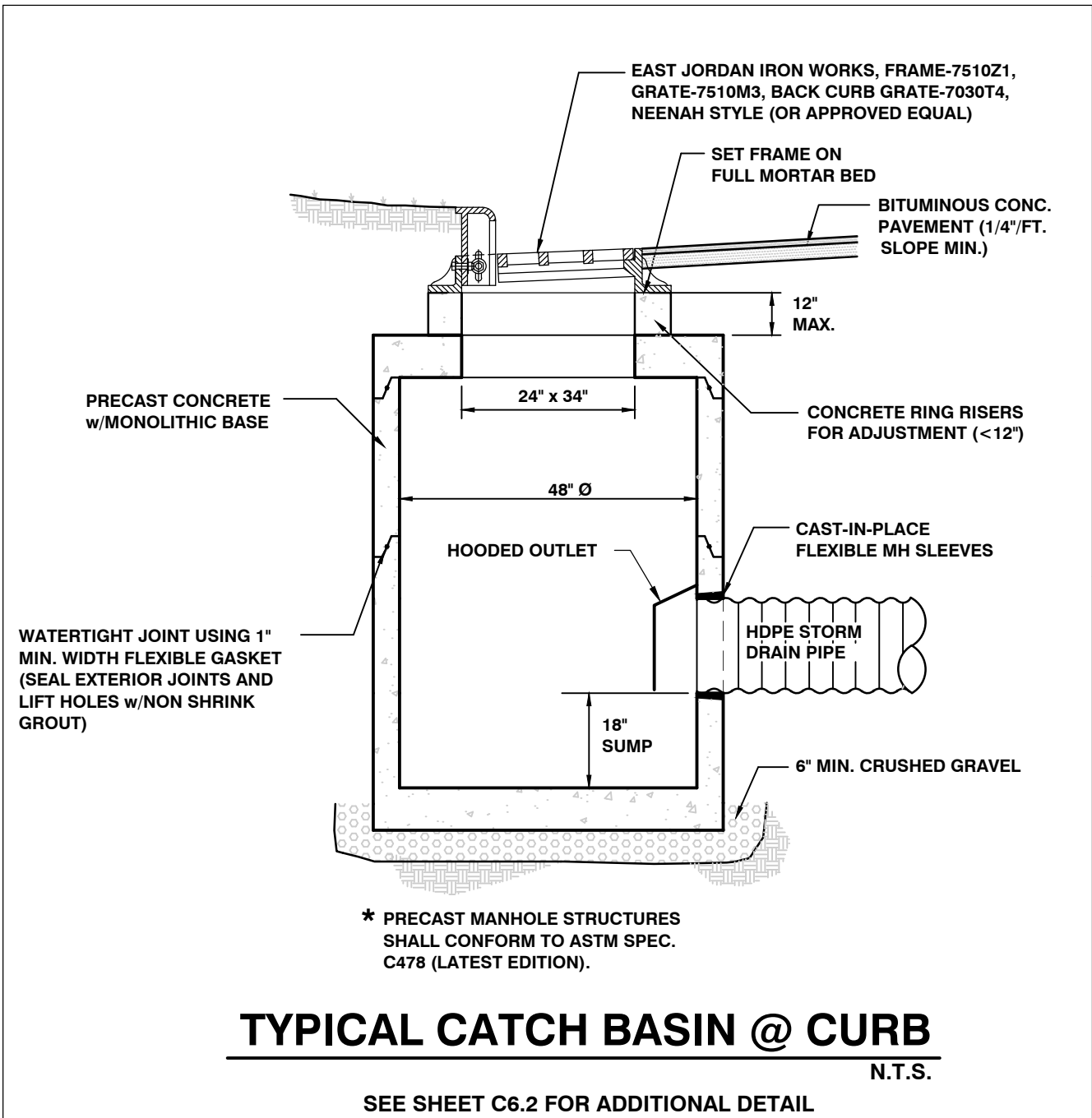
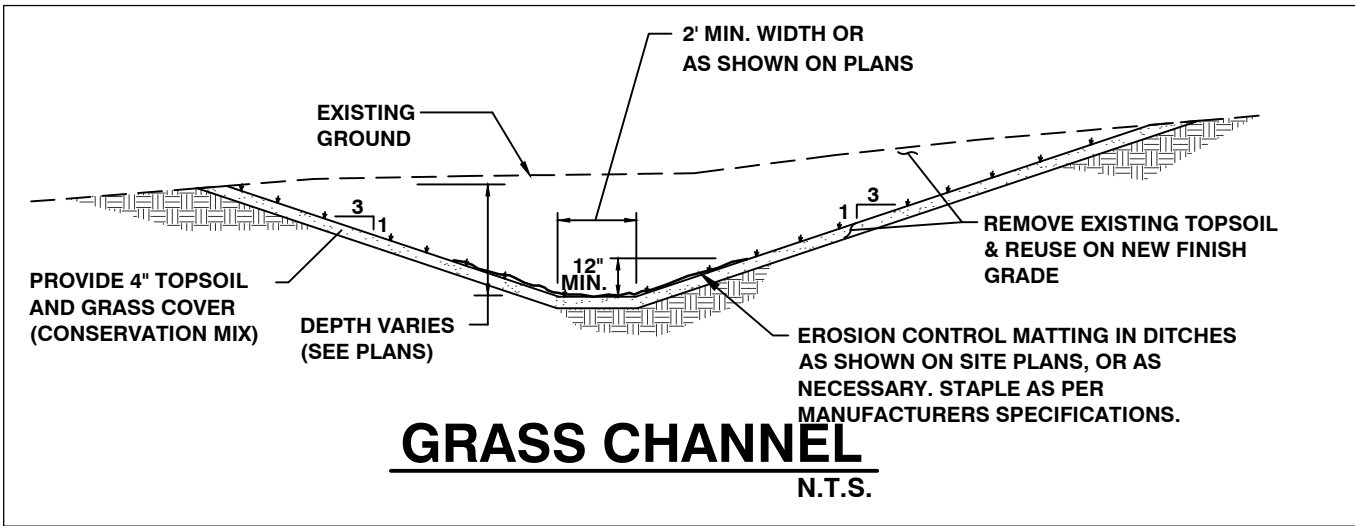
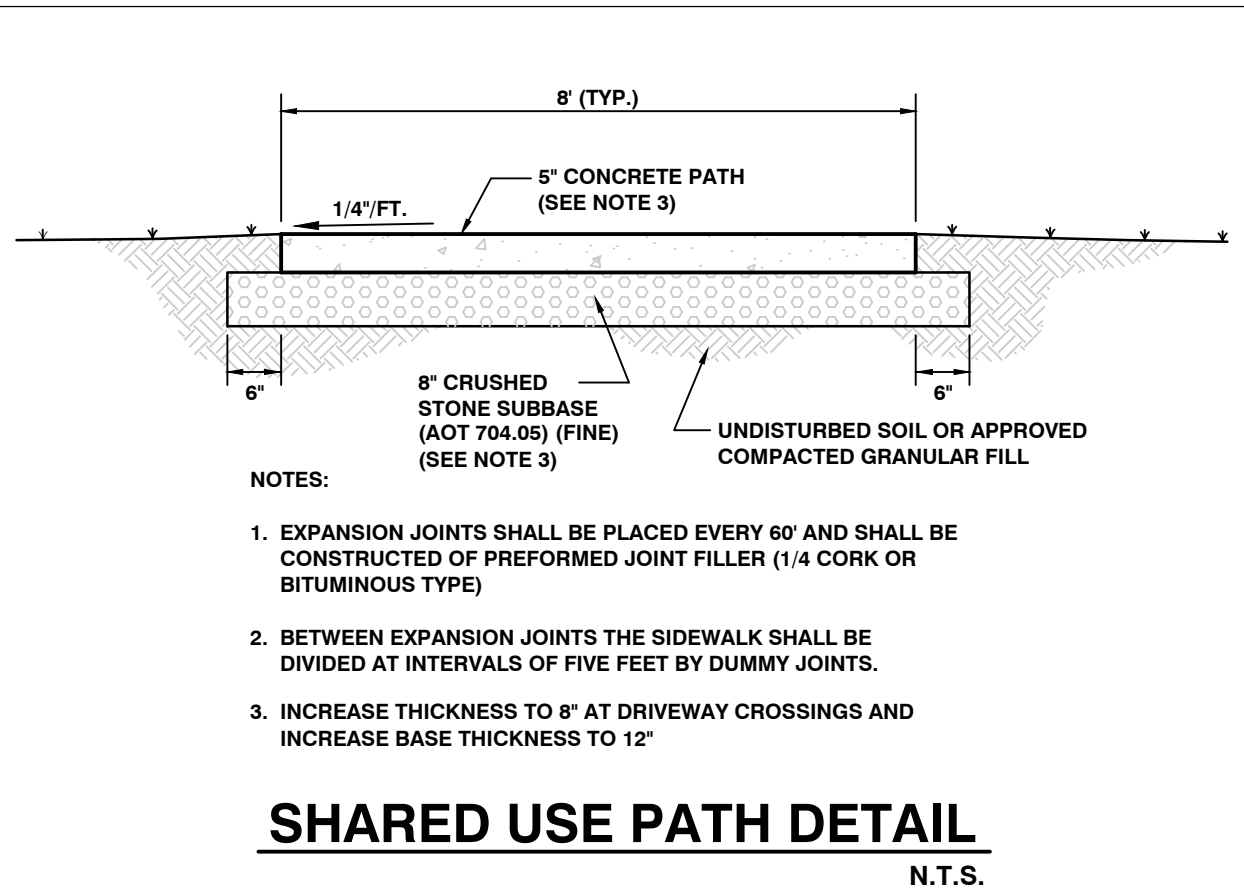
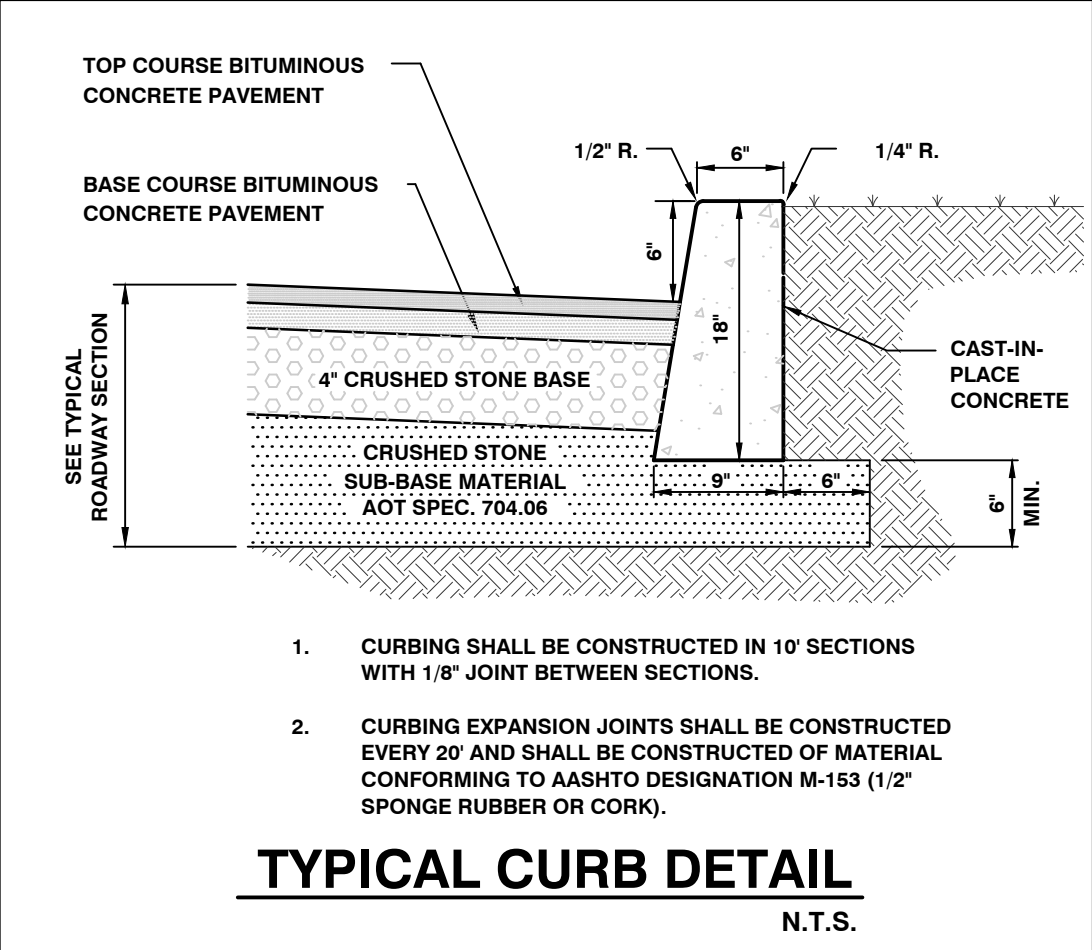
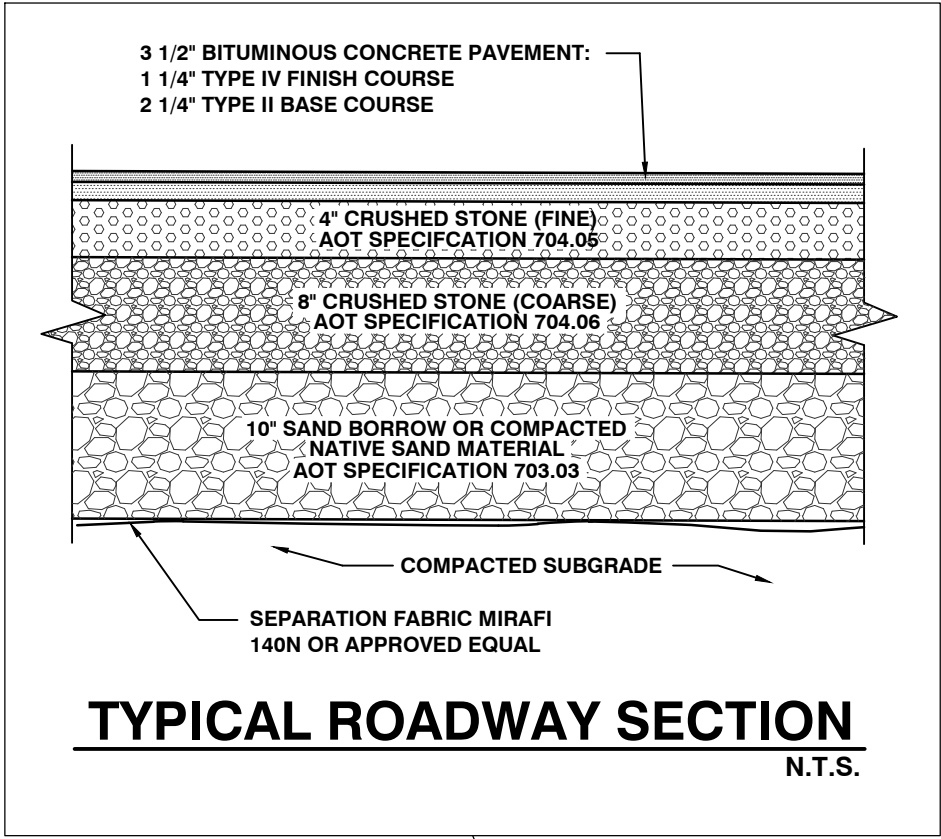
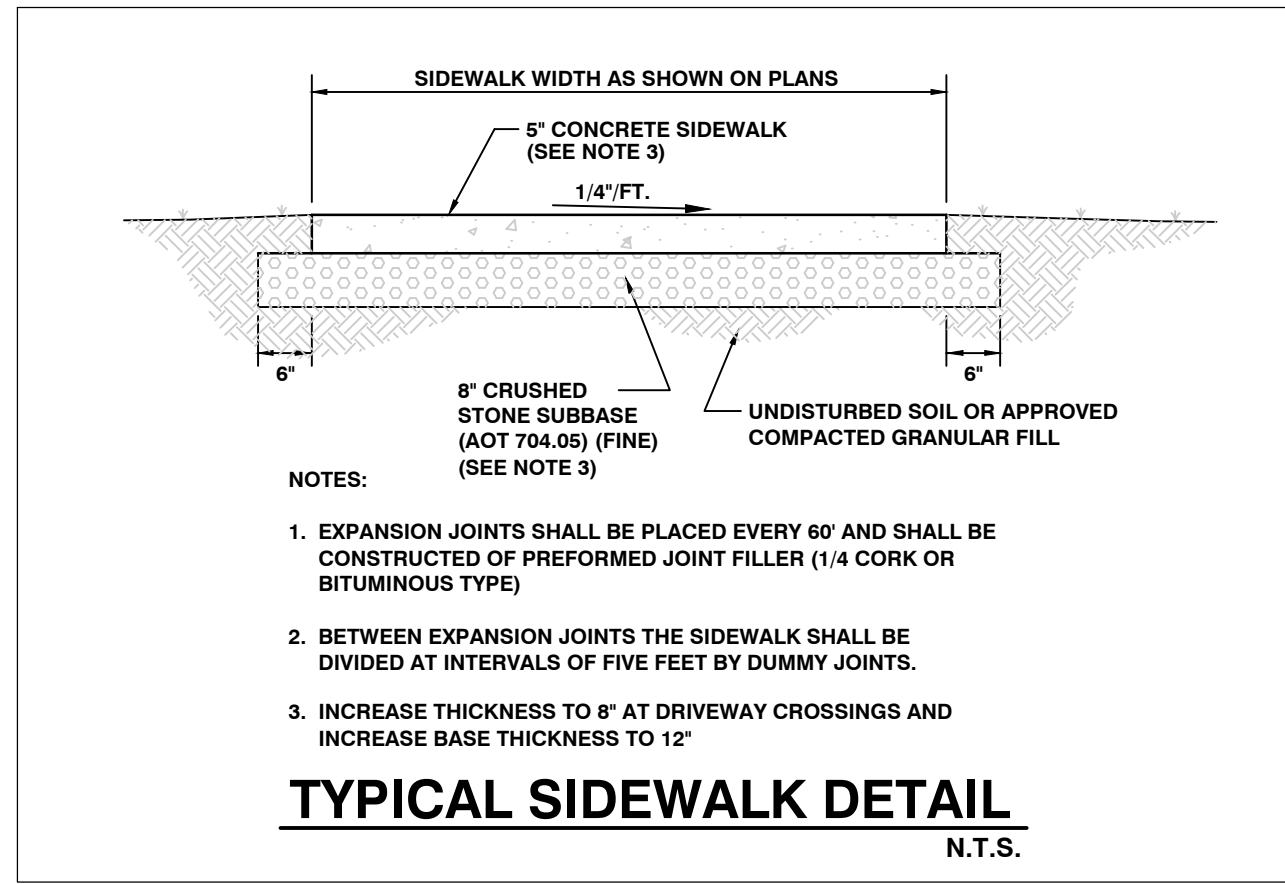
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14215

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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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P.O. BOX 1335  
BURLINGTON VERMONT 05402

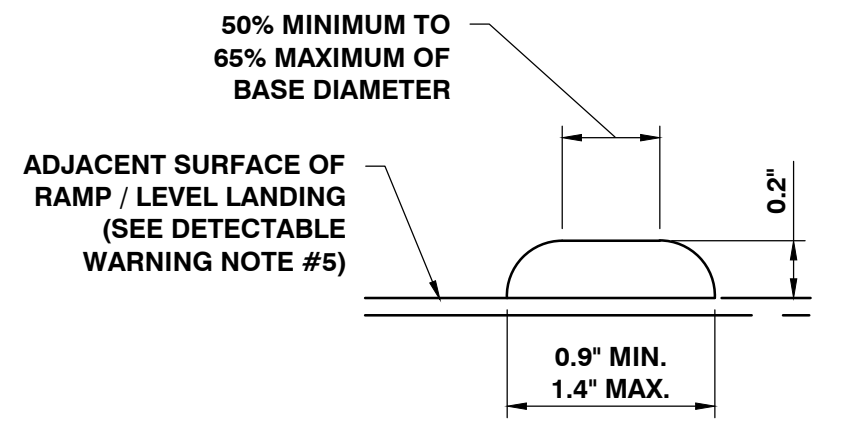
PROJECT:  
**CAMBRIAN RISE**  
311 & 329 NORTH AVE.  
BURLINGTON, VT

| DATE | CHECKED | REVISION |
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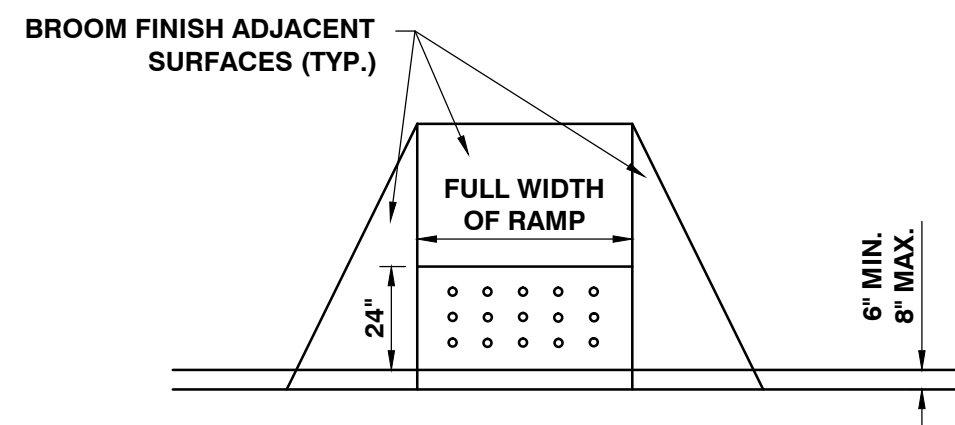
**SITE DETAILS**

DATE  
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SCALE  
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PROJ. NO.  
14215  
DRAWING NUMBER  
**C6.0**





DETECTABLE WARNING DETAILS



DETECTABLE WARNING PLACEMENT

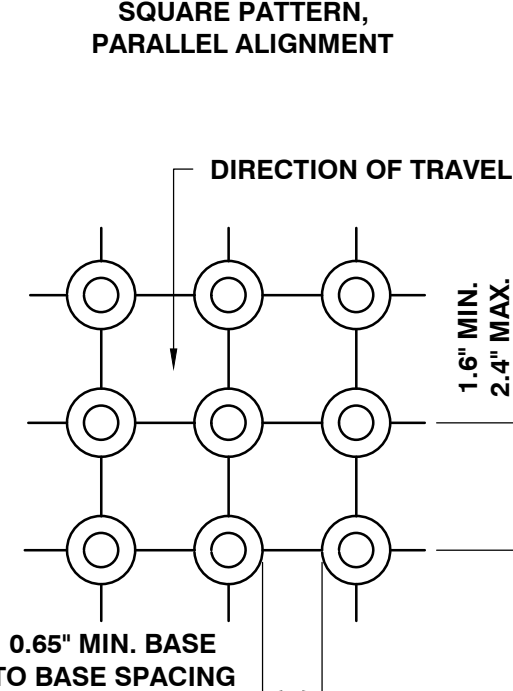
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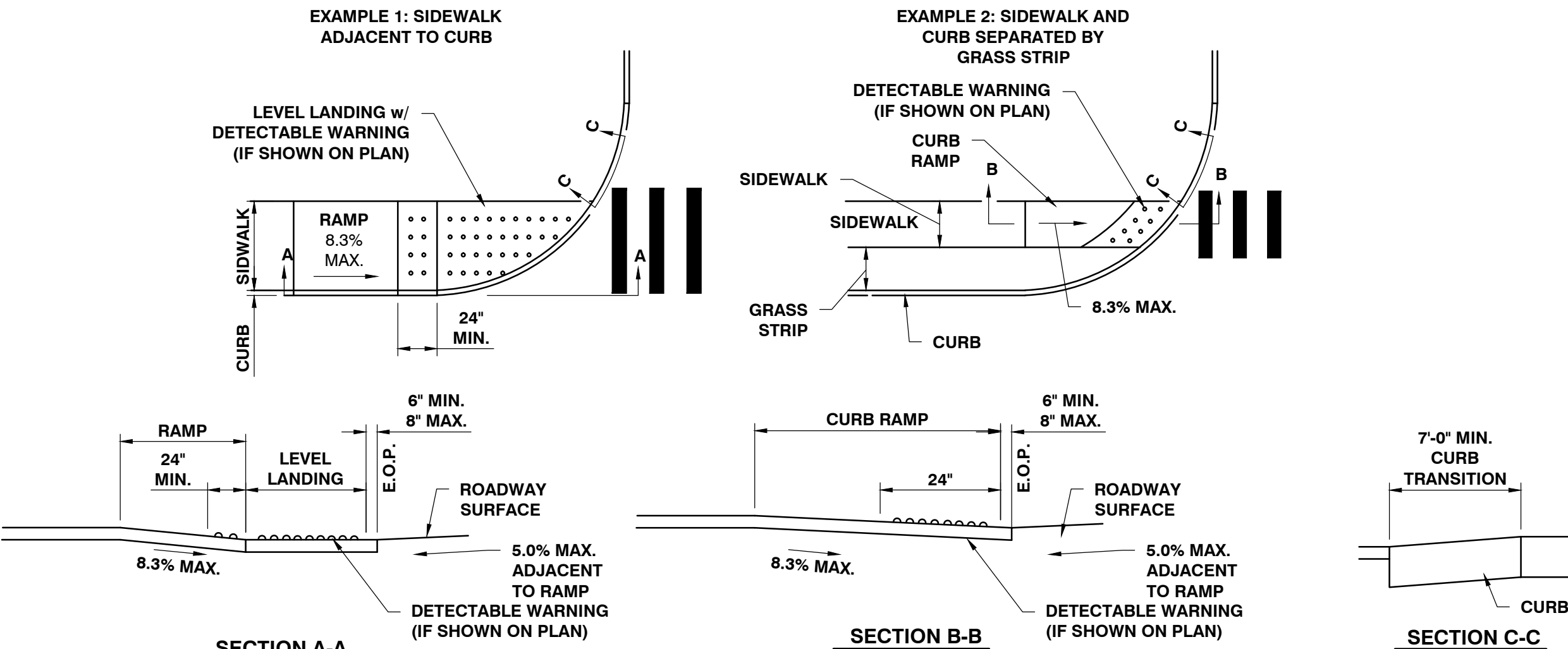
REVISED 08/01/2014

DETECTABLE WARNING NOTES

1. DETECTABLE WARNING SURFACES SHALL BE PAID FOR AS SPECIFIED IN THE CONTRACT.
2. CONCRETE ADJACENT TO ALL DETECTABLE WARNINGS SHALL HAVE A BROOM FINISH.
3. THE COLOR OF THE DETECTABLE WARNING SHALL PROVIDE A VISUAL CONTRAST TO THE SURROUNDING SURFACE AND SHALL BE AS SPECIFIED IN THE DOCUMENTS.
4. TRUNCATED DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF PEDESTRIAN TRAVEL.
5. FOR SURFACE APPLIED TRUNCATED DOME PRODUCTS, A MAXIMUM 0.25" VERTICAL CHANGE IN LEVEL IS ALLOWED. FOR CHANGES IN LEVEL BETWEEN 0.25" AND 0.50", A BEVEL WITH A MAXIMUM 1:2 SLOPE IS REQUIRED. CHANGES IN LEVEL GREATER THAN 0.50" MUST BE TREATED AS A RAMP - 8.3% MAXIMUM SLOPE.
6. SEE THE TOWN FOR A LIST OF ACCEPTABLE DETECTABLE WARNINGS MANUFACTURERS FOR ANY WARNINGS TO BE INSTALLED WITHIN THE PUBLIC RIGHT-OF-WAY.



SQUARE PATTERN, PARALLEL ALIGNMENT



TYPICAL HANDICAP RAMP - TYPE 1

N.T.S.

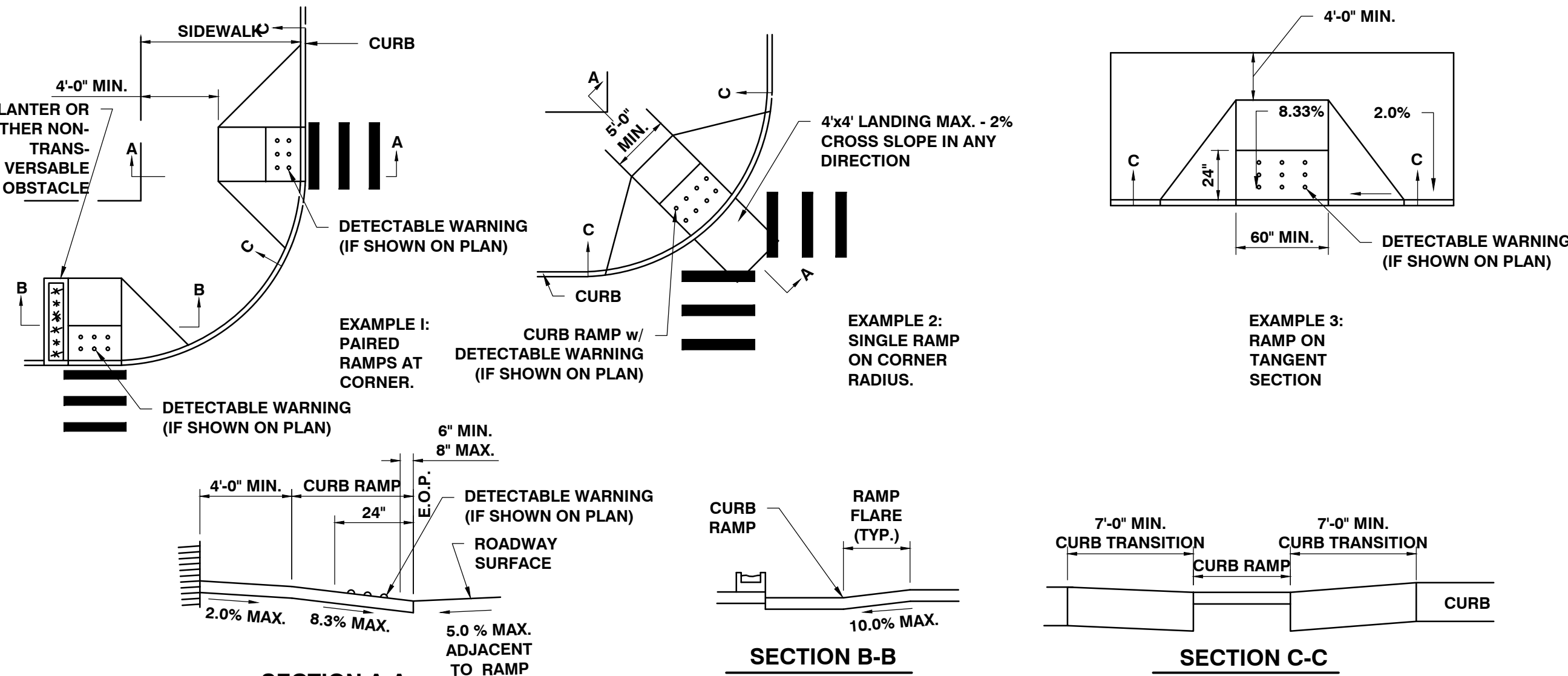
REVISED 08/01/2014

1. THE DIMENSIONS AND GRADES SHOWN ON THIS STANDARD WILL BE ADHERED TO IN THE DESIGN AND THE CONSTRUCTION OF SIDEWALK RAMPS. WHERE SIDEWALKS RUN ADJACENT TO ROADWAYS ON STEEP (5% OR GREATER) GRADES, RAMP GRADES WILL BE AS FLAT AS POSSIBLE. (ON LOW SIDE OF DRIVES AND INTERSECTING SIDE STREETS, RAMPS SHALL SLOPE TOWARDS DRIVE OR SIDE STREET @ 2%)
2. NOMINAL RAMP DIMENSIONS: RAMP WIDTH - 5'-0" MINIMUM RAMP SLOPE - 8.3% MAXIMUM FLARE SLOPE - 10% MAXIMUM RAMP CROSS SLOPE - 2.0% MAXIMUM
3. A LEVEL LANDING (NO GREATER THAN 2.0% SLOPE IN ANY DIRECTION) SHALL BE PROVIDED AT THE TOP OF SIDEWALK RAMPS TO ALLOW FOR STOPPING AND MANEUVERING OF WHEELCHAIRS.
4. LEVEL LANDINGS AT THE BOTTOM OF PERPENDICULAR RAMPS SHALL BE WHOLLY CONTAINED WITHIN MARKED CROSSWALKS.
5. DUMMY JOINTS SHALL BE PROVIDED AT TRANSITIONS (GRADE CHANGES) AT TOPS AND BOTTOMS OF RAMPS AND FLARES.
6. VERTICAL DROP-OFF EDGES TO RAMPS WILL NOT BE BUILT UNLESS THE RAMP ADJOINS THE ROADWAY.
7. NO VERTICAL "LIP" OR "CURB REVEAL" WILL BE PROVIDED WHERE THE RAMP ADJOINS THE ROADWAY.
8. AT MARKED CROSSWALKS, THE FULL WIDTH OF THE RAMP OR LANDING SHALL BE CONTAINED WITHIN THE PAVEMENT MARKINGS.
9. WHERE POSSIBLE, RAMP FLARES SHOULD BE LOCATED OUTSIDE THE DIRECT LINE OF TRAVEL MOST LIKELY TO BE FOLLOWED BY THE VISUALLY IMPAIRED.
10. SIGNS, POLES, PLANTERS, MAILBOXES, ETC. SHALL NOT BE LOCATED WHERE THEY WILL INTERFERE WITH THE USE OF SIDEWALK RAMPS.
11. WHERE POSSIBLE, SIDEWALK RAMPS SHOULD NOT BE LOCATED WHERE USERS MUST CROSS DROP INLET GRATES, MANHOLE COVERS OR OTHER ACCESS LIDS. IF THIS CANNOT BE AVOIDED THEN GRATE DESIGN AND PLACEMENT SHALL CONFORM TO ADA REQUIREMENTS.
12. CURB DRAINAGE SHOULD BE CONSTRUCTED SO AS TO PRECLUDE THE FLOW OF WATER PAST THE SIDEWALK RAMP.
13. WHEREVER FEASIBLE, TWO SIDEWALK RAMPS ARE RECOMMENDED IN PREFERENCE TO A SINGLE RAMP.
14. JOINTS WILL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT SIDEWALK SPECIFICATIONS, HOWEVER EXPANSION JOINTS WITHIN THE SIDEWALK RAMP AREA WILL BE AVOIDED WHEREVER POSSIBLE.
15. SIDEWALKS THAT ARE LESS THAN 5' WIDE REQUIRE 5' WIDE BY 5' LONG PASSING AREAS (NO GREATER THAN 2.0% CROSS SLOPE) AT INTERVALS NOT TO EXCEED 200 FEET.
16. E.O.P. = EDGE OF PAVEMENT
17. THE PUBLIC SIDEWALK CURB RAMP STANDARDS DEPICTED HERE MAY NOT BE APPROPRIATE FOR ALL LOCATIONS. FIELD CONDITIONS AT INDIVIDUAL LOCATIONS MAY REQUIRE SPECIFIC DESIGNS. DESIGNS MUST BE CONSISTENT WITH THE PROVISIONS OF THIS SHEET TO THE MAXIMUM EXTENT FEASIBLE ON ALTERATION PROJECTS AND WHEN STRUCTURALLY PRACTICABLE ON NEW CONSTRUCTION PROJECTS AS REQUIRED BY THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.
18. ALL AREAS OF SIDEWALK RAMPS SHALL HAVE EXPOSED AGGREGATE.

HANDICAP RAMP NOTES

N.T.S.

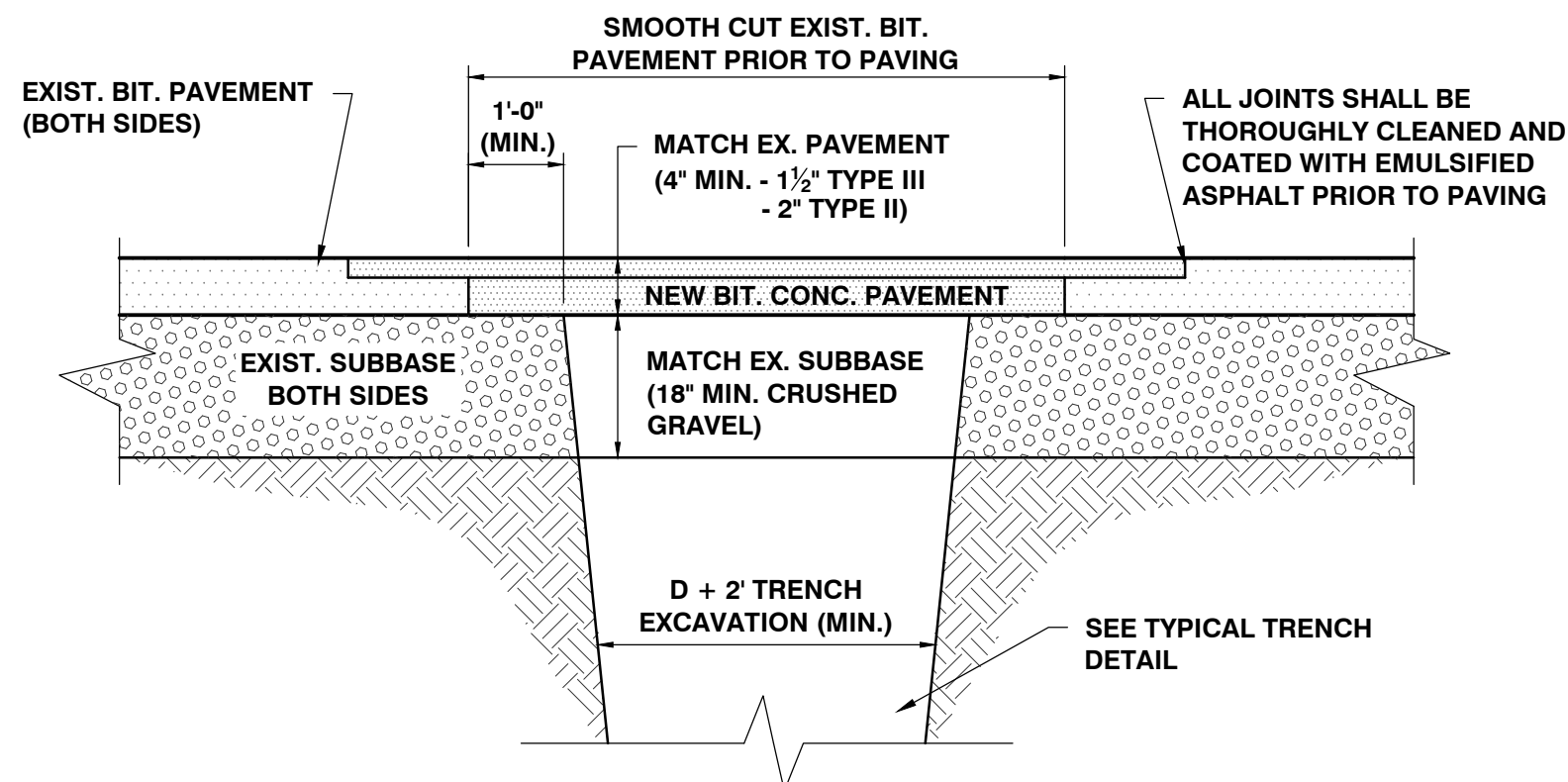
REVISED 08/01/2014



TYPICAL HANDICAP RAMP - TYPE 2

N.T.S.

REVISED 11/21/2016



NOTES:

1. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE-WAY TRAFFIC AT ALL TIMES DURING WORK WITHIN THE R.O.W.
2. MAINTENANCE AND PROTECTION OF TRAFFIC DURING WORK WITHIN THE HIGHWAY R.O.W. SHALL BE PROVIDED IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL NOT WORK WITHIN THE R.O.W. WITHOUT APPROPRIATE CONSTRUCTION SIGNING IN PLACE.
3. ALL BACKFILL SHALL BE MADE IN SIX INCH (6") LIFTS AND COMPACTED TO NOT LESS THAN 95% MAXIMUM DRY DENSITY ACCORDING TO ASTM D698.
4. REPLACE EXISTING ROAD STRIPING AS NECESSARY.

REPLACEMENT OF EXISTING PAVEMENT

N.T.S.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.  
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403  
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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

DATE CHECKED REVISION

SITE DETAILS

DATE

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SCALE

NONE

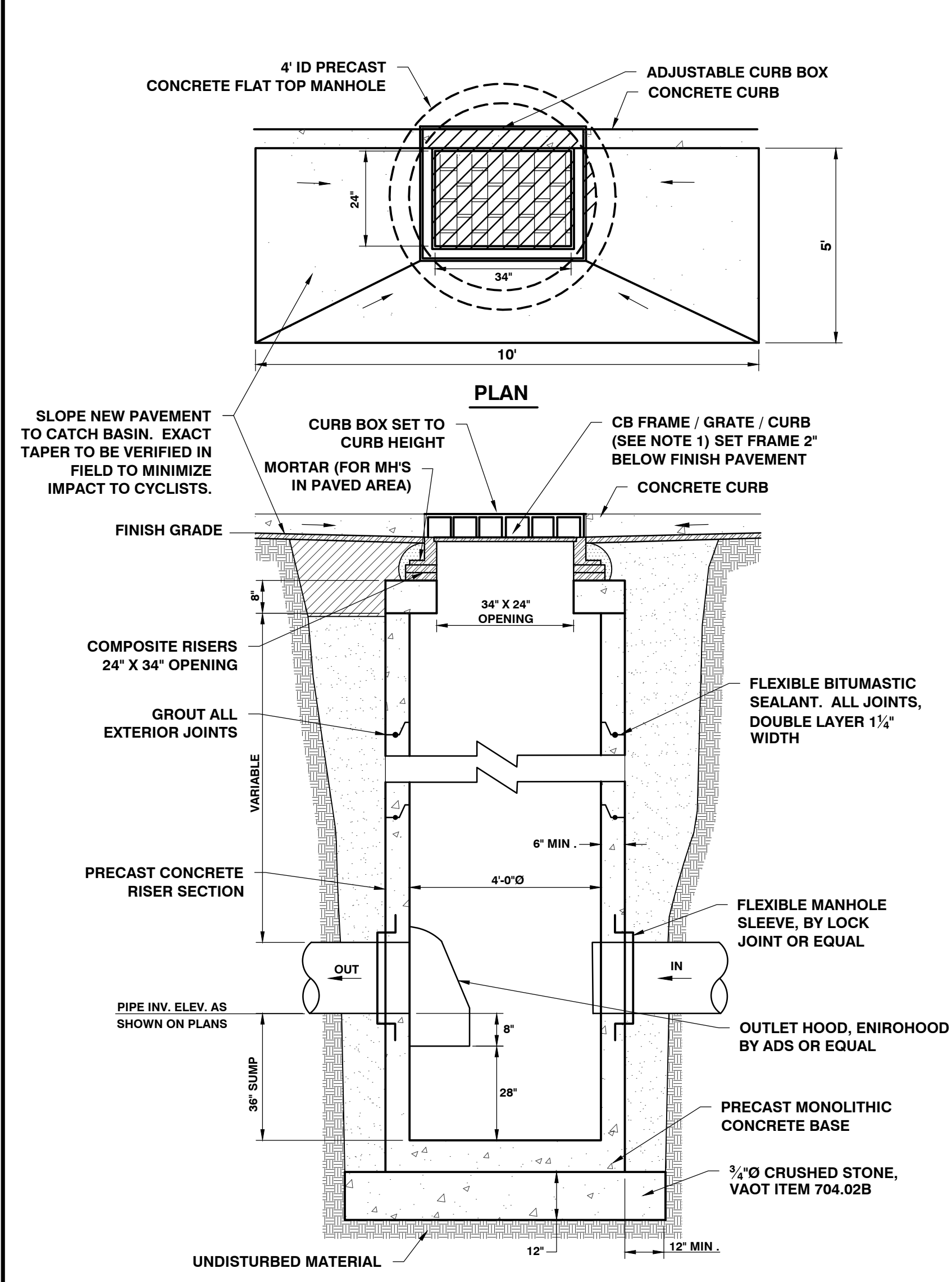
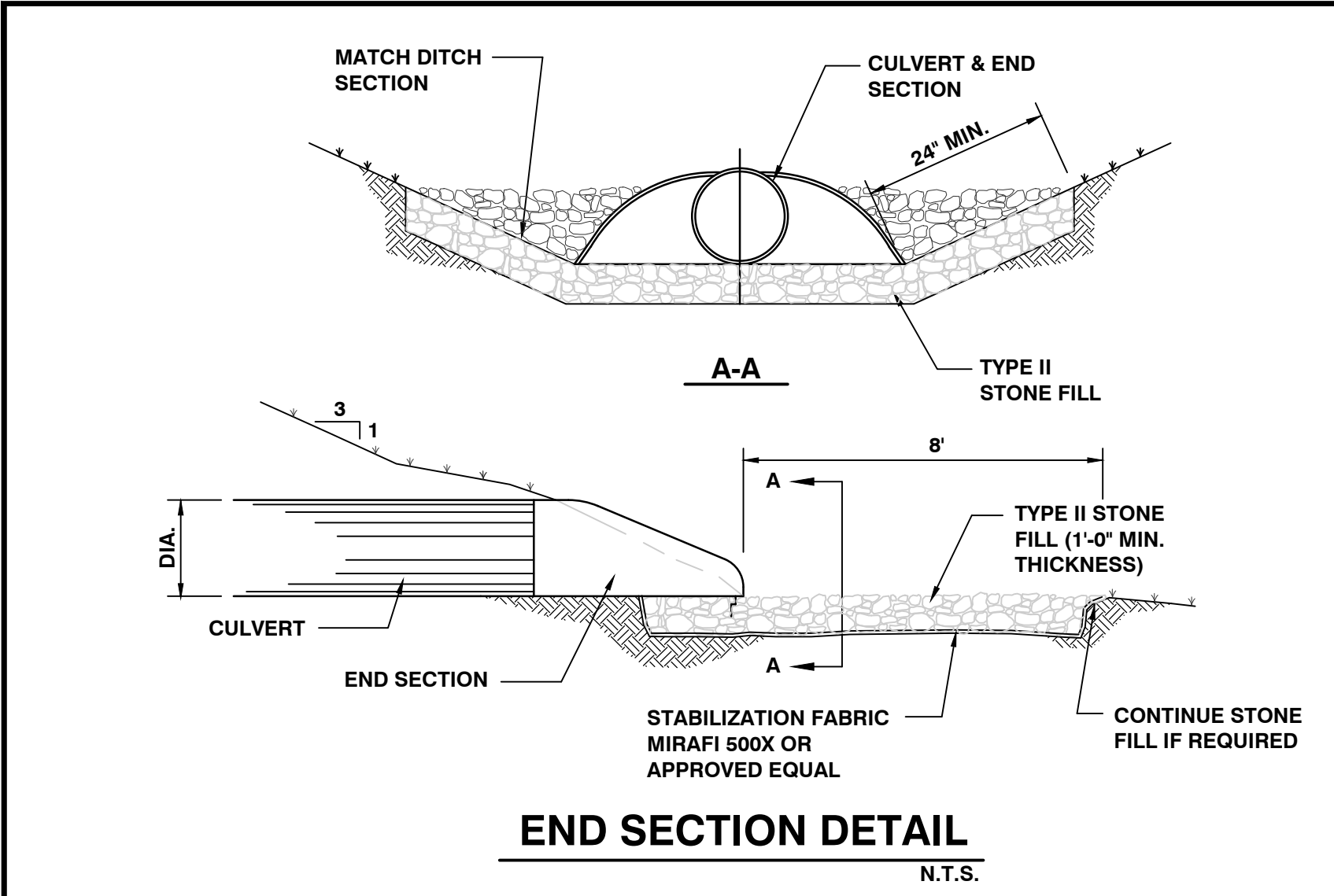
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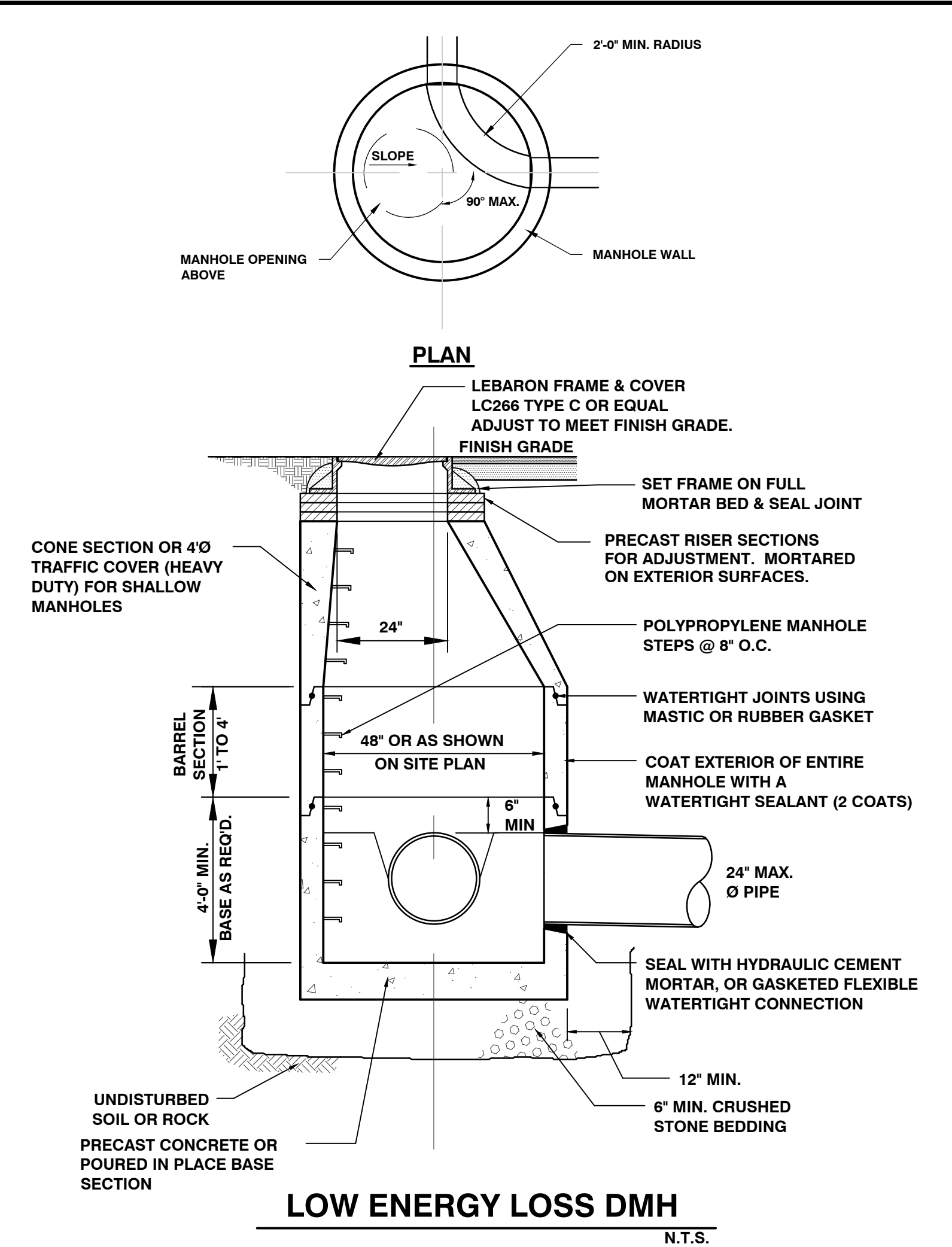
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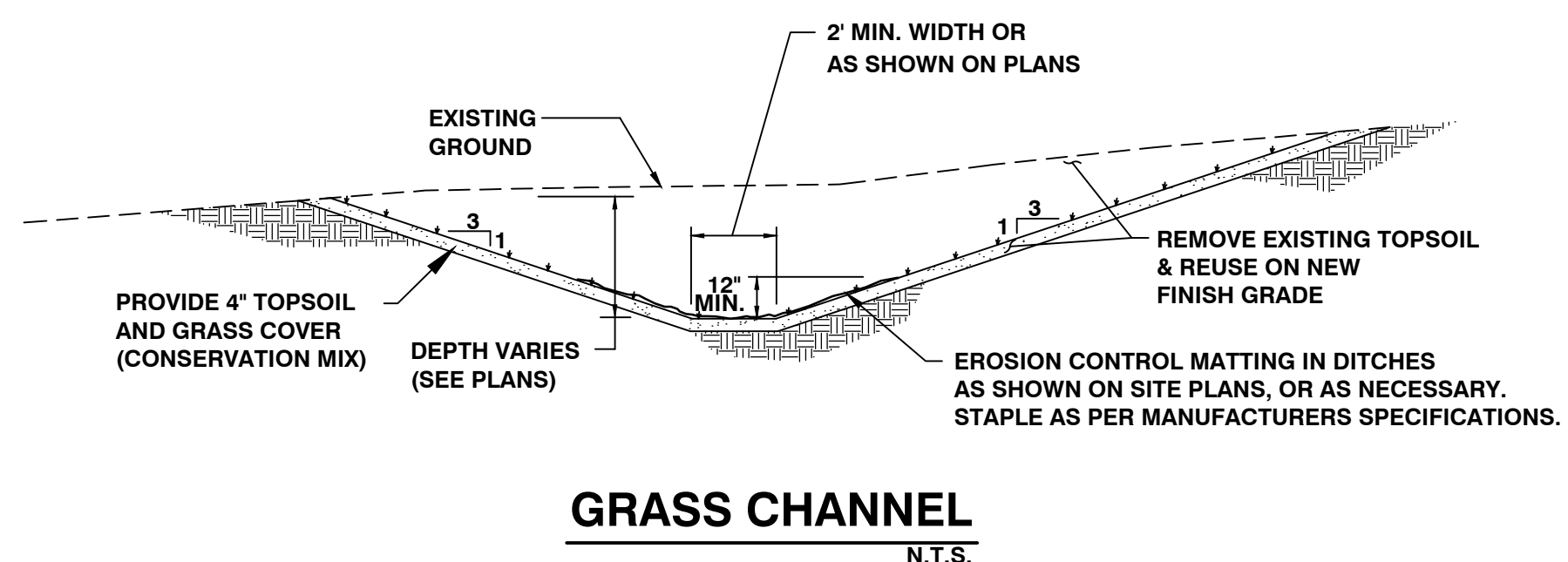


- NOTES
1. PROVIDE CATCH BASIN FRAME/GRATE/CURB BY EAST JORDAN IRON WORKS, FRAME-7510Z1, GRATE-7510M3, BACK CURB GRATE-7030T4, NEENAH STYLE, OR EQUAL.
  2. CONCRETE=4,000 psi; STEEL REBAR-40,000 psi
  3. STRUCTURES SHALL BE DESIGNED TO WITHSTAND AN H2O LOADING.
  4. STANDARD 4' CATCH BASIN BY CAMP PRECAST, SD IRELAND, OR EQUAL.
  5. VERTICAL DISTANCE BETWEEN THE TOP OF THE CONCRETE STRUCTURE AND PROPOSED RIM ELEVATION SHALL BE MINIMUM 12" TO ALLOW FOR THE PLACEMENT OF RISERS, MORTAR, FRAME AND GRATE SUCH THAT RIM IS 2" BELOW FINISH PAVEMENT.

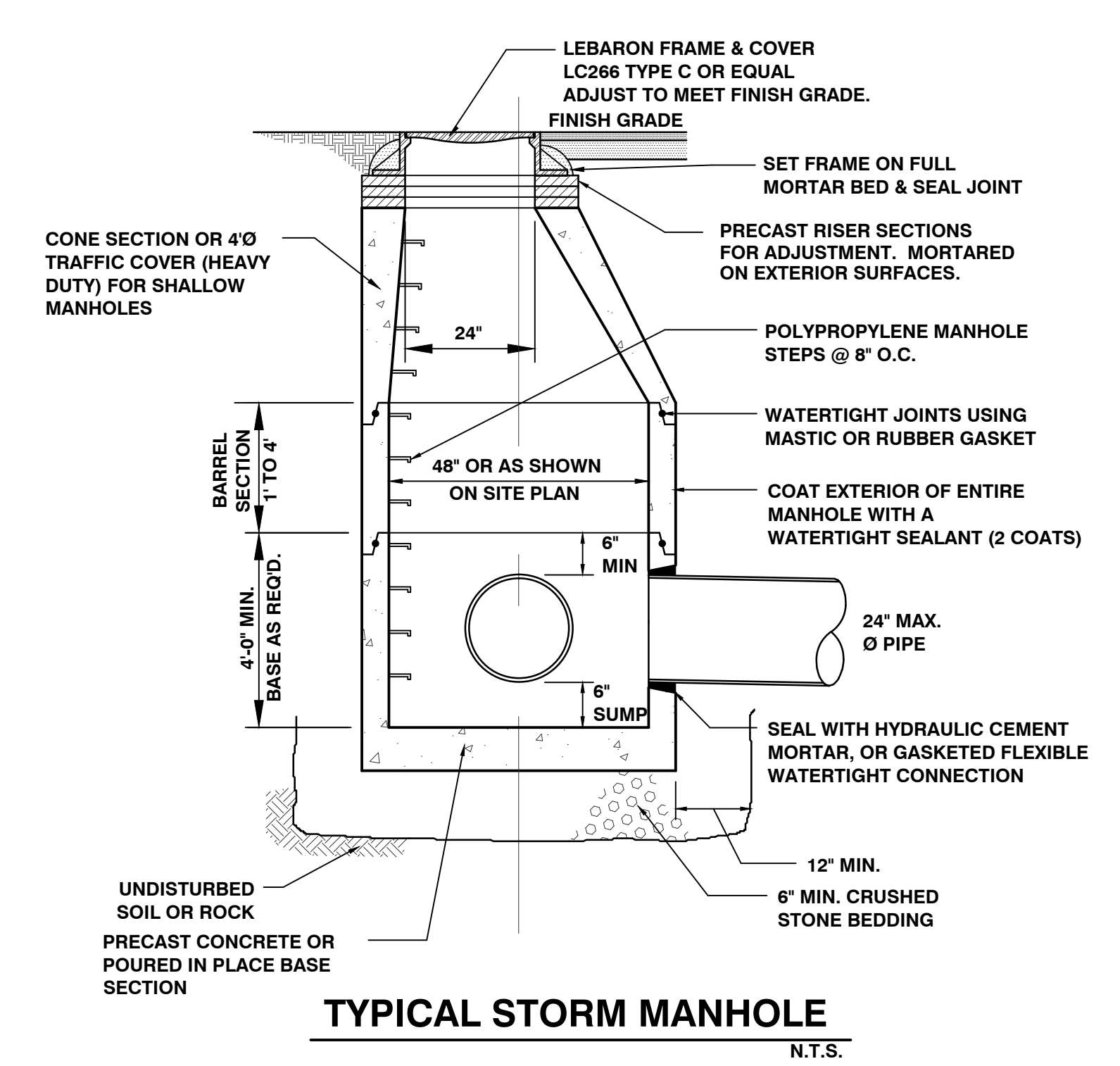
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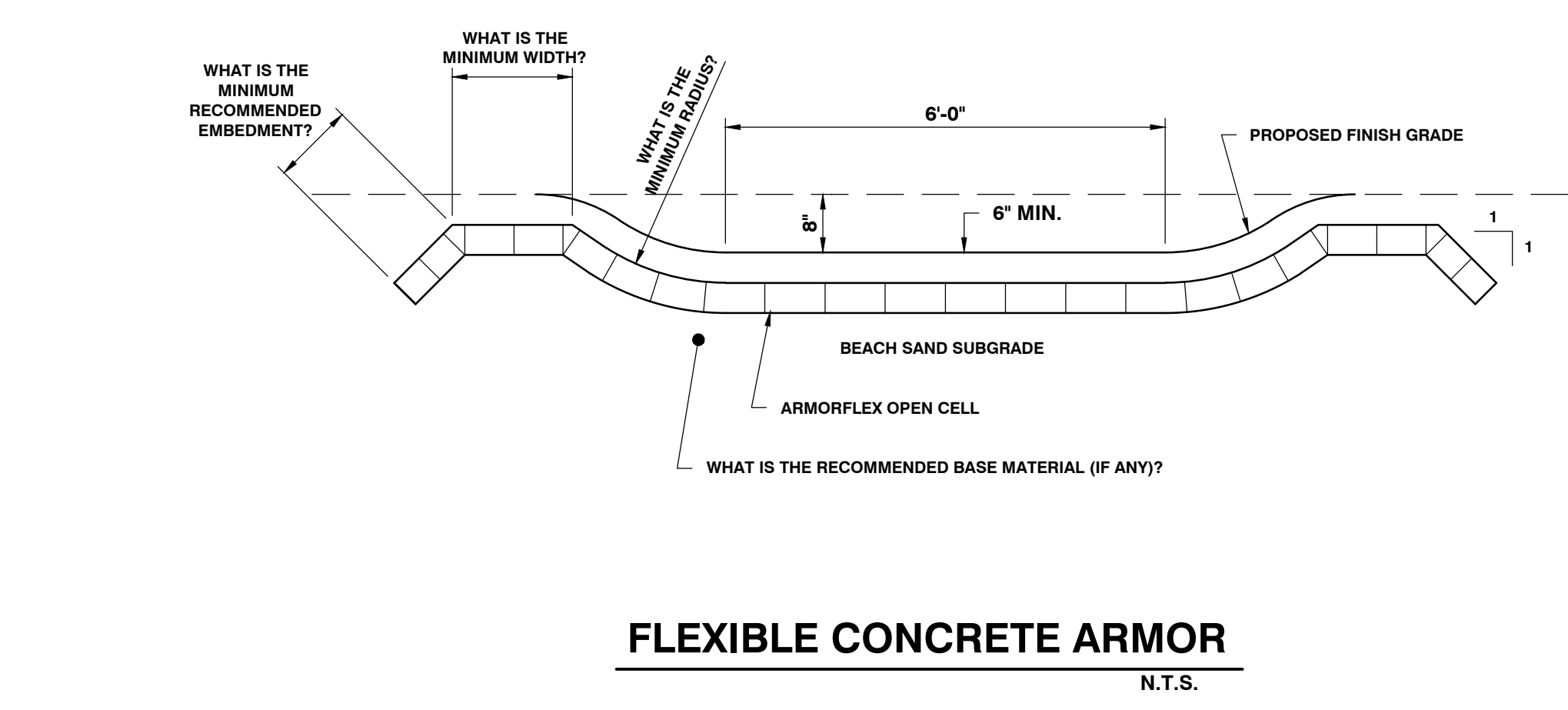
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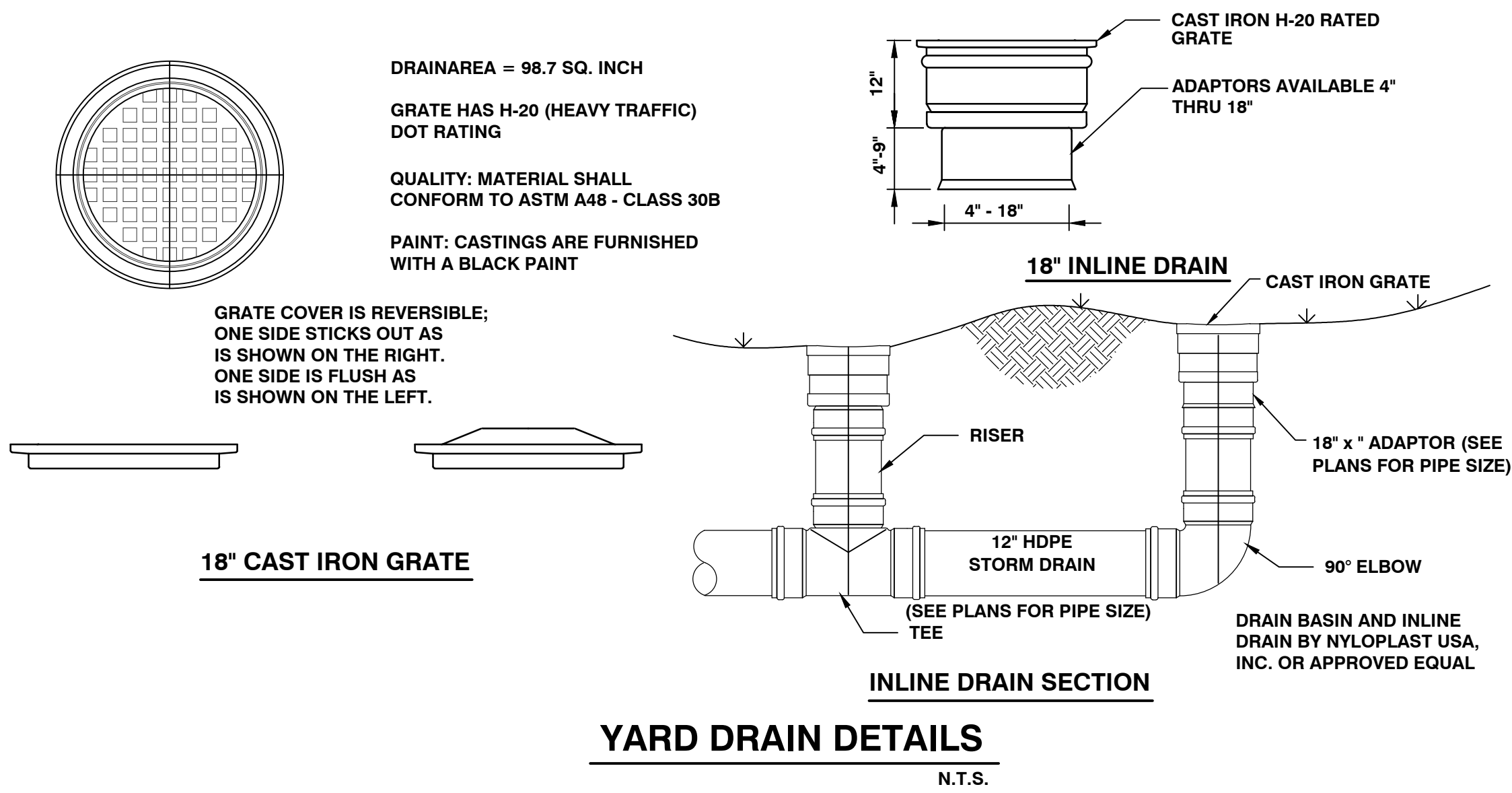
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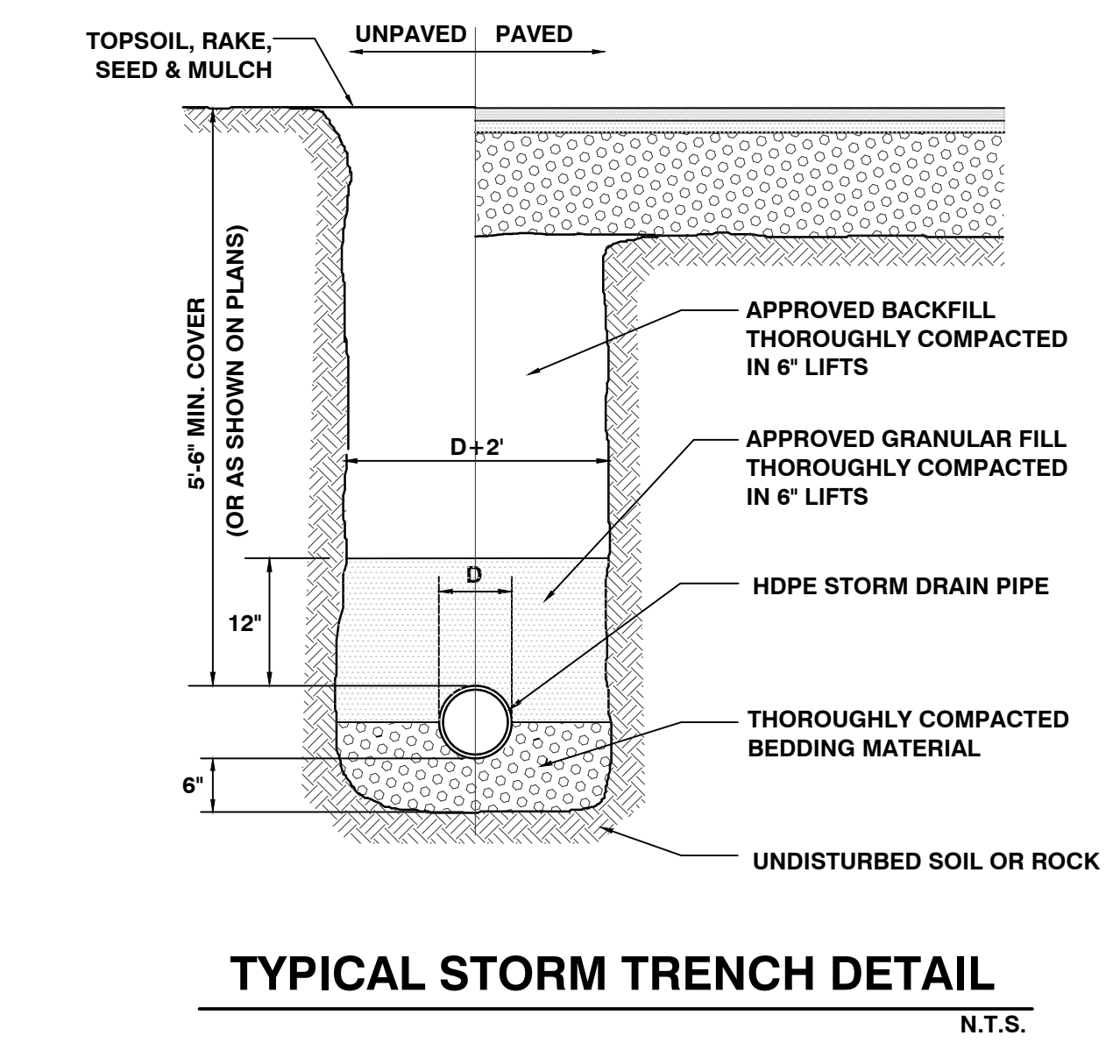
TYPICAL STORM MANHOLE  
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FLEXIBLE CONCRETE ARMOR  
N.T.S.



YARD DRAIN DETAILS  
N.T.S.



TYPICAL STORM TRENCH DETAIL  
N.T.S.

- NOTES:
1. Compaction of backfill and bedding shall be a minimum of 90% (95% under roadway surfaces) of maximum dry density determined in the standard proctor test (ASTM D698).
  2. Bedding material shall not be placed on frozen subgrade.
  3. Approved backfill shall not contain any stones more than 12" in largest dimension (6" in roadways, 2" maximum diameter within 2' of the outside of the pipe), or contain any frozen, wet, or organic material.
  4. Trenches shall be completely dewatered prior to placing of pipe bedding material and kept dewatered during installation of pipe and backfill.
  5. In trenches with unstable materials, trench bottom shall first be stabilized by placement of filter fabric then crushed stone (3/4" maximum).
  6. The sides of trenches 4' or more in depth entered by personnel shall be sheeted or sloped to the angle of repose as defined by O.S.H.A. standards.
  7. Bedding material shall consist of crushed stone, with a maximum size of 3/4". Submit a sample to the Engineer for approval.
  8. Granular backfill shall consist of crushed stone, crushed gravel, gravel or sand.

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

CLIENT:  
  
BC COMMUNITY  
HOUSING, LLC  
  
P.O. BOX 1335  
BURLINGTON VERMONT  
05402

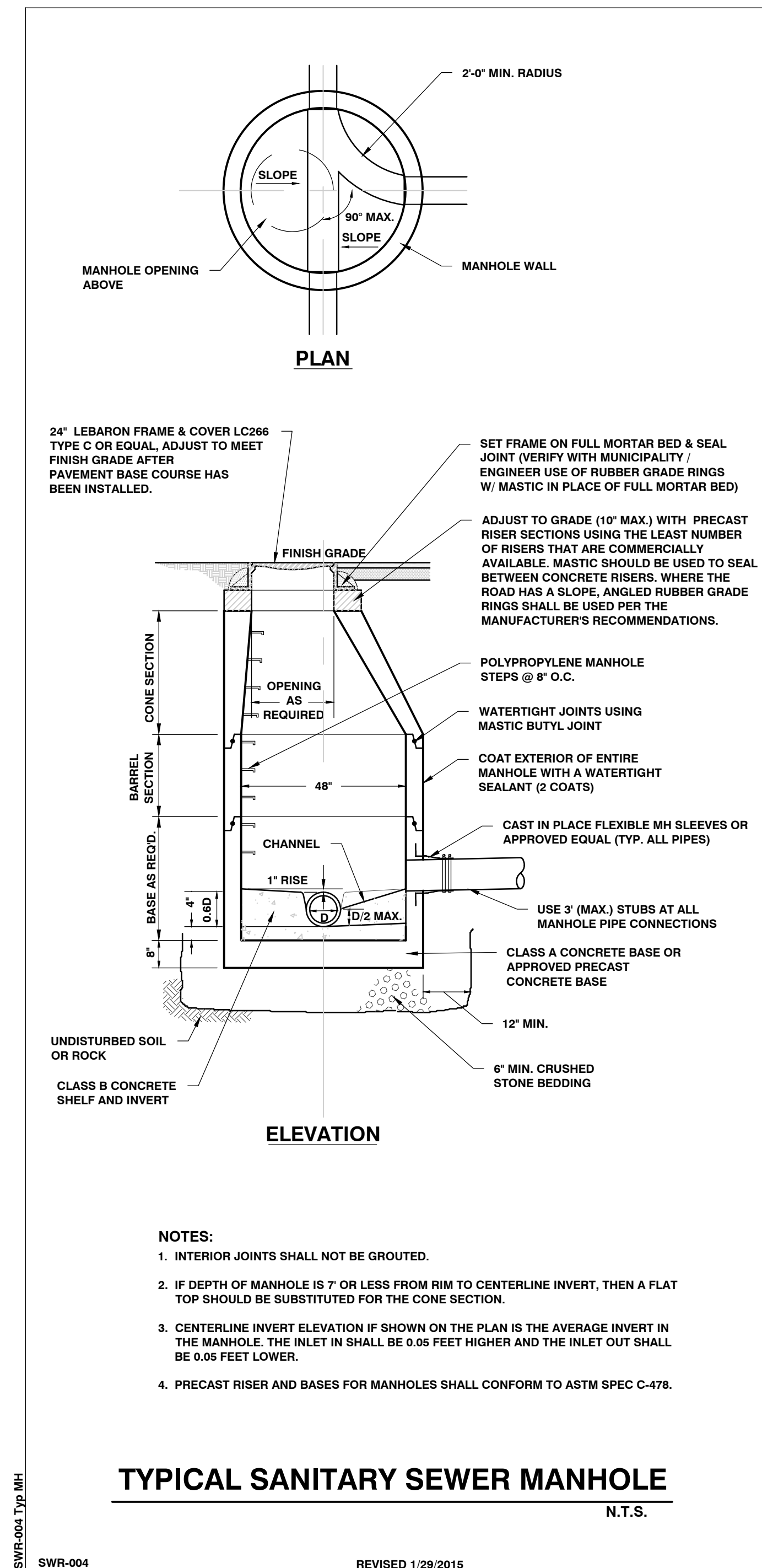
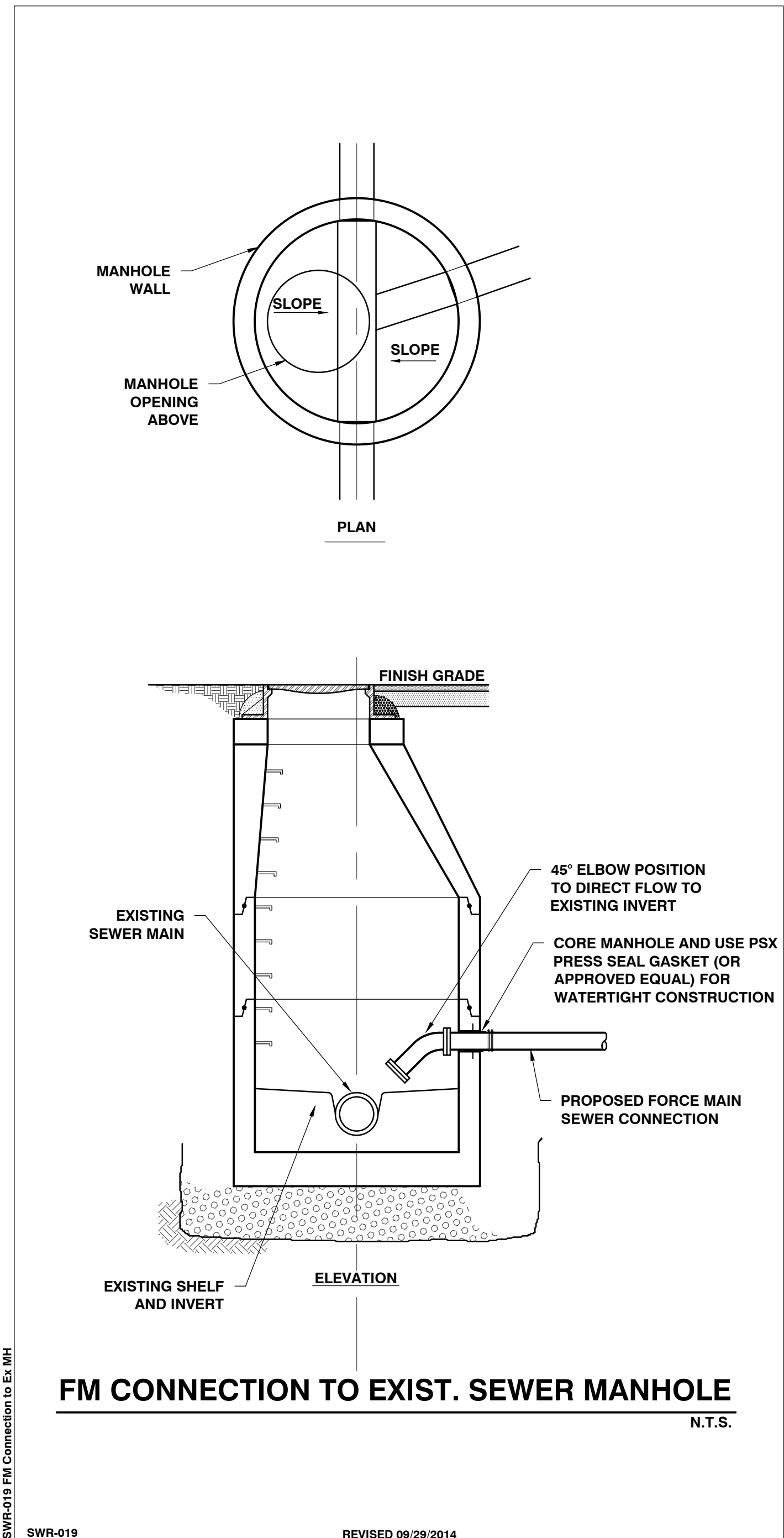
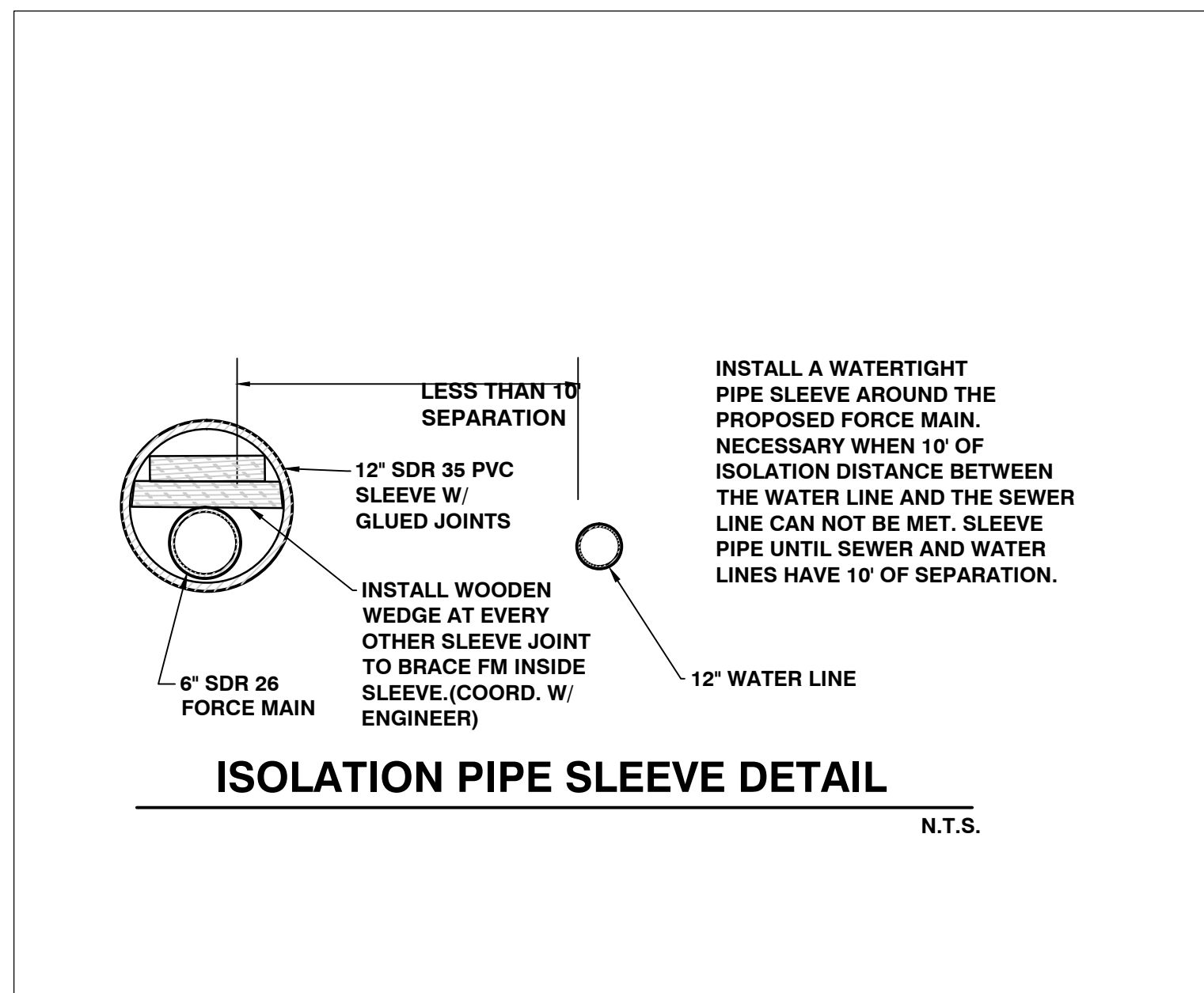
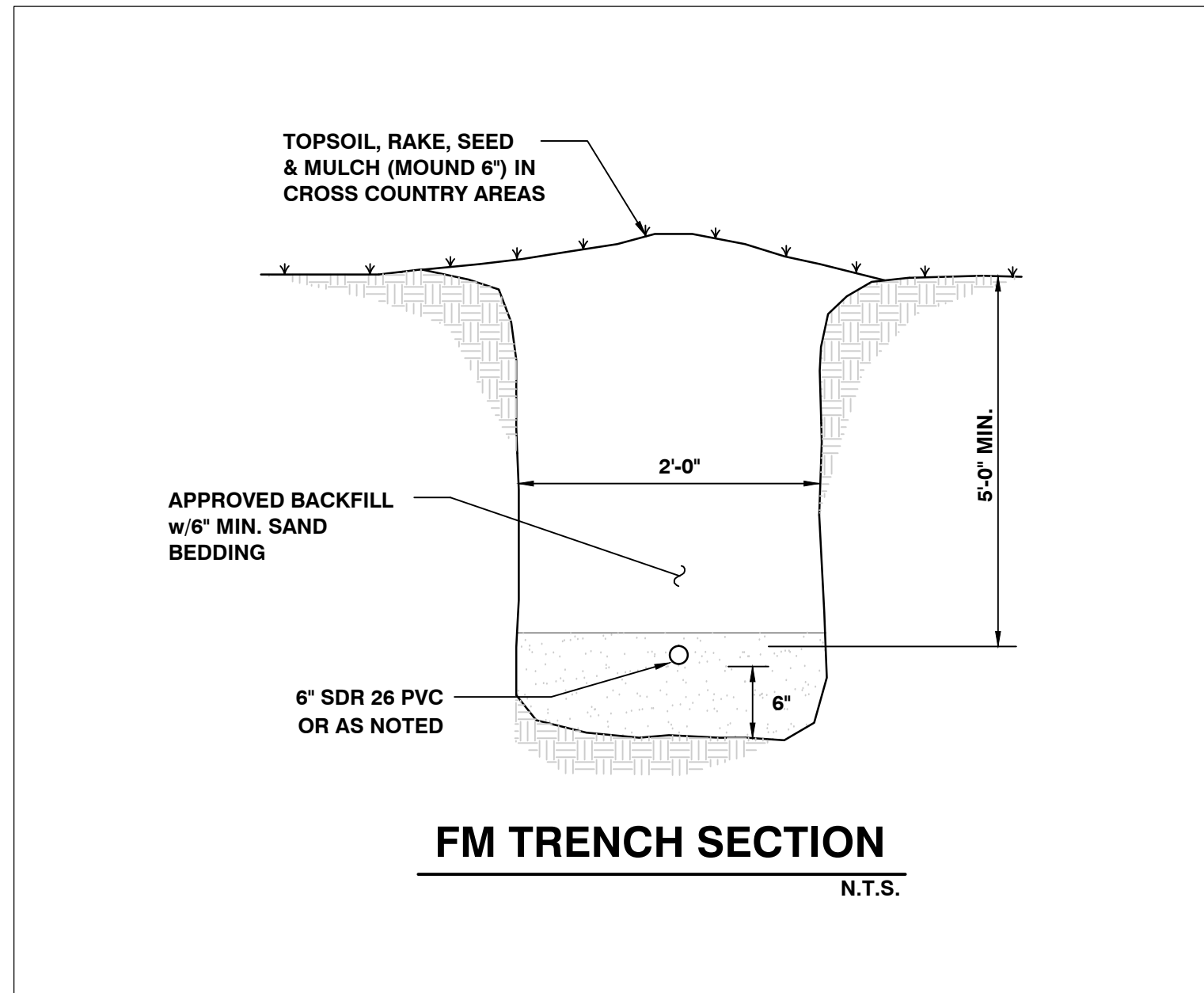
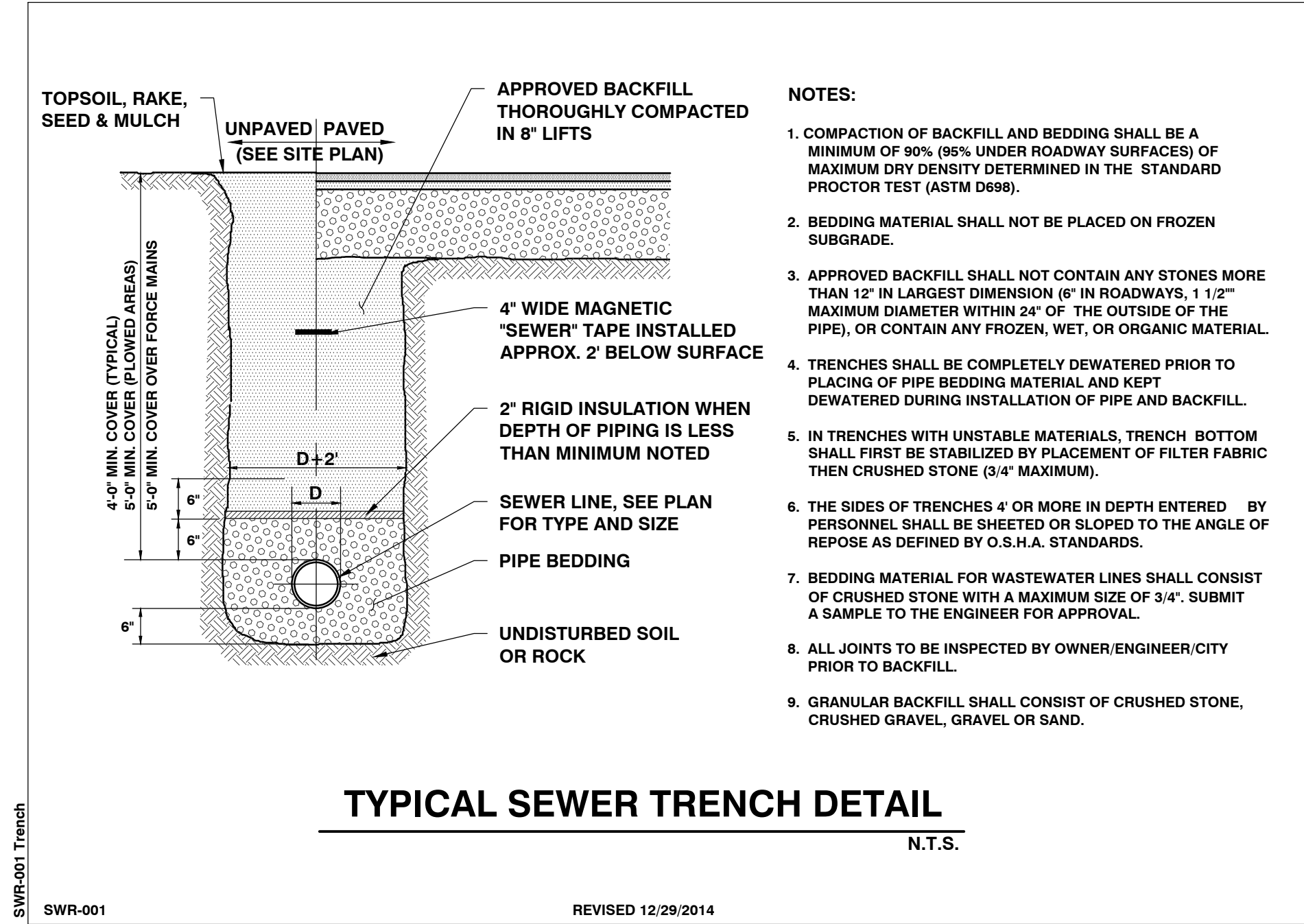
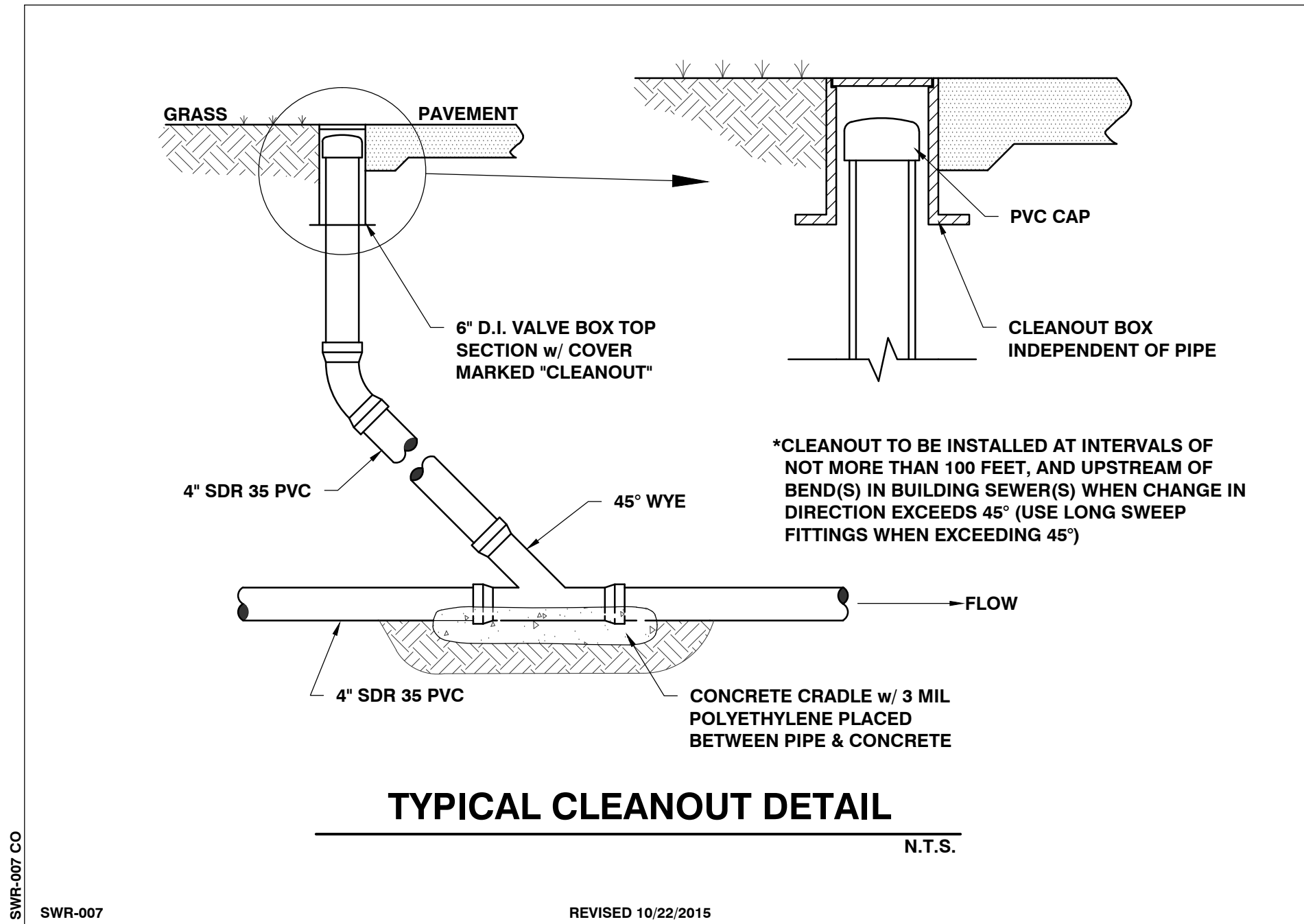
PROJECT:  
  
CAMBRIAN RISE  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

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SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.  
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403  
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CLIENT:

**BC COMMUNITY HOUSING, LLC**

P.O. BOX 1335  
BURLINGTON VERMONT 05402

PROJECT:

**CAMBRIAN RISE**

311 & 329 NORTH AVE.  
BURLINGTON, VT

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**SEWER DETAILS**

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PROJ. NO.  
14215

DRAWING NUMBER  
**C6.3**



PROJECT COORDINATION    UPDATED 8/5/16

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 CLEARING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

1. Remove surface debris.
2. Clear site of plant life and grass.
3. Remove trees and shrubs.
4. Remove root system of trees and shrubs.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 PROTECTION

- A. Protect utilities that remain from damage.
- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect bench marks and existing structures from damage or displacement.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.
- 3.02 CLEARING
- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within marked areas. Remove stumps, roots and tap roots and other projections 14" or greater in diameter to 2'-0" below the excavated surfaces in cut areas and 2'-0" below the exposed subgrade in fill areas.

3.03 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. The Contractor shall coordinate Work with the Engineer and Owner in establishing suitable areas within the property limits for depositing debris, rocks and extracted plant life. The Contractor shall be responsible for backfilling (capping) and grading all waste sites.

3.04 UTILITIES

- A. Coordinate with utility companies and agencies as required.

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<br>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<br>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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 3"                | 100                                            |
| 3/4"              | 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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 1"                | 100                                            |
| 3/4"              | 90 – 100                                       |
| 3/4"              | 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 |
|-------------------|-------------------------|
| 3 1/2"            | 100                     |
| 3"                | 90 – 100                |
| 2"                | 75 – 100                |
| 1"                | 50 – 80                 |
| 1/2"              | 30 – 60                 |
| No. 4             | 15 – 40                 |
| No. 200           | 0 – 6                   |

2.1. RECYCLED ASPHALT PAVEMENT (RAP) 1 1/2" 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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 2"                | 100                                            |
| 1 1/2"            | 90 – 100                                       |
| No. 4             | 30 – 60                                        |
| No. 100           | 0 – 12                                         |
| No. 200           | 0 – 6                                          |

2.6 SAND BORROW AND CUSHION

- A. Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the requirements for Vermont AOT Standard Specifications and the gradation requirements shown in Table 703.03A of the Vermont AOT Standard Specifications.

| Sieve Designation | Percent Finer by Weight |
|-------------------|-------------------------|
| 2"                | 100                     |
| 1 1/2"            | 90 – 100                |
| 1/2"              | 70 – 100                |
| No. 4             | 60 – 100                |
| No. 100           | 0 – 20                  |
| No. 200           | 0 – 8                   |

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. 40 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 some 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 disk, 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<br>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.

SITE ENGINEER:



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

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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

DATE CHECKED REVISION

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SPECIFICATIONS

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| <p>the leakage determined on the basis of depth and size of structure. The leakage for each structure shall not exceed one gallon per vertical foot per 15 linear feet of wall (as measured in plan view) for a 24 hour period for exfiltration and there shall be no visible infiltration.</p> <p>C. Air Test: Alternatively, the manhole may be tested for leakage using the following procedure:</p> <p>1. All lifting hole and exterior joints shall be filled and pointed with an approved non-shrinking mortar. The completed manhole shall not be backfilled prior to testing. Structures that have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage by means of a hydrostatic test.</p> <p>2. All pipes and other openings in the manhole shall be suitably plugged in a manner to prevent displacement.</p> <p>3. A plate with an inflatable rubber ring the size of the top of the manhole shall be installed by inflating the ring with air to a pressure adequate to prevent leakage of air between the rubber ring and the manhole wall.</p> <p>4. Air shall then be pumped out of the manhole through an opening in the plate until a vacuum is created inside of the manhole equal to 10 inches of mercury on an approved vacuum gauge. The removal of the air shall then be stopped and the test time begin.</p> <p>5. The vacuum must not drop below 9 inches of mercury within a 2 minute test period. If more than 1 inch of drop in vacuum occurs within the 2 minute test period the manhole has failed the test and shall be repaired or reconstructed and retested.</p> <p>D. Following satisfactory test results, the manhole may be backfilled.</p> <p>3.09 SERVICE CONNECTION</p> <p>No sanitary sewer shall be placed in service until such time as the Town has given final approval to the sewer installation, including satisfactory completion of all required tests. Service connections shall not be made until all receiving sewer mains have been completed and approved and as-built drawings received along with GPS coordinates and approved by the Town Wastewater Department.</p> <p>A. Laterals</p> <p>Where required on the plans, sewer service connections for one house shall be constructed of four inch (4") pipe, unless otherwise noted on the plans, of the type material specified under this section. The pipe shall be laid and its joints made as required for sewer construction in this specification. Open ends of pipes shall be properly sealed to prevent damage and intrusion of foreign matter where hookup to the building sewer is not coincident with sewer main construction. Additionally, the Contractor will provide a stable, temporary marker approved by the Town Wastewater Department from the sewer service invert up to six inches (6") above the finish grade and seated securely into the ground for ease in relocating the end of sewer service connection for hooking up the building sewer. Two (2) tie points to permanent objects shall be documented. The tie points shall be submitted to the homeowner and to the Wastewater Department.</p> <p>In the case of reconnection of existing sewers, such reconnection will be made only after the new sewer main has been completed, tested, and accepted. The excavation, bedding material, installation, and backfill for service connections shall be the same as for sewer mains.</p> <p>B. Cleanouts for Sewers</p> <p>Cleanouts for gravity sewers and force mains shall be provided at locations indicated on the plans or as directed by the Town Wastewater Department. Cleanout frames and covers against each other shall be machined to give continuous contact throughout their circumference. All iron castings shall be thoroughly cleaned and then coated with hot coal tar before being delivered. Individual laterals shall have cleanouts every one hundred feet (100'). Cleanouts shall also be installed in laterals with changes of alignment of 45 degrees or greater.</p> <p>C. Chimneys</p> <p>Chimneys shall be built of four inch (4") pipe and/or as indicated on the contract drawings. Each chimney shall be plugged or capped at end until ready to connect to existing services. Chimneys are required where the vertical drop between the finished grade surface and the main sewer line exceeds fifteen feet (15') at the wye from a service connection.</p> <p>3.10 Force Main</p> <p>After force mains have been laid and the trench backfilled, the pipe shall be subjected to a hydrostatic pressure test in accordance with AWWA Standard for Installation of Cast Iron Water Main, AWWA C600 (latest issue), Section 13. The hydrostatic pressure shall be 150 percent (150%) of normal operational pressure. After the pressure test has been satisfactorily completed, a leakage test shall be conducted in accordance with AWWA C600 (latest issue), Section 13. The minimum test pressure shall be 75 pounds per square inch at the high point in the system.</p> <p>3.11 Wet well</p> <p>The pre-cast concrete wet well shall be externally coated with an asphaltic sealant and tested for water tightness using an approved vacuum or water testing procedure.</p> <p>PART 4 – PUMP STATION</p> <p>4.00 SPARE PARTS</p> <p>A. A complete replacement pump shaft seal assembly shall be furnished with each lift station. The spare seal shall be securely fastened to the control panel and shall include complete installation instructions.</p> <p>B. Two (2) spare volute gaskets shall be provided.</p> <p>C. A spare filter cone for the seal filter shall be provided in the same container as the pump shaft seal.</p> <p>D. Provide 100% spare lamps and fuses for control panel.</p> <p>E. Provide all lubricants required for initial operation.</p> <p>F. Provide one (1) spare input and output cord, processor, and power supply for the Programmable logic controller (PLC) system.</p> <p>G. Provide one (1) spare level transducer.</p> <p>4.01 O &amp; M MANUALS</p> <p>A. Installation of all mechanical equipment shall be done in accordance with written instructions provided by the manufacturer. Installation instructions shall be delivered with the station.</p> <p>B. The manufacturer shall provide 5 copies of a complete and detailed operating and maintenance manual. This manual shall provide all design criteria, general operating procedures, maintenance and servicing procedures for all major components, and as-built drawings of the contributory gravity sewer system, the pumping station and force main. All instructions and parts lists shall be prepared for the specific equipment furnished and shall not refer to similar equipment. Operating manuals must be submitted to the Town prior to final acceptance of the station.</p> <p>4.02 POLYETHYLENE (PE3408) SANITARY SEWER FORCE MAINS</p> <p>A. This specification covers requirements for PE3408 high density polyethylene sanitary sewer force mains. All work shall be performed in accordance with these specifications and manufacturer requirements.</p> <p>B. <u>Referenced Standards.</u> All standard specifications, i.e., Federal, ANSI, ASTM, etc., made a portion of these Specifications by reference, shall be the latest edition and revision thereof.</p> <p>C. <u>Warranty and Acceptance.</u> The Contractor shall warrant all work to be free from defects in workmanship and materials for a period of one year from the date of completion of all construction. If work meets these specifications, a letter of acceptance, subject to the one year warranty period, shall be given at the time of completion. A final acceptance letter shall be given upon final inspection at the end of the one year warranty period, provided the work still complies with these specifications. In the event deficiencies are discovered during the warranty period, they shall be corrected by the Contractor without additional charge to the owner before final acceptance. During the warranty period, the Project Engineer shall determine if warranty repairs or replacement work shall be performed by the Contractor. The decision of the Project Engineer shall be binding upon the Contractor.</p> <p>D. <u>Polyethylene Pipe and Fittings</u></p> <p>1. <u>Qualification of Manufacturers.</u> The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these Specifications. The manufacturer's production facilities shall be open for inspection by the Owner or his Authorized Representative. Qualified manufacturers shall be approved by the Project Engineer.</p> <p>2. <u>Materials.</u> Materials used for the manufacture of polyethylene pipe and fittings shall be PE3408 high density polyethylene (SDR 11 or better) meeting cell classification 345444C or 345444E per ASTM D 3350; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute's TR-4, <u>Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fitting</u></p> <p><u>Compounds</u>, with a standard grade HDB rating of 1,600 psi at 73°F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meets these requirements.</p> <p>3. <u>Polyethylene Pipe.</u> Polyethylene pipe shall be manufactured in accordance with ASTM F 714, <u>Polyethylene (PE) Plastic Pipe (SDR=11 rating or better) Based on Outside Diameter</u>, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and ring tensile strength.</p> <p>4. <u>Polyethylene Fittings &amp; Custom Fabrications.</u> Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All fittings and custom fabrications and connections shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.</p> <p>5. <u>Molded Fittings.</u> Molded fittings shall be manufactured in accordance with ASTM D 3261, <u>Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing</u>, and shall be so marked. Each production lot of molded fittings shall be subjected to the tests required under ASTM D 3261.</p> <p>6. <u>Fabricated Fittings.</u> Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe.</p> <p>7. <u>Polyethylene Flange Adapters.</u> Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder.</p> <p>8. <u>Back-up Rings &amp; Flange Bolts.</u> Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 6 or higher (stainless steel).</p> <p>9. <u>Compliance Tests.</u> Manufacturer's inspection and testing of the materials. In case of conflict with manufacturer's certifications, the Contractor, Project Engineer, or Owner may request retesting by the manufacturer or have retests performed by an outside testing service. All retesting shall be at the requestor's expense, and shall be performed in accordance with the Specifications.</p> <p>E. Joining</p> <p>1. <u>Heat Fusion Joining.</u> Joints between plain end pipes and fittings shall be made by butt fusion, electrofusion couplings and joints between the main and saddle branch fittings shall be made using saddle fusion procedures that are recommended by the pipe and fitting manufacturer. The Contractor shall ensure that persons making heat fusion joints have received training in the manufacturer's recommended procedure. The Contractor shall maintain records of trained personnel and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed.</p> <p>2. <u>Butt Fusion of Unlike Wall Thicknesses.</u> Fusions of different wall thickness are acceptable, as long as the difference is limited to a one SDR difference, i.e. SDR 11 to SDR 9. Transitions between unlike wall thicknesses greater than one SDR shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.</p> <p>3. <u>Joining by Other Means.</u> Polyethylene pipe and fittings may be joined together or to other materials by means of (a) flanged connections (flange adapters and backup rings), (b) mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material, or (c) electrofusion. When joining by other means, the installation instructions of the joining device manufacturer shall be followed. All connections shall maintain the total pressure rating of the force main.</p> <p>4. <u>Mechanical Joint Installation.</u> Mechanical joints shall be installed in accordance with the manufacturer's recommended procedure. When an OD compression mechanical coupling is used, a stiffener shall be installed in the bore of the polyethylene pipe.</p> <p>5. <u>Branch Connections.</u> Branch connections to the main shall be made with saddle fittings or tees. Polyethylene saddle fittings shall be saddle fused to the main pipe.</p> <p>4.03 HORIZONTAL DIRECTIONAL DRILLING W/ POLYETHYLENE PIPE</p> <p>A. Directional boring with PE3408 pipe shall be completed in accordance with the manufacturer's requirements and shall not in any way affect the joint connections or the overall strength characteristics of the pipe.</p> <p>B. References:</p> <p>"Mini-Horizontal Directional Drilling Manual" published by North American Society for Trenchless Technology (NASTT).</p> <p>"Guidelines for a Successful Directional Crossing Bid Package" published by Directional Crossing Contractors Association (DCCA).</p> <p>"Polyethylene Pipe for Horizontal Directional Drilling" of the Plastic Pipe Institute's Handbook of Polyethylene Piping.</p> <p>C. <u>Quality Control.</u> All directional boring shall be completed in such a way as not to jeopardize the existing infrastructure/facilities, such as the roadway, utility poles, subsurface utilities, structures/foundations, or significant landscaping. Prior to directional drilling, all potential conflicts shall be field verified.</p> <p>D. General</p> <p>1. Directional drilling shall be performed in a manner required to install HDPE utility line as indicated on the drawings. Furnish all manpower and equipment required to perform the pipeline installation. The operation shall include all excavation and dewatering, drilling calculations, pilot hole, and pullback operations. Contractor shall be responsible for type of reamer, diameter, and other pertinent operations required for a complete installation. Contractor shall be responsible for mobilizing on-site with a full range of drill stems and reaming heads to allow for various factors which may occur. Drill stems shall be of proper size and diameter to allow for full thrust and torque capabilities of the drilling machines.</p> <p>2. Contractor shall perform utility survey to locate information concerning existing utility lines located in the areas of the directional drilling work.</p> <p>3. Directional drilling shall be accomplished by drilling from one side of the crossing to the other using an approved method. One method shall be drilling a small diameter pilot hole along the proposed utility route. Steering shall be accomplished by using drilling mud which is pumped into the drill pipe to provide rotational energy in a drill bit at the end of the drill pipe. A jet bit shall force the mud through small orifices and jet away the earth and to allow the drilled path to curve in the proper direction as the drill pipe is thrust forward. An electronic survey instrument shall be placed inside the drill pipe head. The instrument shall signal a computer of the drilled paths magnetic azimuth, vertical inclination, and orientation of the bend. This data shall be used by the drilling contractor to calculate location of the drill bit and allow steering adjustments to be made.</p> <p>4. After completing the pilot hole, larger diameter reaming heads shall be pulled back in order to enlarge the hole as required to allow for the pipe pullback. The Contractor shall be responsible for multiple reaming operations as required to complete the work. Pull back operations shall be carried out as soon as possible following the final preream. During this phase of the work, the Contractor shall continue his work operations without interruption regardless of the day of week or hour of the day. A pullback head shall be attached to the pipe to allow fastening to the swivel head reamer. The head shall be closed to prevent drilling mud from entering the main during the pullback operation.</p> <p>5. Upon completion of the drilling operations, the equipment and materials used shall be removed from the site and the areas disturbed shall be restored to original conditions. The main shall be tested in accordance with Section 02730 of the Specifications. If the main fails the testing, it shall be removed and the work repeated at no additional cost to the Owner.</p> <p><b>WATER SUPPLY SYSTEM</b></p> <p>PART 1 – GENERAL</p> <p>1.01 SUMMARY</p> <p>A. Section includes:</p> <p>1. Pipe Materials</p> <p>2. Hydrants</p> <p>3. Valves</p> <p>4. Fittings</p> <p>5. All other appurtenances necessary to complete the water main system as shown on the Contract Plans.</p> <p>1.02 SUBMITTALS</p> <p>A. Product Data: Submit published data from manufacturers of products and accessories specified, indicating compliance with requirements to the Engineer and local municipality.</p> <p>1.03 QUALITY ASSURANCE</p> <p>A. All materials and the installation procedure shall be in accordance with the Department of Environmental Conservation, Water Supply Division and the applicable construction ordinances of the local municipality.</p> <p>PART 2 – PRODUCTS</p> <p>2.01 GENERAL</p> <p>A. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of the same type and class of material as the conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer as necessary to complete the water system.</p> <p>2.02 WATER MAIN MATERIAL</p> <p>C-900 PVC WATER MAIN</p> <p>A. Pipe shall be C-900 (DR-14 200 psi) PVC (sizes as shown on the plans) conforming to current AWWA C-900, latest revision and shall be UL and FM approved. Larger size mains will be required if necessary to allow withdrawal of the required fire flow while maintaining the minimum pressure specified in the VT Water Supply Rule, Chapter 21, 8.1.1. Any proposed departure from minimum requirements shall be justified by hydraulic analysis and future water use assessment, and will be considered only in special circumstances (VT Water Supply Rule, Chapter 21 8.1.4). Push-on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.</p> <p>B. When a pipe material is specifically noted on the contract drawings,the contractor/developer shall not have the option of utilizing any other pipe material. Galvanized pipe or fittings shall not be used in any water system owned or maintained by the Town. The Town Water Department requires the use of polyethylene pipe sleeve encasements and/or alternate pipe materials in known or suspected corrosive soil conditions.</p> <p>DUCTILE IRON WATER PIPE</p> <p>A. Pipe shall be Tyton Ductile Iron Class 52 (sizes as shown on the plans) conforming to current ANSI/AWWA C151/A21.51 latest revision. Push-on joint pipe shall be minimum thickness Class 52. Push-on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.</p> <p>B. Pipe shall be cement mortar lined on the inside in accordance with ANSI Specification A21.4 except that the cement lining thickness shall not be less than 1/8 inch. A plus tolerance of 1/8 inch will be permitted.</p> <p>C. Pipe shall be given an exterior petroleum asphaltic coating in accordance with ANSI/AWWA Specification C151/ASNI A21.51.</p> <p>D. Pipe shall be poly wrapped with a minimum thickness of 4 mil poly in accordance with AWWA Specification C105 / ANSI A21.5, unless approved otherwise.</p> <p>2.03 FITTINGS</p> <p>A. Ductile iron fittings shall conform to ANSI/AWWA C110/A21.10, 350 PSI working pressure. Ductile iron fittings larger than twelve inches (12") shall have a standard body length equal to Class 250 Cast Iron fittings. Cast Iron Class 250 fittings will be allowed in lieu of ductile iron fittings larger than twelve inches (12"). Ductile iron fittings shall be rated for 250 p.s.i. However, twelve inch (12") and smaller may be rated for 350 p.s.i. with the use of special gaskets. All ductile iron compact fittings shall conforming to AWWA/ANSI C153/A21.53 standards.</p> <p>B. Anchor tees shall be standard mechanical joint tees except that the branch is plain Class 250 cast iron or Class 350 ductile iron, cement lined, conforming to ANSI/AWWA C110/A21.10, C111/A21.11, and C104/A21.4. Anchor tees shall be Clow F-1217, U.S. Pipe U5-92 or equal.</p> <p>C. Mechanical Joint restraints shall be incorporated into the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron, and have a minimum working pressure of 350 psi. Twist off nuts (i.e. mega-lug) or equal shall be used to ensure proper actuating of the restraining devices. Contractors may also use approved grip ring (or equal) retainer glands.</p> <p>D. Bolts shall conform to ANSI Specification A21.10.</p> <p>E. Pipeline couplings shall conform to AWWA Standards C110 and ANSI A21.10. Mechanical joint connecting pieces of proper diameter shall be installed in accordance with the manufacturer recommendations and at locations directed by the plans or the Town Water Department.</p> <p>F. All fittings shall be restrained; double poly wrapped and have concrete thrust blocks poured in place as defined herein.</p> <p>2.04 TAPPING SLEEVES AND VALVES</p> <p>A. The Town Water Department shall be notified whenever a proposed tap is to be made on any transmission main within the municipal system.</p> <p>B. Only approved tapping companies shall be allowed to perform wet taps on any Town Water Department water mains.</p> <p>C. All materials used when tapping for a branch connection or interconnection from any Town Water Department water transmission or distribution pipelines shall be specified below</p> <p>2.05 TAPPING SLEEVES</p> <p>For use on existing asbestos cement, gray cast iron, ductile iron or PVC C-900 pipe:</p> <p>A. Tapping sleeves shall be of the split sleeve design, constructed with two solid half-sleeves bolted together. Sleeves shall be constructed of ductile iron, shall have a working pressure of at least 250 psi, and shall have mechanical joint ends with end and side gasket seals.</p> <p>B. All iron body tapping sleeves shall be provided with a 3/4" NPT test plug, or other provisions must be made for air testing the valve and sleeve at maximum working pressure, prior to tapping.</p> <p>C. All bolts and nuts for mechanical joints of tapping sleeves shall be of high-strength cast iron or high-strength, low-alloy steel conforming to ANSI/AWWA C111/A21.11.</p> <p>D. All bolts and nuts for flanged joints of tapping sleeves shall be of high-strength, low carbon steel conforming to ANSI/AWWA C110/A21.10.</p> <p>E. All bolts and nuts shall be sound, clean, and coated with a rust-resistant lubricant; their surfaces shall be free of objectionable protrusions that would interfere with their fit in the made-up mechanical or flanged joint.</p> <p>2.06 TAPPING VALVES</p> <p>A. Tapping valves shall conform to ANSI/AWWA C509 Standard for Resilient-Seated Gate Valves for Water and Sewage Systems, except as modified herein. Valves shall open counterclockwise and shall have a minimum working pressure of 200 psi. Inlet flanges shall be Class 125 conforming to ANSI Specification B16.1 or ANSI/AWWA C110/A21.10, and outlet connection shall be Standardized Mechanical Joint unless specified otherwise on the drawings for the type of pipe required for the branch or lateral pipeline.</p> <p>B. Tapping valves over sixteen inches (16") diameter shall be installed with their stems horizontal, shall be equipped with rollers, tracks and scrapers, and shall be provided with bypass valves unless otherwise specified.</p> <p>C. Buried tapping valves shall be provided with a two inch (2") square wrench nut and shall be installed with a cast iron valve box as required to allow positive access to the valve operating nut at all times. In installations where the depth from grade to top of valve operating nut is greater than 5'0", a valve stem riser shall be provided and installed such that the depth from valve stem riser nut to grade is from four feet to five feet (4'-5'), (minimum length of valve stem riser is two feet (2')). Valve stem riser shall be of high strength steel and of welded construction.</p> <p>D. All contractors (or others) who apply for water line tapping permits shall submit complete specifications of the tapping material they intend to use at the time the tapping permit application is submitted on 8 1/2" x 11" shop drawing sheets</p> <p>E. All bolts and nuts used with all pipe sleeves shall, upon final tightening and testing, be brush coated heavily with bitumastic cold-applied material to thoroughly cover all exposed surfaces of the bolts and nuts.</p> <p>2.07 GATE VALVES-RESILIENT SEAT</p> <p>A. Valves shall be manufactured to meet all requirements of AWWA Specification C509, latest edition. Valves twelve inches (12") and smaller shall be bubble tight, zero leakage at 200 psi working pressure. Valves shall have non-rising stems, open counter clockwise, and provide a two inch (2") square operating nut with arrow cast in the metal indicating direction of opening. Each valve shall have maker's name, pressure rating and year in which manufactured cast on the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. Gate valves shall be Mueller, Kennedy, AFC, or approved equal.</p> <p>B. Buried valves shall be installed with a gate valve box.</p> <p>C. Gate valves shall normally be placed a maximum of five hundred feet (500') apart. Tee intersections shall have a minimum of three (3) gate valves. Cross sections (four way intersections) shall have a minimum of four (4) valves.</p> <p>D. The Town Water Department may require all bolts, studs and nuts be made from a corrosion resistant-material stainless steel.</p> <p>2.08 VALVE BOXES</p> <p>A. Valve boxes shall be of the three-piece Cast iron slide-type with a minimum inside shaft diameter of five and one quarter inches (5 1/4") and a six foot (6') trench depth. Valve boxes shall not transfer loads onto the valve.</p> <p>B. Valve boxes shall have a cast iron cover, marked "WATER". The boxes shall be dirt tight with the top of the cover flush with the top of the box rim.countersunk brass pentagon plug for paved or concrete areas, and standard two holes for grass areas. Curb box couplings and extensions will be the same material as the curb box. Both cover and upper section of the box shall be able to be located with an aqua type metal locator.</p> <p>C. All service connections shall be installed to the curb stop for all building lots before the street is paved.</p> <p>D. Valve boxes located in roadways shall have one non-adjusting paving riser of a height ranging from one and a half inches (1.5") to six inches (6") as needed to be brought to final pavement grade.</p> <p>2.09 BACKFLOW PREVENTION DEVICES</p> |                | <p>SITE ENGINEER:</p> <div></div> <p>CIVIL ENGINEERING ASSOCIATES, INC.<br/>10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403<br/>802-864-2323 FAX: 802-864-2271 web: www.ceavt.com</p> <p>COPYRIGHT © 2016 – ALL RIGHTS RESERVED</p> <table><tr><td>DRAWN</td><td></td></tr><tr><td>SAL</td><td></td></tr><tr><td>CHECKED</td><td></td></tr><tr><td>DSM</td><td></td></tr><tr><td>APPROVED</td><td></td></tr><tr><td>DSM</td><td></td></tr></table> <p>CLIENT:</p> <p><b>BC COMMUNITY HOUSING, LLC</b></p> <p>P.O. BOX 1335<br/>BURLINGTON VERMONT<br/>05402</p> <p>PROJECT:</p> <p><b>CAMBRIAN RISE</b></p> <p>311 &amp; 329 NORTH AVE.<br/>BURLINGTON, VT</p> <table><tr><th>DATE</th><th>CHECKED</th><th>REVISION</th></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></table> <p><b>SITE SPECIFICATIONS</b></p> <table><tr><td>DATE</td><td>DRAWING NUMBER</td></tr><tr><td>--</td><td>C7.3</td></tr><tr><td>SCALE</td><td></td></tr><tr><td>NONE</td><td></td></tr><tr><td>PROJ. 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service, the applicant's developer/contractor will be responsible for any necessary repairs or corrections as part of the project warranty. At the end of a one-year period, an inspection will be performed by the Town Water Department prior to the system owner assuming ownership of any of the lines and appurtenances. The contractor shall correct any punch list items accumulated during the inspection after receipt of this list. Incomplete work on the system shall not be included in the initial inspection, but shall be inspected as the project continues. The contractor shall repair, replace, or retest promptly as directed by the Town Water Department and without further charges, all work equipment, materials or parts, which may fail during the one year warranty period.

- B. A final walk-through inspection shall be conducted by the Town Water Department prior to the water system being accepted for ownership by the system owner. This inspection shall include but not be limited to:

- Valves, hydrants, and curb stops operating properly.
- Valve boxes and covers set plumb and at proper elevations.
- Proper hydrant nozzle height above grade.
- Proper hydrant opening direction, nozzle thread, and barrel color.
- Proper distance from the face of the curb of hydrant nozzles.
- Hydrant flags meeting Town Water Department specifications installed on each fire hydrant at the time of installation.
- Static and residual hydrant pressures and flow rates.
- Curb boxes inside ROW, set to grade, containing operating rod, and plumb.
- Tie information and record drawings complete and submitted.
- Material testing results, lab reports, manufacturers' certificates, and leakage test results complete and on file.
- General appearance and restoration.
- Submittal of O&M manuals in hard copy and Adobe Acrobat Reader (.pdf) format.
- Submittal of As-Built in hard copy format and Auto-CAD.DWG Version 2000 format or newer within 14 days of completion.

3.07 GENERAL INFORMATION

- A. All persons taking water must keep the fixtures and service pipe within their own premises in good repair and fully protected from frost, and must prevent unnecessary leakage of water. The Town Water Department shall not be liable for leakage of hydrants, pipes or fixtures upon the premises of any consumer, nor for obstructions therein by freezing or otherwise, nor for damages resulting from any of the foregoing causes. All leaks that are on the building side of the curb stop will be the owner's responsibility and repaired at the owner's expense.
- B. Water rates shall be collected for all water used until the water is shut off at the curb stop by the Town Water Department. No abatement of water rates will be allowed by reason of disuse, diminished use, or vacancy of premises without proper notice to the Town Water Department.
- C. The Town Water Department or system owner shall not be liable for any injury, loss or damage of whatever nature occasioned by the failure to maintain a constant or uniform pressure in the water mains, or for damages occasioned by or growing out of a stoppage of said water by frost or other cause, or for damage occasioned by or growing out of an insufficient supply of the same, or for accident or damage of any kind caused by or growing out of the use or failure of said water.
- D. No person shall open any hydrant or draw water there from except the Town Water Department personnel or persons under their direction, or the officers or designees of the municipal fire department and members of the fire companies under their direction for fire purposes, or those individuals who have been granted approval on a hydrant use application by the Town Water Department, in which case, all such usage shall be metered. Fines for unauthorized use of any hydrant or connection may be incurred, according to the Rules and Regulations of the Town Water Department.
- E. One curb stop and one water meter shall be installed for each individual dwelling unit, condominium unit, apartment unit, commercial or office occupancy. Exceptions may be permitted in cases where a condominium association signs a binding agreement to be responsible for all collection of water bills. In cases where condominiums are converted into separate apartments, separate curb stops and water meters shall be installed for each unit. Town Water Department employees shall install all water meters. Under no circumstances are plumbers or persons other than those authorized by the Town Water Department permitted to turn water on or off at the curb stop. The water will not in any instance be turned on to any premise for use until the Town Water Department has suitably attached a meter.
- F. The owner of the premises shall be responsible for all water payments. A change of tenants or premises will not relieve the owners from payment of a back bill.

STORM WATER PONDS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
- Construction of storm water detention pond.

PART 2 – PRODUCTS

- A. Compacted Fill/Granular Borrow: The material for the fill shall be obtained from the designated areas and shall conform to the requirements of Section 02210 – Site Earthwork. The material shall be free from stumps, wood,

brush, roots, sod, rubbish, and other matter that may decay. It should be free of stones over 2 inches in diameter where compacted by hand or mechanical tampers, or over 6 inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill, nor shall the fill material be placed on a frozen foundation.

- B. Stone Fill: Stone fill shall conform to the requirements of Type I Stone Fill as specified in Section 02439 – Stone Fill.
- C. Riser and Drain Pipe: Riser and drain pipe shall conform to the requirements of Section 02725 – Drainage.

PART 3 – EXECUTION

3.01 SITE PREPARATION

- A. The area to be covered by the pond and embankments shall be cleared of all trees, brush, stumps, roots and other objectionable material. The area to be covered by the earth embankment and the surface of the borrow area shall be stripped of all grass, roots, organic materials, or other objectionable materials to a depth that will insure the removal of any materials which will prevent bond between the foundation and the fill. Material cleared shall be disposed of in accordance with Section 02110 – Site Clearing. Where the embankment will be 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.

3.02 COMPACTED FILL/GRANULAR BORROW

- A. Preparation of Foundation: Upon completion of the clearing operation and just prior to placing the fill material on any portion of the foundation, that portion shall be scarified, plowed, or disked to a depth of 3 inches. All objectionable material exposed by this operation shall be disposed of outside the limits of the fill.
- B. Placing and Spreading Material: The placing and spreading of material shall be started at the lowest part of the section under construction and the fill constructed in layers of 6 inches. The layers shall slope slightly towards the reservoir to prevent puddles and provide for faster runoff in case of rain. Where possible, the layers shall extend over the entire area of the fill. The distribution and gradation of the materials throughout the fill shall be such that there be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The most porous borrow material shall be placed on the downstream portions of the embankment.
- C. Compaction: All fill shall be compacted to 95 % maximum density per ASTM D-698.
- D. Limits: The embankment shall be constructed where located and as detailed in the Contract Plans. Side slope shall be 1 vertical to 3 horizontal.
- E. Revisions to the proposed design of the detention pond may be necessary if, in the opinion of the Engineer, unsuitable material is found at the pond location.

3.03 SLOPE PROTECTION

- A. Placement: Stone Fill Type I shall be placed at locations indicated on the plans to a minimum thickness of 1'-0" in one course in a manner that will result in a reasonably well graded surface. Care shall be taken in the placing to avoid displacing of the underlying material. The stones shall be placed and distributed so that there will be no accumulations of either the larger or the smaller stones. Re-arrangement of the stone fill by hand labor or mechanical equipment may be required to obtain the specified results.

3.26 LANDSCAPING

- A. At completion of grading, slopes, ditches, and all disturbed areas shall be smooth and free of pockets with sufficient slope to ensure drainage. All disturbed areas shall receive a minimum of four inches (4") of topsoil and shall be seeded, fertilized, limed, and mulched in accordance with the following:

- Seed mixture in all areas shall be urban mix conforming to the table below. For seeding between September 1 and October 1, winter rye shall be used at an application rate of 100 pounds per acre.
- Fertilizer shall be standard commercial grade conforming to the State Fertilizer Law and to the Standards of the Association of Official Agricultural Chemists. Dry fertilizer, if used, shall be applied at the rate of 500 pounds per acre. Liquid fertilizer, if used, shall be applied in a 1-2-1 ratio with the minimum rate to include 100 pounds of nitrogen, 200 pounds of phosphate, and 100 pounds of potash per acre.
- Limestone shall conform to all State and Federal regulations and to the Standards of the Association of Official Agricultural Chemists. The limestone shall be applied at a rate of one ton per acre as directed.
- Within twenty-four (24) hours of application of fertilizer, lime, and seed, the surface shall be mulched with a hay mulch. Mulch shall be spread uniformly over the area at a rate of two (2) tons per acre.
- All turf establishment shall be performed in accordance with the Vermont Standard Specifications for Construction, Section 651.

URBAN MIX GRASS SEED

| Percentage<br>By Weight | Pounds Live Seed<br>Per Acre  | Type of Seed                                           |
|-------------------------|-------------------------------|--------------------------------------------------------|
| 37.50%                  | 45.0                          | Creeping Red Fescue                                    |
| 37.25%                  | 37.5                          | Kentucky Blue Grass,<br>Winter Hardy, Perennial Rye    |
| 31.25%                  | 37.5                          | (variety Pennfine, Manhattan,<br>or similar varieties) |
| 100%                    | 120 pounds live seed per acre |                                                        |

LANDSCAPE GRADING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
- Finish grading; bring rough grade in areas to design elevations as shown on the drawings.
  - Topsoil: Work shall consist of furnishing, placing and shaping topsoil, or placing, spreading, and shaping topsoil form stockpiles or stripped areas.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be loose, friable, reasonably free of admixtures of subsoil, free from refuses, stumps, roots, brush, weeds, rocks, and stones 1 1/4 inch in overall dimensions. The topsoil shall also be free from any material that will prevent the formation of a suitable seedbed or prevent seed germination and plant growth. It shall contain not less than three (3) nor more than twenty (20) percent organic matter. Any material which has become mixed with undue amounts of subsoil during any operation at the source or during placing or spreading will be rejected and shall be replaced by the Contractor with acceptable material.

PART 3 – EXECUTION

3.01 SUBGRADE PREPARATION

- A. Clean subgrade of all stumps, stones, roots, trash or other materials which might hinder proper tillage or spreading.
- B. All surfaces on which topsoil is to be placed shall be graded to a reasonably true surface and scarified by raking, discing or other approved means to a minimum depth of two inches before placing topsoil.

3.03 PLACING TOPSOIL

- A. Minimum final depth of topsoil shall be 4 inches.
- B. Place topsoil when seeding operations can closely follow spreading operations. Use topsoil in relatively dry state.
- C. Topsoil shall be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The depth stated in the contract to which the topsoil is to be placed is that required after final rolling of the material has taken place. All stones, roots and debris over 1 1/4 inch in diameter along with any sodding weeds and other undesirable material shall be removed.
- D. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.
- E. It shall be the Contractor's responsibility to restore to the line, grade and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the work.

SEEDING

PART 1 – GENERAL

1.1 Section Includes:

- A. Seeding.
- Furnish all labor, materials and equipment to complete all seeding work as shown on the drawings and specified herein.
  - Except where otherwise shown or specified, the Contractor shall seed all areas where new contours are shown on the drawings and all areas where existing ground cover has been disturbed by the Contractor's operations.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 PROJECT CONDITIONS

Planting Restrictions: Seeding and initial fertilizing shall be done between May 1st and September 15th unless otherwise authorized. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. If seeding is done during July or August, additional mulch material may be required. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 SEED

- A. Conservation Seed Mix:

| Kind of Seed        | Minimum<br>Purity | Minimum<br>Germination | Lbs./Acre |
|---------------------|-------------------|------------------------|-----------|
| Creeping Red Fescue | 98%               | 85%                    | 22.5      |
| Tall Fescue         | 95%               | 95%                    | 22.5      |
| Red Top             | 95%               | 90%                    | 3         |
| Birdsfoot Trefoil   | 98%               | 85%                    | 9         |
| Annual Ryegrass     | 95%               | 85%                    | 3         |
| TOTAL =             |                   |                        | 60        |

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 85 percent calcium carbonate equivalent and as follows:

- Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2.3 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer

of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

2.4 MULCHES

- A. Mulch: Provide air-dry, clean, mildew- and seed-free, hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

- Organic Matter Content: 50 to 60 percent of dry weight.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  - Protect grade stakes set by others until directed to remove them.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.
- Apply fertilizer directly to subgrade before loosening.
    - Dry mix fertilizer with planting soil if planting will not proceed within a few days.
    - Mix lime with dry soil before mixing fertilizer.
  - Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
  - Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
  - Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.2 APPLICATION RATES

- A. When a soil test is not available, the following minimum amounts should be applied:
- Agricultural limestone: 2 tons/acre.
  - Nitrogen (N): 50 lbs./acre.
  - Phosphate: 100 lbs./acre.
  - Potash: 100 lbs./acre.
    - This is the equivalent of 500 lbs./acre of 10-20-20 fertilizer or 1,000 lbs./acre of 5-10-10.
  - Hay mulch: 2 tons/acre.

3.3 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
- Do not use wet seed or seed that is moldy or otherwise damaged.
  - Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- C. Protect seeded areas with slopes exceeding 1:3 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- D. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a depth of 3/16 inch, and roll surface smooth.

3.4 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
- Mix slurry with fiber-mulch manufacturer's recommended tackifier.
  - Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.5 MAINTENANCE

- A. Maintain and establish seeding by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original

installation.

- In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
- Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

- Seeded Areas: 90 days from date of Substantial Completion.
- When initial maintenance period has not elapsed before end of planting season, or if seeding is not fully established, continue maintenance during next planting season.

3.6 SATISFACTORY CONDITIONS

- A. Installations shall meet the following criteria as determined by Engineer/Owner:
- Satisfactory Seeded Area: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

- B. Use specified materials to reestablish area that do not comply with requirements and continue maintenance until areas are satisfactory.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by work. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

SITE ENGINEER:



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

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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

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SITE  
SPECIFICATIONS

DATE

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SCALE

NONE

PROJ. NO.

14215

DRAWING NUMBER

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GENERAL NOTES

1.

UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
2.

ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3.

THE CONTRACTOR SHALL MAINTAIN AS-BUILT PLANS (WITH TIES) FOR ALL UNDERGROUND UTILITIES. THOSE PLANS SHALL BE SUBMITTED TO THE OWNER AT THE COMPLETION OF THE PROJECT.
4.

THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
5.

ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
6.

MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
7.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
8.

THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL ITEMS AND MATERIALS INCORPORATED INTO THE SITE WORK. WORK SHALL NOT BEGIN ON ANY ITEM UNTIL SHOP DRAWING APPROVAL IS GRANTED.
9.

IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE WITH ALL PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
10.

THE TOLERANCE FOR FINISH GRADES FOR ALL PAVEMENT, WALKWAYS AND LAWN AREAS SHALL BE 0.1 FEET.
11.

ANY DEWATERING NECESSARY FOR THE COMPLETION OF THE SITEWORK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12.

THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
13.

THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
14.

EXISTING PAVEMENT AND TREE STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
15.

IF THERE ARE ANY CONFLICTS OR INCONSISTENCIES WITH THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR VERIFICATION BEFORE WORK CONTINUES ON THE ITEM IN QUESTION.
16.

PROPERTY LINE INFORMATION IS BASED PLAT ENTITLED "LOT LINE ADJUSTMENT BETWEEN 329 & 351 NORTH AVE BURLINGTON COLLEGE" PREPARED BY CIVIL ENGINEERING ASSOCIATES, INC., DATED DECEMBER 18, 2014. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO USED AS ONE. MONUMENTATION RECOVERED IS CONSISTENT WITH RECORDED DOCUMENTS.
17.

IF THE BUILDING IS TO BE SPRINKLERED, BACKFLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH AWWA M14. THE SITE CONTRACTOR SHALL CONSTRUCT THE WATER LINE TO TWO FEET ABOVE THE FINISHED FLOOR. SEE MECHANICAL PLANS FOR RISER DETAIL.
18.

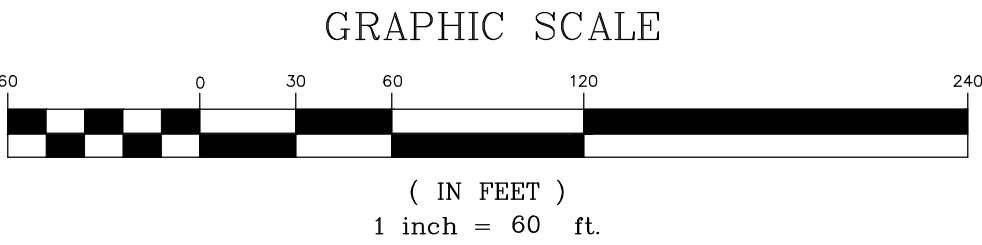
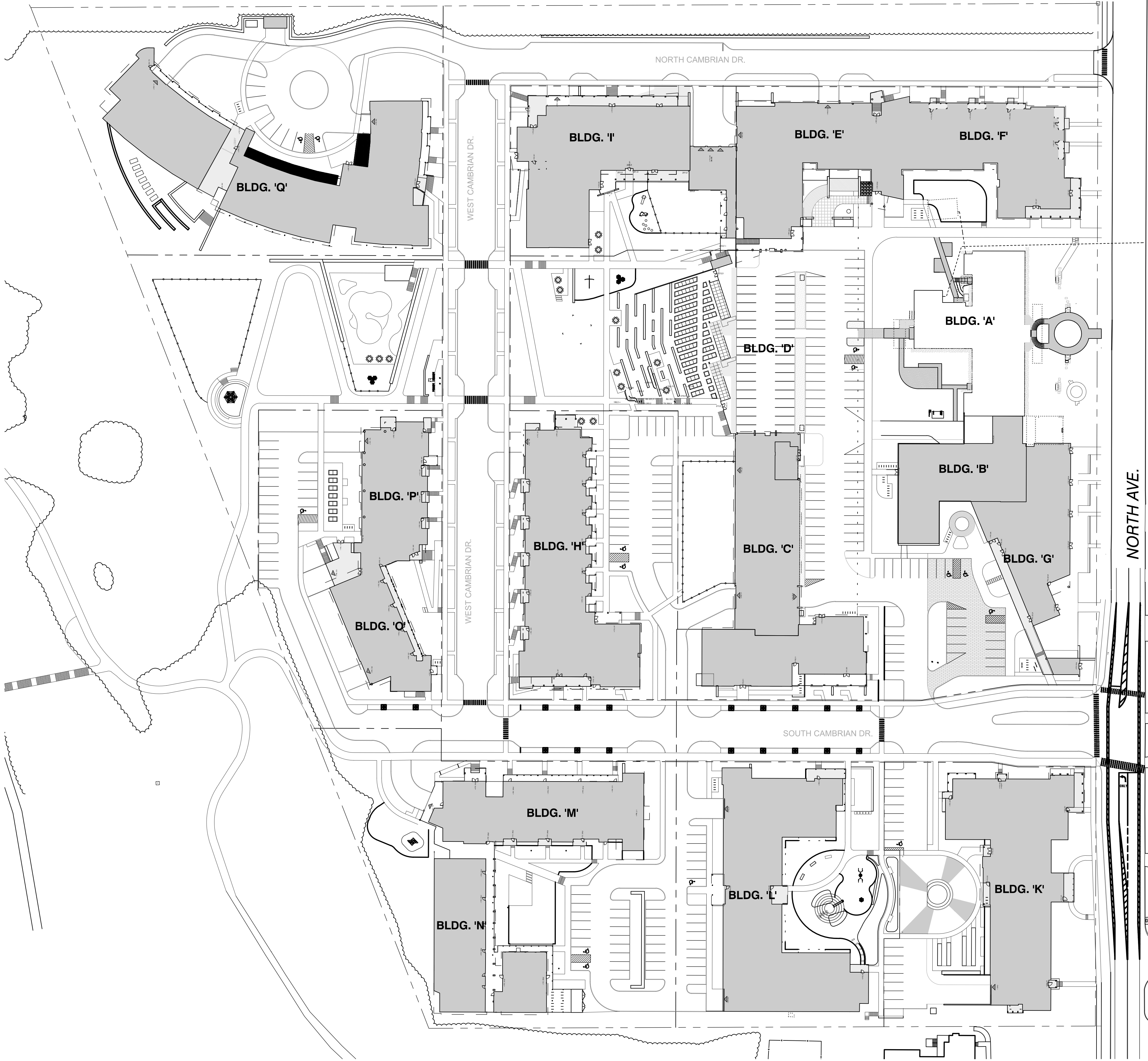
THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
19.

THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT AND FIELD ENGINEERING REQUIRED FOR COMPLETION OF THE PROJECT. CIVIL ENGINEERING ASSOCIATES WILL PROVIDE AN AUTOCAD FILE WHERE APPLICABLE.
20.

THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ANY AND ALL SAFETY FENCES OR RAILS ABOVE EXISTING AND PROPOSED WALLS. THE OWNER SHALL VERIFY LOCAL, STATE AND INSURANCE REQUIREMENT GUIDELINES FOR THE INSTALLATION AND VERIFY ANY AND ALL PERMITTING REQUIREMENTS.

LEGEND

|  |                           |  |                              |
|--|---------------------------|--|------------------------------|
|  | APPROXIMATE PROPERTY LINE |  | PROPOSED PROPERTY LINE       |
|  | APPROXIMATE SETBACK LINE  |  | PROPOSED SETBACK LINE        |
|  | EXISTING CONTOUR          |  | PROPOSED CONTOUR             |
|  | EXISTING CURB             |  | PROPOSED CURB                |
|  | EXISTING FENCE            |  | PROPOSED FENCE               |
|  | EXISTING GRAVEL           |  | PROPOSED GRAVEL              |
|  | EXISTING PAVEMENT         |  | PROPOSED PAVEMENT            |
|  | EXISTING GUARD RAIL       |  | PROPOSED GUARD RAIL          |
|  | EXISTING ELECTRIC         |  | PROPOSED ELECTRIC            |
|  | EXISTING FORCEMAIN        |  | PROPOSED FORCEMAIN           |
|  | EXISTING GAS              |  | PROPOSED GAS                 |
|  | EXISTING STORM            |  | PROPOSED STORM               |
|  | EXISTING GRAVITY SEWER    |  | PROPOSED GRAVITY SEWER       |
|  | EXISTING TELEPHONE        |  | PROPOSED TELEPHONE           |
|  | EXISTING WATER            |  | PROPOSED WATER               |
|  | EXISTING SWALE            |  | PROPOSED SWALE               |
|  | STREAM                    |  |                              |
|  | WETLANDS                  |  |                              |
|  | WETLANDS BUFFER           |  |                              |
|  | EXISTING SEWER MANHOLE    |  | PROPOSED SEWER MANHOLE       |
|  | EXISTING STORM MANHOLE    |  | PROPOSED STORM MANHOLE       |
|  | EXISTING CATCH BASIN      |  | PROPOSED CATCH BASIN         |
|  | EXISTING WELL             |  | PROPOSED WELL                |
|  | EXISTING HYDRANT          |  | PROPOSED HYDRANT             |
|  | EXISTING SHUT OFF         |  | PROPOSED SHUT OFF            |
|  | EXISTING UTILITY POLE     |  | PROPOSED UTILITY POLE        |
|  | EXISTING LIGHT POLE       |  | PROPOSED LIGHT POLE          |
|  | EXISTING GUY WIRE/POLE    |  | PROPOSED GUY WIRE/POLE       |
|  | EXISTING SIGN             |  | PROPOSED SIGN                |
|  | EXISTING DECIDUOUS TREE   |  | PROPOSED DECIDUOUS TREE      |
|  | EXISTING CONIFEROUS TREE  |  | PROPOSED CONIFEROUS TREE     |
|  | EDGE OF BRUSH/WOODS       |  | PROPOSED EDGE OF BRUSH/WOODS |
|  | IRON ROD/PIPE FOUND       |  | CONCRETE MONUMENT FOUND      |
|  | TEST PIT                  |  |                              |
|  | PERCOLATION TEST          |  |                              |
|  | PROJECT BENCHMARK         |  |                              |



PROGRESS PLANS  
11/22/2016

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.  
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802-864-2323 FAX: 802-864-2271 web: www.cca-vt.com

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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

1" = 200'

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OVERALL SITE  
PLAN

DATE

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SCALE

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PROJ. NO.

14215

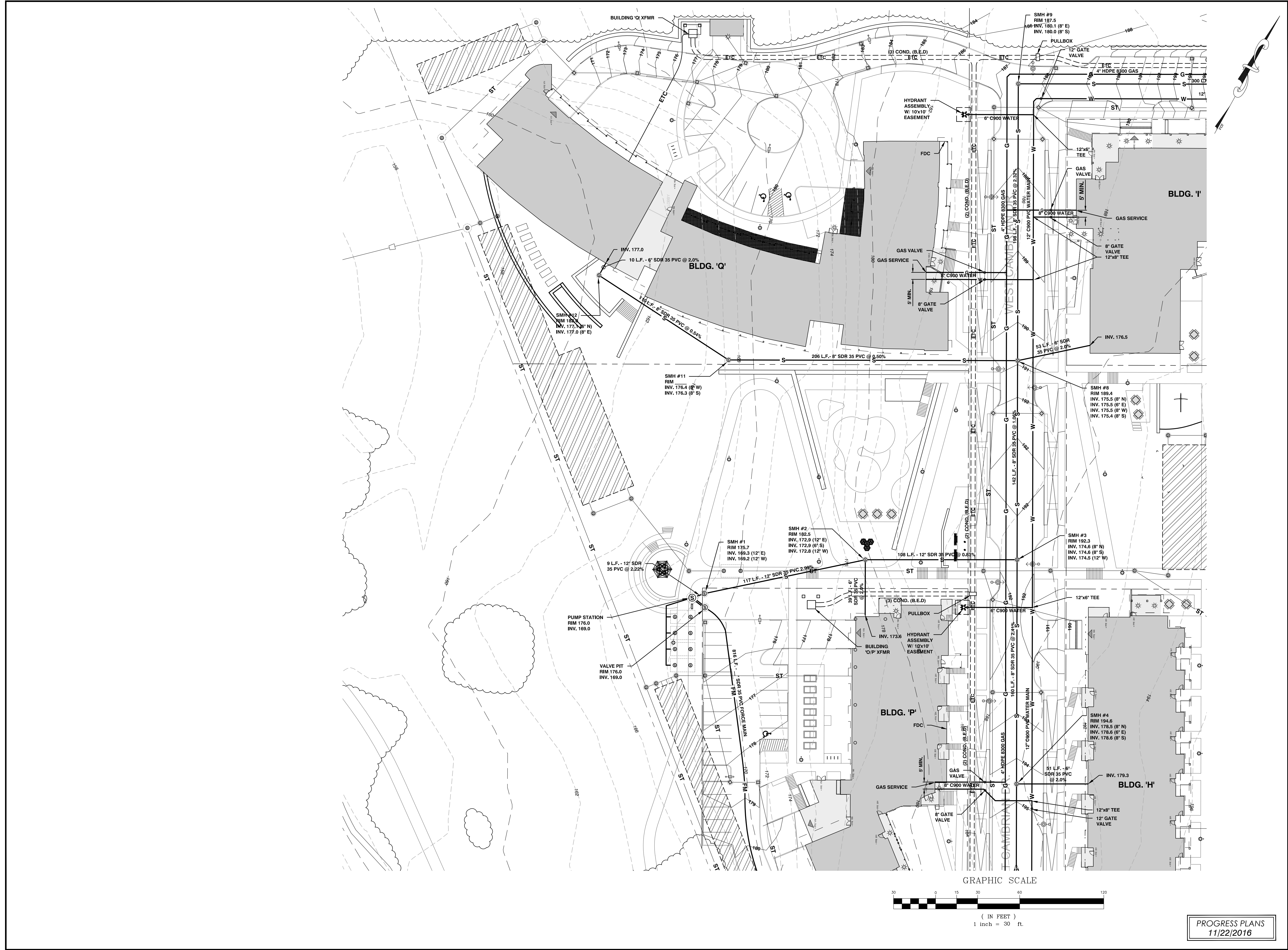
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SITE ENGINEER:

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05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

BURLINGTON  
PROJECT LOCATION  
LAKE CHAMPLAIN

LOCATION MAP

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PROPOSED UTILITY PLAN - NORTHWEST QUADRANT

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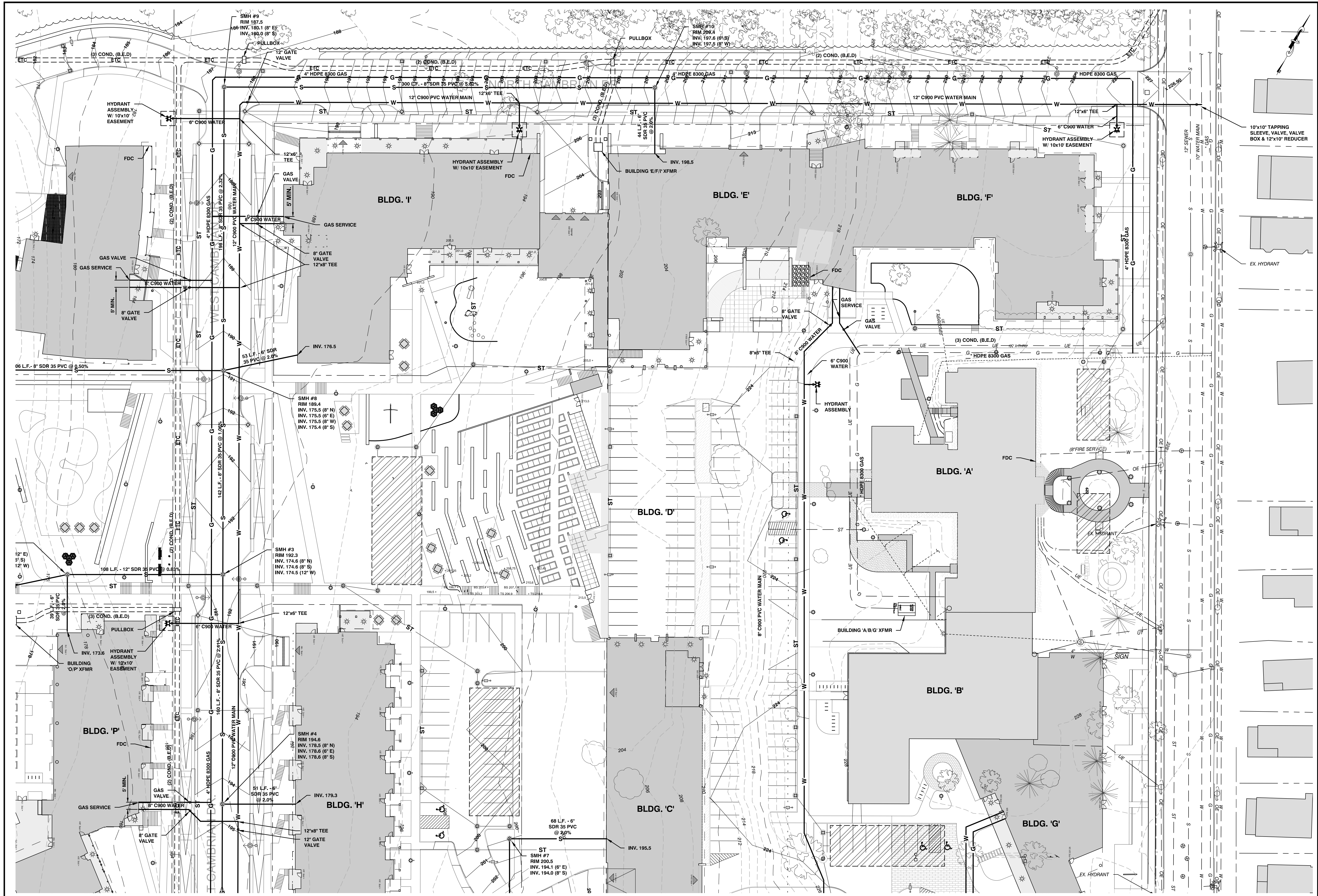
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SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.  
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P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:  
  
**CAMBRIAN RISE**  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

BURLINGTON  
PROJECT LOCATION  
LAKE CHAMPLAIN  
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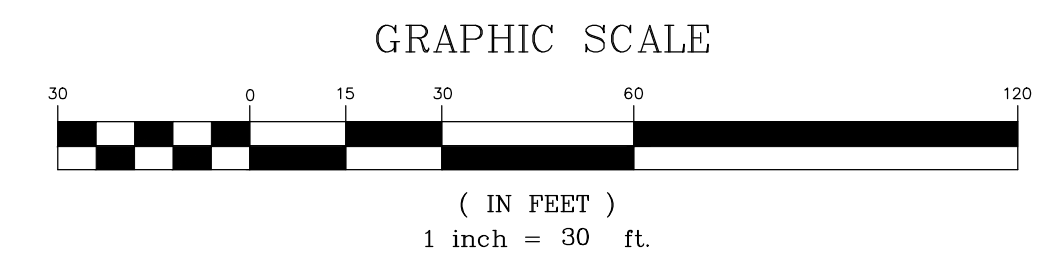
PROPOSED  
UTILITY PLAN -  
NORTHEAST  
QUADRANT

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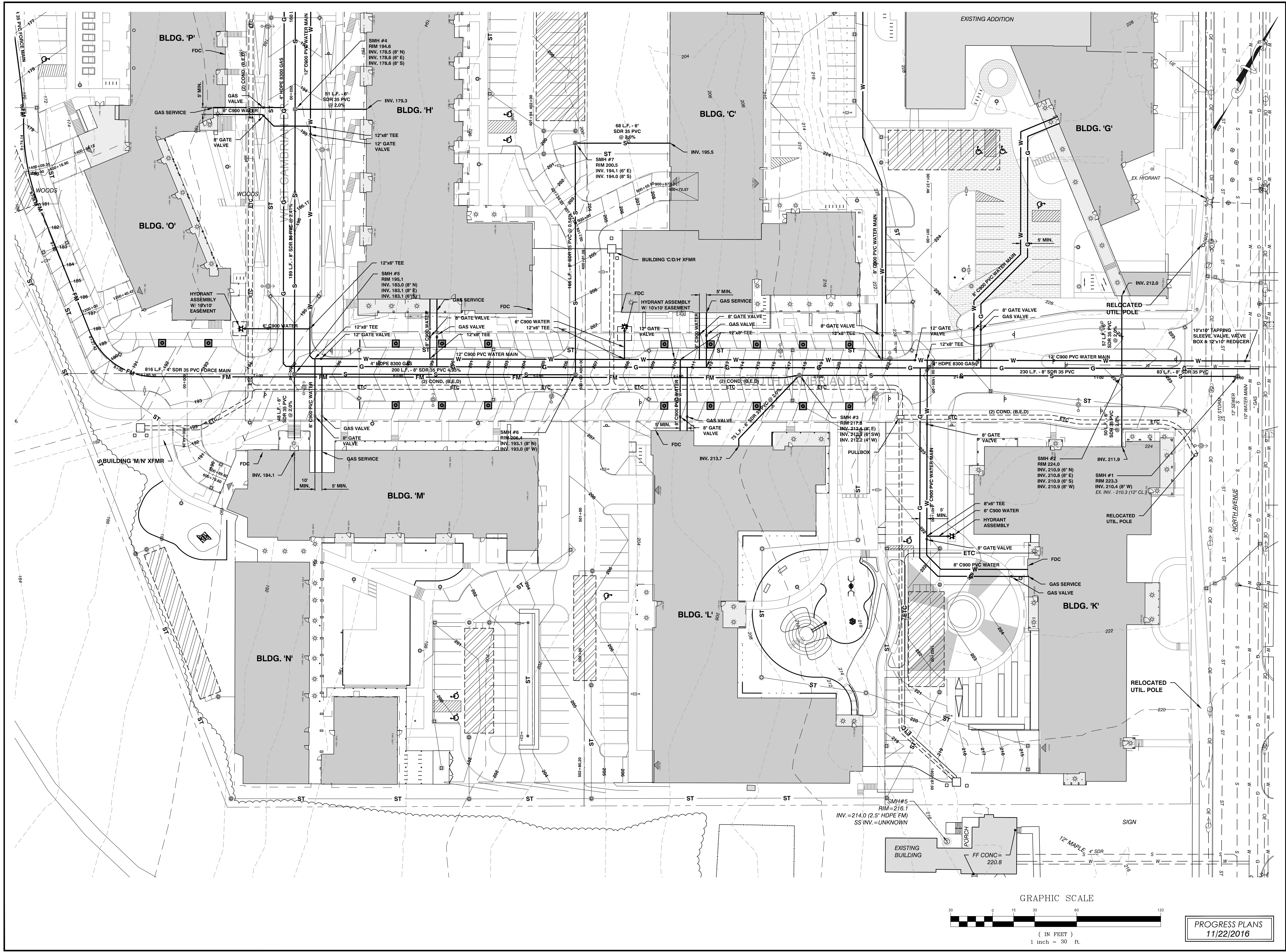
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PROGRESS PLANS  
11/22/2016

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SITE ENGINEER:

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BC COMMUNITY HOUSING, LLC

P.O. BOX 1335  
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05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

BURLINGTON

PROJECT LOCATION

LAKE CHAMPLAIN

LOCATION MAP

1" = 2000'

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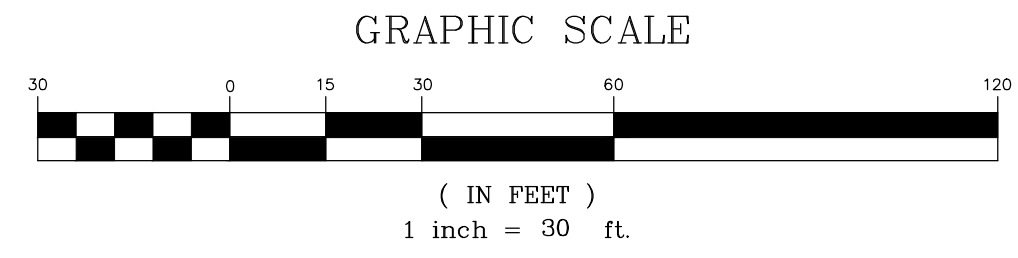
PROPOSED UTILITY PLAN - SOUTH QUADRANT

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PROGRESS PLANS  
11/22/2016



## Sequencing Plan

Cambrian Rise (CR) requests that it be permitted under a single PUD application (i.e. a single zoning permit), entitled to be constructed in a single phase. As a practical matter, CR will likely be built out over 5 – 8 years, subject to market conditions, and therefore, we request the zoning permit have an initial duration of 10 years and be automatically renewable thereafter.

The attached Phasing Plan is CR's good faith estimate of the sequence in which the various buildings and site infrastructure improvements will be constructed, some of which may be concurrent. CR needs to reserve the right to change the sequence, in response to market conditions and to facilitate infrastructure installation changes to accommodate changes in the sequencing.

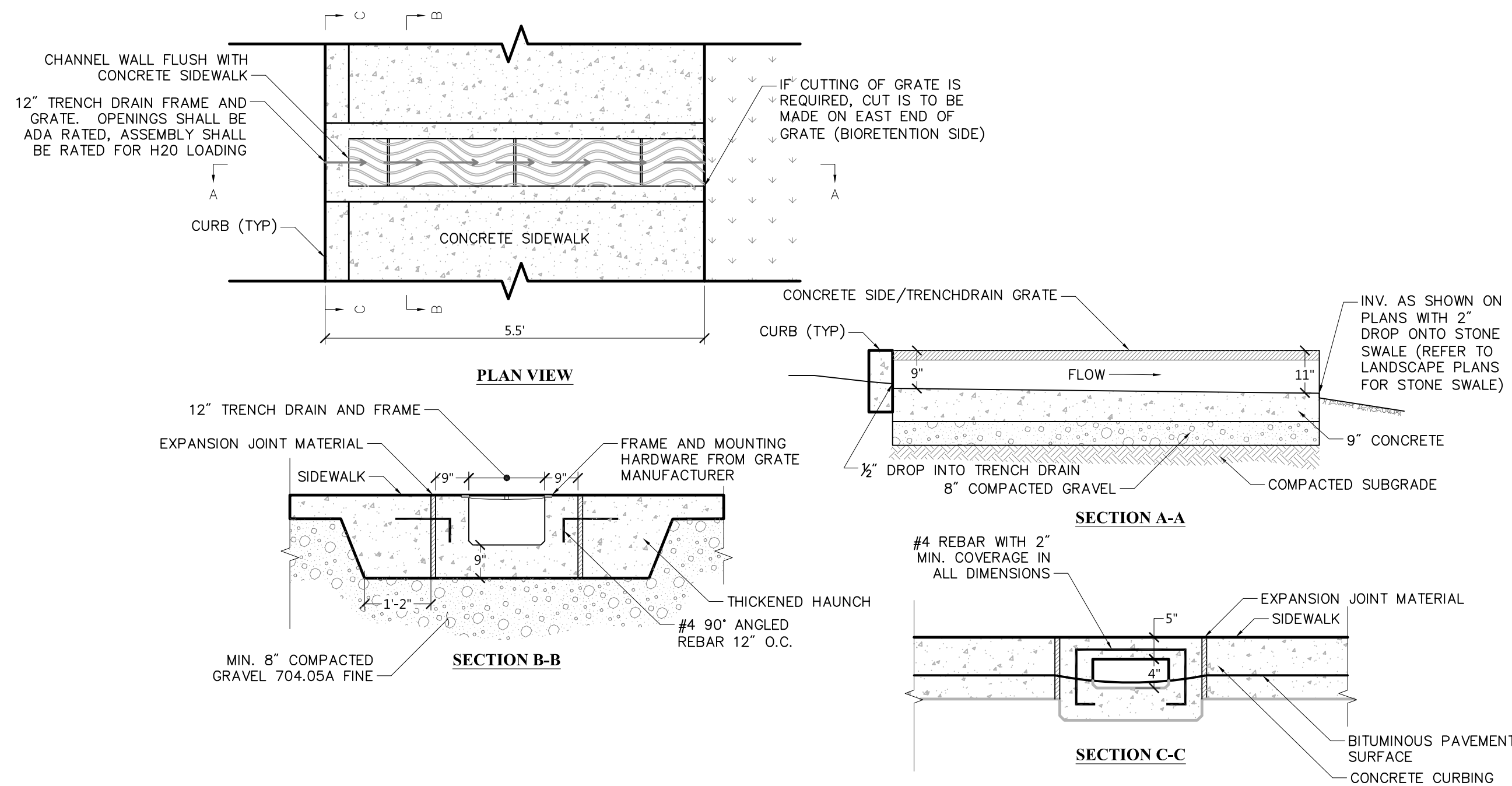
It is critically important that upon completion, each building is entitled to secure a Unified Certificate of Occupancy from the City.

Upon the completion of Liberty House (Phase I, former Orphanage), a temporary (gravel only) parking lot on the north side of the building will be constructed and used by the residents, until the completion of Phase 2, at which time the temporary parking lot will be removed or retained for use as a staging area for Phase 5. This arrangement allows Phase I to be fenced off from ongoing construction activities on the site for the protection and benefit of the residents of Liberty House.

Similar temporary parking arrangements may be necessary as each phase of the project is constructed. Specific requests in this regard will be submitted to the Planning Office when and as the need arises. This process reflects the complex nature of constructing a multi-building project over several years.

The new proposed public street, currently scheduled for completion at the end of Phase 6, will be offered for dedication to the City at that time.

In light of the multi-year sequencing of the buildout of CR, we respectfully request that the Planning Department support our request to the City Council to time the payment of zoning permit release fees to coincide with the construction of each phase.



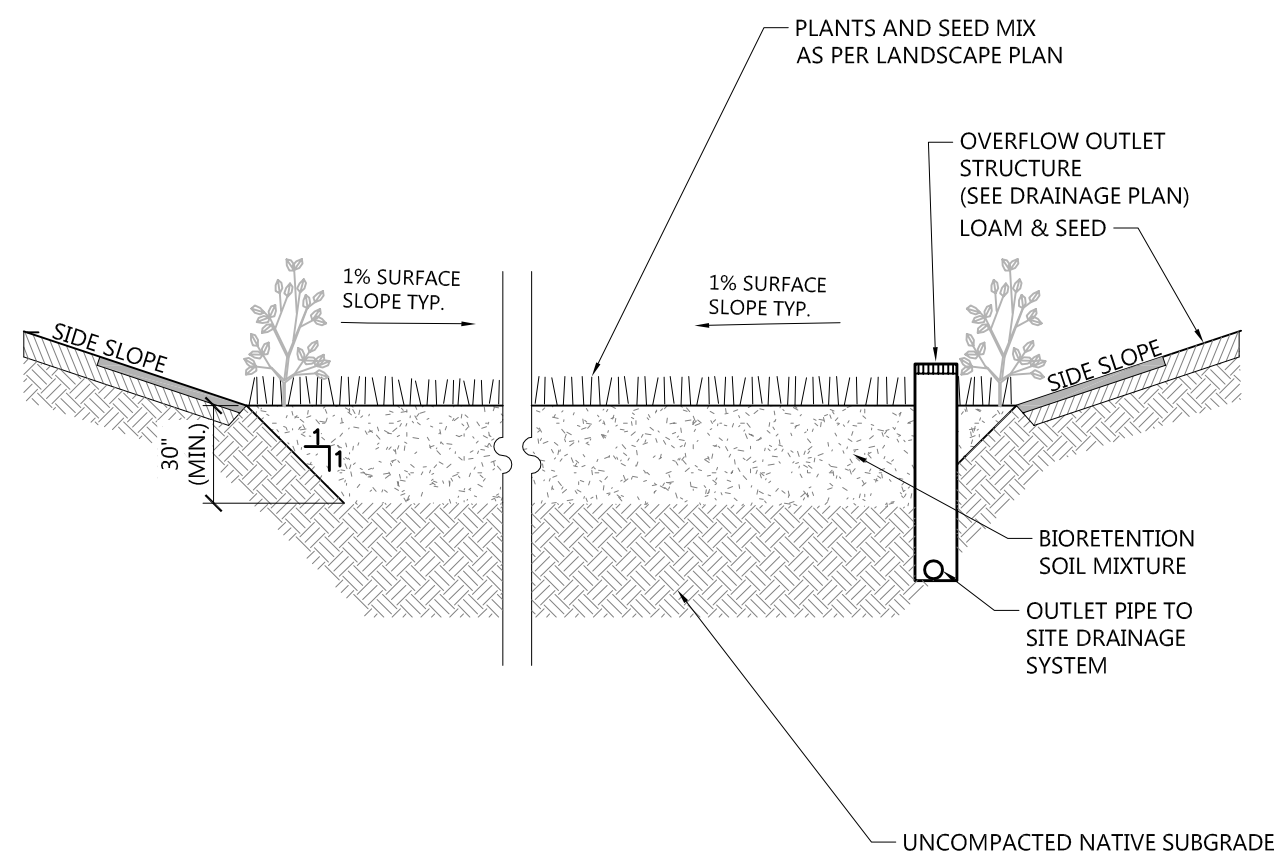
### Trench Drain (Bioretention Inlet at Green Streets)

N.T.S.

Source: VHB

10/16

LD\_



## NOTES

1. SIDE SLOPES SHALL BE 3:1 MAX. 2% MIN.

## Bioretention Basin

N.T.S.

Source: VHB

REV

1/16

LD\_353



40 IDX Dr  
Building 100 Suite 200  
South Burlington, VT 05403  
802.497.6100

# Cambrian Rise Project

North Avenue  
Burlington, Vermont

| No.                       | Revision | Date                  | Approved by |
|---------------------------|----------|-----------------------|-------------|
|                           |          |                       |             |
|                           |          |                       |             |
|                           |          |                       |             |
|                           |          |                       |             |
|                           |          |                       |             |
|                           |          |                       |             |
|                           |          |                       |             |
| Designed by<br><b>PBS</b> |          | Checked by            |             |
| Issued for                |          | Date<br>Nov. 22, 2016 |             |

Not Approved for Construction

# Stormwater Details

Drawing Number

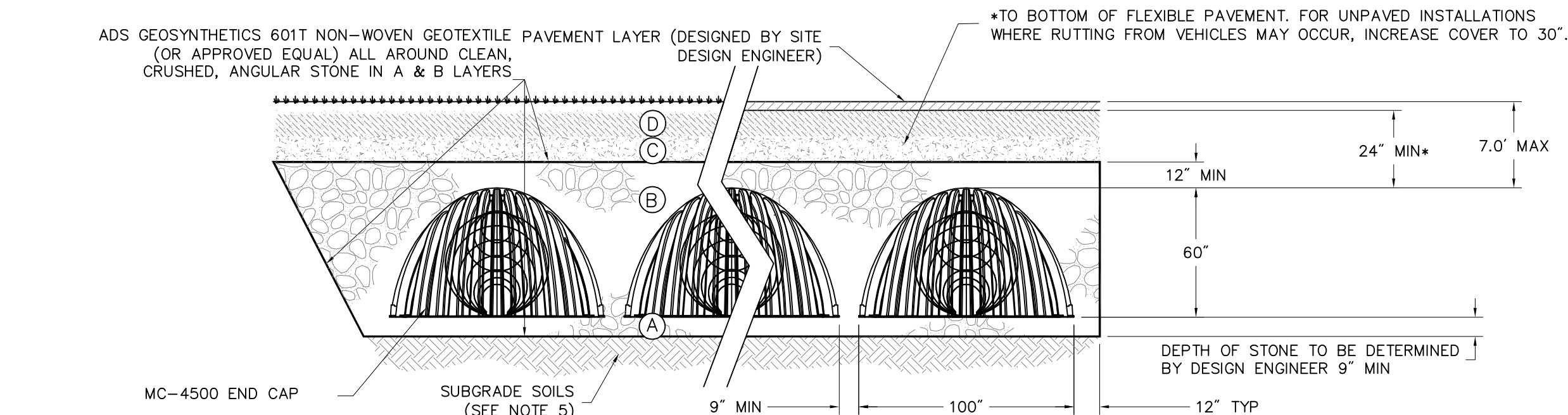
## C6.8

Sheet 0

Project Number

57848.00





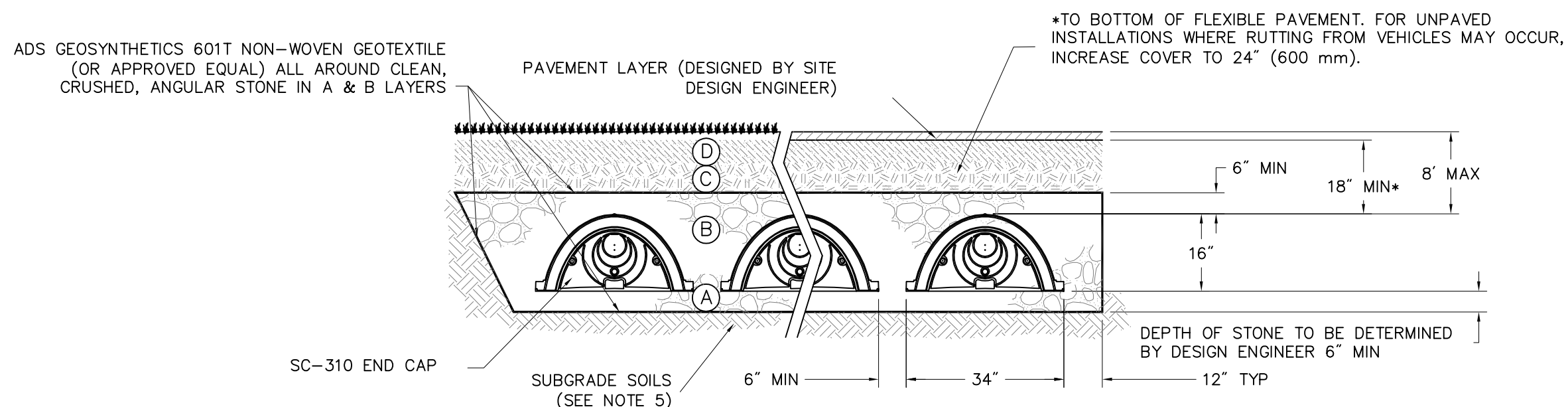
### MC - 4500 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



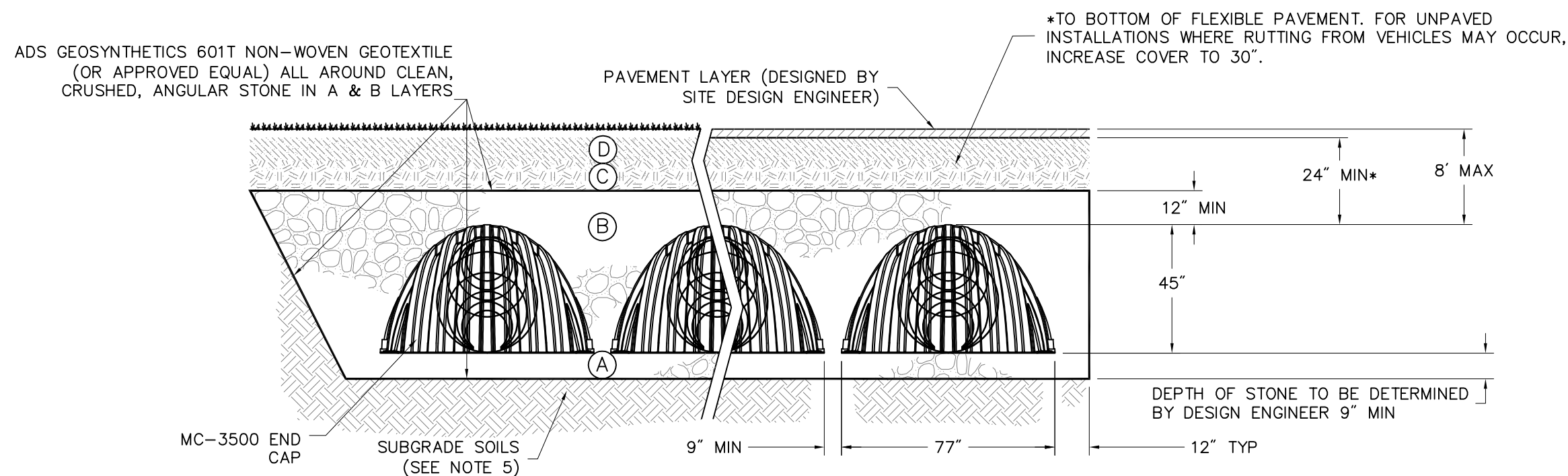
## SC - 310 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



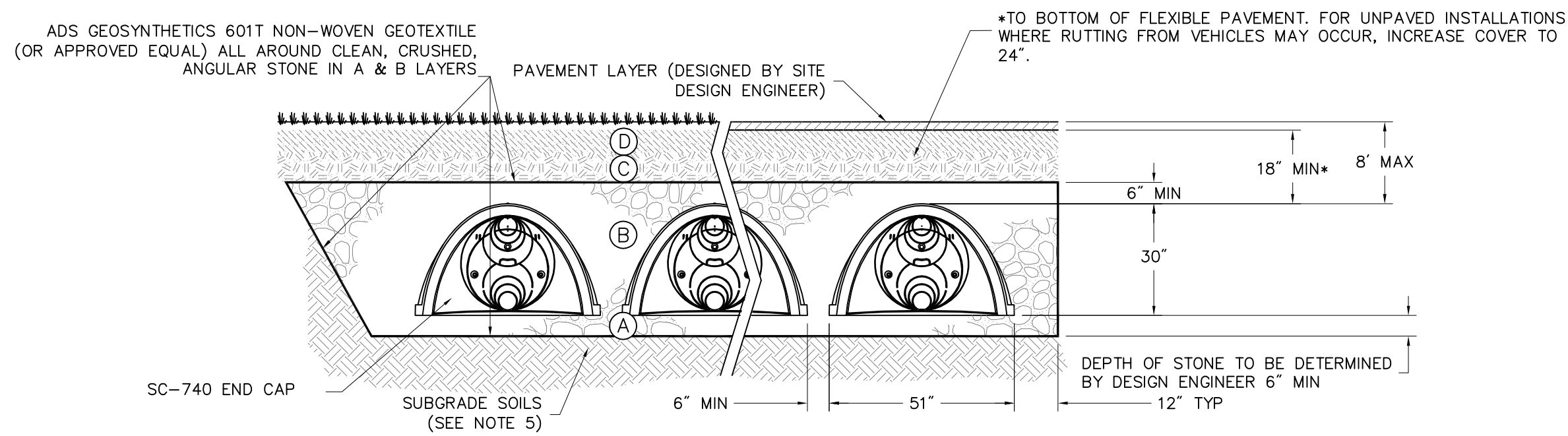
### MC - 3500 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



### SC - 740 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD.



N.T.S

Source: VHE

11/10

LD

| MATERIAL LOCATION |                                                                                                                                                                                                                 | DESCRIPTION                                                                                                                                                | AASHTO MATERIAL CLASSIFICATIONS                                                                                           | COMPACTION / DENSITY REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D                 | <b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER | ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.                                            | N/A                                                                                                                       | PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| C                 | <b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.         | GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE.<br><br>MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER. | AASHTO M145'<br>A-1, A-2-4, A-3<br><br>OR<br><br>AASHTO M43'<br>3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10 | BEGIN COMPACTIONS FOR MC-3500, MC-4500 CHAMBER AFTER 24" OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.<br><br>FOR SC-310, SC-741 CHAMBERS, BEGIN COMPACTION AFTER 12" OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN). |
| B                 | <b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.                                                                                             | CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH                                                                                | AASHTO M43'<br>3, 4                                                                                                       | NO COMPACTION REQUIRED.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| A                 | <b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.                                                                                                          | CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH                                                                                | AASHTO M43'<br>3, 4                                                                                                       | PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE 1/8 3/8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR ADAPTIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR, WASHED STONE.
2. STORMTIECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (MAX) LIFTS FOR MC-3500 AND MC-4500 AND 6" (MAX) LIFTS FOR MC-3000.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTIECH FOR COMPACTION REQUIREMENTS.
4. FILL MATERIALS SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
5. ACCEPTABLE FILL MATERIALS: TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ALL SOIL/MATERIAL CAN BE PLACED IN 'A' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

# Cambrian Rise Project

North Avenue  
Burlington, Vermont

| No. | Revision | Date | Appvd. |
|-----|----------|------|--------|
|-----|----------|------|--------|

|                           |                              |
|---------------------------|------------------------------|
| Designed by<br><b>TAS</b> | Checked by<br><b>PBS</b>     |
| Issued for                | Date<br><b>Nov. 22, 2016</b> |

Nov. 22, 2016

Not Approved for Construction

# Drawing Title

## Infiltration System Cross Sections and Notes

Drawing Number

## C6.9

Sheet 1 of 1

Project Number  
**57848.00**



BLDG A

375 North Avenue - Planting Schedule

| Trees |      |                                      |                                |             |               |         |                                          |
|-------|------|--------------------------------------|--------------------------------|-------------|---------------|---------|------------------------------------------|
| Qty   | Code | Scientific Name                      | Common Name                    | Size        | Spec          | Remarks | Notes                                    |
| 4     | ASGM | ACER saccharum 'Green Mountain'      | Green Mountain Sugar Maple     | 3" cal.     | B&B           |         | single stem                              |
| 10    | ACAB | AMELANCHIER x g. 'Autumn Brilliance' | Autumn Brilliance Serviceberry | 6" Ht.      | B&B           |         | multi-stem, 3-4 stems                    |
| 3     | BNVJ | BETULA nigra 'Fox Valley'            | Fox Valley River Birch         | 4" Ht.      | B&B           |         | multi-stem, 3-4 stems                    |
| 4     | GTH  | GLEDT'SIA 'Haleka'                   | Haleka Honeylocust             | 3" cal.     | B&B           |         | single stem                              |
| 5     | MSC  | MAGNOLIA stellata 'Centennial'       | Centennial Star Magnolia       | 6" Ht.      | B&B           |         | single stem                              |
| 3     | MAB  | MAGNOLIA acuminata x 'Betty'         | Betty Magnolia                 | 5" Ht.      | B&B           |         | single stem                              |
| 1     | PDP  | PRUNUS d. 'Pendula'                  | Weeping Japanese Red Pine      | 4" Ht.      | #10 Cont.     |         | specimen, landscape architect to inspect |
| 2     | PJC  | PRUNUS orientalis 'Gowdy'            | Gowdy Oriental Spruce          | 6" Ht.      | B&B           |         | single stem                              |
| 8     | PMR  | PRUNUS domestica 'Mount Royal'       | Mount Royal Plum               | 1 1/2" Cal. | 15 Gal. Cont. |         | single stem                              |
| 8     | TON  | THUJA occidentalis 'Nigra'           | Techy Arborvitae               | 6" Ht.      | B&B           |         | single stem                              |
| 2     | TON1 | THUJA occidentalis 'Nigra'           | Techy Arborvitae               | 6" Ht.      | B&B           |         | single stem                              |
| 3     | UAP  | ULMUS americana 'Princeton'          | Princeton Elm                  | 2 1/2" Cal. | B&B           |         | single stem                              |

| Shrubs |        |                                      |                            |          |             |         |             |
|--------|--------|--------------------------------------|----------------------------|----------|-------------|---------|-------------|
| Qty    | Code   | Scientific Name                      | Common Name                | Size     | Spec        | Remarks | Notes       |
| 3      | ABJ    | ARONIA arbutifolia 'Brilliantissima' | Brilliant Red Chokeberry   | 4" Ht.   | B&B         |         | single stem |
| 3      | GTP    | CHAMAECYPARIS thyoides 'Top Point'   | Top Point White Cedar      | 18" Ht.  | No. 5 Count |         | single stem |
| 3      | CSG    | CORNUS sericea 'Silver and Gold'     | Silver and Gray Dogwood    | 30" Ht.  | B&B         |         | single stem |
| 74     | JSS    | JUNIPERUS sabina 'Broadmoor'         | Broadmoor Juniper          | 24" Ht.  | #5 Cont.    |         | single stem |
| 51     | MD     | MICROBIOTA decussata                 | Siberian Cypress           | 10" Ht.  | #3 Cont.    |         | single stem |
| 20     | PPP    | POTENTILLA fruticosa 'Pink Beauty'   | Pink Beauty Abotswood      | 18" Ht.  | #3 Cont.    |         | single stem |
| 5      | PKA    | PRUNUS mugo 'Aurea'                  | Golden Mugo Pine           | 30"      | B&B         |         | single stem |
| 46     | RH     | RHUS aromatica 'So-lo-w'             | Golden Fragrant Sumac      | 18" Ht.  | #3 Cont.    |         | single stem |
| 9      | RCA    | RHOODOENDRON cat. 'Album'            | White Catawba Rhododendron | 3-4" Ht. | B&B         |         | single stem |
| 5      | RGD    | RHUS aromatica 'Green Globe'         | Green Globe Fragrant Sumac | 18" Ht.  | #3 Cont.    |         | single stem |
| 4      | RR     | ROSA rugosa                          | Rugosa Rose                | 24"      | #3 Cont.    |         | single stem |
| 21     | SBAW   | SPRAEA x humulata 'Anthony Waterer'  | Anthony Waterer Spirea     | 24"      | B&B         |         | single stem |
| 10     | S.L.P. | SPRAEA japonica 'Little Princess'    | Little Princess Spirea     | 18"      | #3 Cont.    |         | single stem |
| 6      | SL     | SYRINGA lacinata                     | Cutleaf Lilac              | 18"      | #3 Cont.    |         | single stem |
| 5      | TME    | TAXUS x.m. 'Densform'                | Densform Yew               | 36" Ht.  | B&B         |         | single stem |
| 15     | TOA    | THUJA occidentalis 'Aurea'           | Golden Globe Arborvitae    | 24" Ht.  | B&B         |         | single stem |

| Groundcovers, Ferns & Perennials |          |                                    |                                     |             |             |         |          |
|----------------------------------|----------|------------------------------------|-------------------------------------|-------------|-------------|---------|----------|
| Qty                              | Code     | Scientific Name                    | Common Name                         | Size        | Spec        | Remarks | Notes    |
| 59                               | CAK      | CALAMAGROTIS x.ac. 'Karl Foerster' | Karl Foerster Reed Grass            | Clump       | #2 Cont.    |         | 24" O.C. |
| 8                                | DP       | DENNSTADTIA punctiloba             | Hay Scented Fern                    | Clump       | #2 Cont.    |         | 24" O.C. |
| 43                               | HRR      | HEMEROCALLIS 'Rosy Returns'        | Rosy Returns Daylily                | Clump       | #2 Cont.    |         | 24" O.C. |
| 34                               | IPB      | IRIS c. Powder Blue Giant          | Powder Blue Giant Crested Iris      | Clump       | #2 Cont.    |         | 24" O.C. |
| 13                               | PD       | PHLOX divaricata 'Mary Helen'      | Mary Helen Phlox                    | Clump       | #1 Cont.    |         | 24" O.C. |
| PM                               | PRENNYAL | HEMEROCALLIS 'Hearts Afire'        | Double Scoop Mandarin, Harvest Moon | Clump       | #2 Cont.    |         | 18" O.C. |
| 240                              | PT       | PACHYSANDRA 'Green Sheen'          | Green Sheen Pachyandra              | Clump       | Quart Cont. |         | 15" O.C. |
| 180                              | WT       | WALDSTERIA ternata                 | Barren Strawberry                   | Quart Cont. |             |         | 24" O.C. |

| Rooftop Planting/Planters |      |                                      |                                         |         |          |         |          |
|---------------------------|------|--------------------------------------|-----------------------------------------|---------|----------|---------|----------|
| Qty                       | Code | Scientific Name                      | Common Name                             | Size    | Spec     | Remarks | Notes    |
| 0                         | ABJ  | ARONIA arbutifolia 'Brilliantissima' | Brilliant Red Chokeberry                | 24" Ht. | #3 Cont. |         | 18" O.C. |
| 0                         | DM   | DAYLILY MIX - H-HEMEROCALLIS         | Stella d'oro, Ruby Stella, Rosy Returns | Clump   | #1 Cont. | 2-3'    | 18" O.C. |
| 0                         | RRH  | ROSA rugosa                          | Rugosa Rose                             | 15"     | #3 Cont. |         | 18" O.C. |
| 0                         | RRHs | ROSA rugosa 'Henry Hudson'           | Henry Hudson Rugosa Rose                | 15"     | #3 Cont. |         | 18" O.C. |

2 BUILDING A (375 NORTH AVE), E/F, I, CENTRAL GREEN PLANTING SCHEDULE  
L-502

BLDG E + F

E and F Planting Schedule

| Trees              |      |                                                         |                                |             |             |         |              |
|--------------------|------|---------------------------------------------------------|--------------------------------|-------------|-------------|---------|--------------|
| Qty                | Code | Scientific Name                                         | Common Name                    | Size        | Spec        | Remarks | Notes        |
| 2                  | AC   | ABIES concolor                                          | White Fir                      | 6" Ht.      | B&B         |         | single stem  |
| 9                  | AG   | ACER griseum                                            | Paperbark Maple                | 2 1/2" cal. | B&B         |         | single stem  |
| 3                  | CC   | CARPINUS caroliniana                                    | American Hornbeam              | 2 1/2" cal. | B&B         |         | single stem  |
| 4                  | GTH  | GLEDT'SIA 'Haleka'                                      | Haleka Honeylocust             | 2 1/2" cal. | B&B         |         | single stem  |
| 4                  | MLDM | MAGNOLIA loebneri 'Dr. Merrill'                         | Dr. Merrill Magnolia           | 7" Ht.      | B&B         |         | single stem  |
| 4                  | MR   | MAGNOLIA 'Rivis'                                        | Rivis Magnolia                 | 7" Ht.      | B&B         |         | single stem  |
| 7                  | SRIS | SYRINGA reticulata 'Nory Silk'                          | Nory Silk Tree Lilac           | 3" cal.     | B&B         |         | single stem  |
| 31                 |      |                                                         |                                |             |             |         |              |
| Shrubs             |      |                                                         |                                |             |             |         |              |
| Qty                | Code | Scientific Name                                         | Common Name                    | Size        | Spec        | Remarks | Notes        |
| 30                 | CSAF | CORNUS sericea 'Arctic Fire'                            | Arctic Fire Dogwood            | 30" Ht.     | #5 Cont.    |         | single stem  |
| 2                  | HV   | HAMAMELIS vernalis                                      | Vernal Witchhazel              | 4" Ht.      | B&B         |         | single stem  |
| 13                 | LA   | LEUCOTHOE axillaris                                     | Dwarf Leucothea                | 18" Ht.     | #3 Cont.    |         | single stem  |
| 207                | RAGM | RIBES alpinum 'Green Mound'                             | Green Mound Alpine Currant     | 15"         | B&B         |         | single stem  |
| 3                  | RCA  | RHOODOENDRON 'Catawbiense Album'                        | White Catawba Rhododendron     | 24"         | B&B         |         | single stem  |
| 38                 | RGD  | RHUS aromatica 'Green Globe'                            | Green Globe Fragrant Sumac     | 18" Ht.     | #3 Cont.    |         | single stem  |
| 30                 | SA   | SYMPHORICARPOS alba                                     | Common Snowberry               | 24" Ht.     | #3 Cont.    |         | single stem  |
| 2                  | SPW  | SPRAEA x ventriculata                                   | Van Houtte Spirea              | 36" Ht.     | B&B         |         | single stem  |
| 46                 | TMD  | TAXUS x.m. 'Densiformis'                                | Densform Yew                   | 36" Ht.     | B&B         |         | single stem  |
| 371                |      |                                                         |                                |             |             |         |              |
| Perennials & Ferns |      |                                                         |                                |             |             |         |              |
| Qty                | Code | Scientific Name                                         | Common Name                    | Size        | Spec        | Remarks | Notes        |
| 0                  | DM   | DAYLILY MIX                                             |                                |             |             |         | 18"-30" O.C. |
| 10                 | HRR  | HEMEROCALLIS 'Rosy Returns'                             | Rosy Returns Daylily           | Clump       | #2 Cont.    |         | 30" O.C.     |
| 10                 | HAW  | HEMEROCALLIS 'Ann Warner'                               | Ann Warner Daylilies           | Clump       | #2 Cont.    |         | 30" O.C.     |
| 10                 | HRR  | HEMEROCALLIS 'Happy Returns'                            | Happy Returns Daylilies        | Clump       | #2 Cont.    |         | 30" O.C.     |
| 10                 | HAF  | HEMEROCALLIS 'Hearts Afire'                             | Hearts Afire Daylilies         | Clump       | #2 Cont.    |         | 30" O.C.     |
| 10                 | HB   | HEMEROCALLIS 'Prairie Blue Eyes'                        | Prairie Blue Eyes Daylilies    | Clump       | #2 Cont.    |         | 30" O.C.     |
| 0                  | HSM  | HEMEROCALLIS 'Stella d'oro, Ruby Stella, 'Rosy Returns' |                                | Clump       | #2 Cont.    |         | 24" O.C.     |
| 0                  | IM   | IRIS MIX                                                |                                |             |             |         | 18"-24" O.C. |
| 50                 | IPB  | IRIS c. Powder Blue Giant                               | Powder Blue Giant Crested Iris | Clump       | #2 Cont.    |         | 24" O.C.     |
| 25                 | ISM  | IRIS sibirica 'Blue Moon'                               | Blue Moon Iris                 | Clump       | #2 Cont.    |         | 18"-24" O.C. |
| 25                 | ISP  | IRIS sibirica 'Perry's Blue'                            | Perry's Blue Iris              | Clump       | #2 Cont.    |         | 18"-24" O.C. |
| 150                |      |                                                         |                                |             |             |         |              |
| Ornamental Grasses |      |                                                         |                                |             |             |         |              |
| Qty                | Code | Scientific Name                                         | Common Name                    | Size        | Spec        | Remarks | Notes        |
| 0                  | OGM  | ORNAMENTAL MIX                                          |                                |             |             |         | 24"-36" O.C. |
| 12                 | CAK  | CALAMAGROTIS x.ac. 'Karl Foerster'                      | Karl Foerster Reed Grass       | Clump       | #2 Cont.    | 3-5'    | 24"-30" O.C. |
| 70                 | CAB  | CALAMAGROTIS x.ac. 'Brachytricha'                       | Korean Feather Reed Grass      | Clump       | #2 Cont.    | 3-4'    | 24"-30" O.C. |
| 12                 | PV   | PANICUM virgatum                                        | Switch Grass                   | Clump       | #2 Cont.    | 4-5'    | 24" O.C.     |
| 82                 |      |                                                         |                                |             |             |         |              |
| Groundcovers       |      |                                                         |                                |             |             |         |              |
| Qty                | Code | Scientific Name                                         | Common Name                    | Size        | Spec        | Remarks | Notes        |
| 0                  | GM   | GROUNDCOVER MIX                                         |                                |             |             |         | 12"-24" O.C. |
| 1750               | LS   | LIRIOPE spicata                                         | Creeping Turf Lily             | Clump       | #1 Cont.    |         | 15" O.C.     |
| 220                | PT   | PACHYSANDRA terminalis                                  | Pachyandra                     | Clump       | Quart Cont. |         | 15" O.C.     |
| 1970               |      |                                                         |                                |             |             |         |              |

BLDG B + G

Building B and G Planting Schedule

| Street Trees       |                              |                                                         |                                |             |          |         |                       |
|--------------------|------------------------------|---------------------------------------------------------|--------------------------------|-------------|----------|---------|-----------------------|
| Qty                | Code                         | Scientific Name                                         | Common Name                    | Size        | Spec     | Remarks | Notes                 |
| 1                  | AB                           | ABIES balsamea                                          | Balsam Fir                     | 6" Ht.      | B&B      |         | single stem           |
| 1                  | ACAB                         | AMELANCHIER x g. 'Autumn Brilliance'                    | Autumn Brilliance Serviceberry | 6" Ht.      | B&B      |         | multi-stem, 3-4 stems |
| 2                  | ASGM                         | ACER saccharum 'Green Mountain'                         | Green Mountain Sugar Maple     | 3" cal.     | B&B      |         | single stem           |
| 1                  | BA                           | BETULA alleghaniensis                                   | Yellow Birch                   | 3" cal.     | B&B      |         | single stem           |
| 4                  | BNH                          | BETULA nigra 'Heritage'                                 | Heritage River Birch           | 10-12" Ht.  | B&B      |         | multi-stem, 3-4 stems |
| 7                  | CC                           | CARPINUS caroliniana                                    | American Hornbeam              | 2 1/2" cal. | B&B      |         | single stem           |
| 3                  | GTH                          | GLEDT'SIA 'Haleka'                                      | Haleka Honeylocust             | 3" cal.     | B&B      |         | single stem           |
| 1                  | MLDM                         | MAGNOLIA loebneri 'Dr. Merrill'                         | Dr. Merrill Magnolia           | 7" Ht.      | B&B      |         | single stem           |
| 2                  | SRIS                         | SYRINGA reticulata 'Nory Silk'                          | Nory Silk Tree Lilac           | 3" cal.     | B&B      |         | single stem           |
| 3                  | UAP                          | ULMUS americana 'Princeton'                             | Princeton Elm                  | 2 1/2" cal. | B&B      |         | single stem           |
| 25                 |                              |                                                         |                                |             |          |         |                       |
| Shrubs             |                              |                                                         |                                |             |          |         |                       |
| Qty                | Code                         | Scientific Name                                         | Common Name                    | Size        | Spec     | Remarks | Notes                 |
| 28                 | CSAF                         | CORNUS sericea 'Arctic Fire'                            | Arctic Fire Dogwood            | 30" Ht.     | #5 Cont. |         | single stem           |
| 2                  | HV                           | HAMAMELIS vernalis                                      | Vernal Witchhazel              | 4" Ht.      | B&B      |         | single stem           |
| 19                 | SA                           | SYMPHORICARPOS alba                                     | Common Snowberry               | 24" Ht.     | #3 Cont. |         | single stem           |
| 22                 | LA                           | LEUCOTHOE axillaris                                     | Dwarf Leucothea                | 18" Ht.     | #3 Cont. |         | single stem           |
| 4                  | RCA                          | RHOODOENDRON 'Catawbiense Album'                        | White Catawba Rhododendron     | 24"         | B&B      |         | single stem           |
| 68                 | RAGM                         | RIBES alpinum 'Green Mound'                             | Green Mound Alpine Currant     | 15"         | B&B      |         | single stem           |
| 28                 | RGD                          | RHUS aromatica 'Green Globe'                            | Green Globe Fragrant Sumac     | 18" Ht.     | #3 Cont. |         | single stem           |
| 1                  | SPW                          | SPRAEA x ventriculata                                   | Van Houtte Spirea              | 36" Ht.     | B&B      |         | single stem           |
| 6                  | SPM                          | SYRINGA patula 'Miss Kim'                               | Miss Kim Lilac                 | 3" Ht.      | B&B      |         | single stem           |
| 13                 | TMD                          | TAXUS x.m. 'Densiformis'                                | Densform Yew                   | 36" Ht.     | B&B      |         | single stem           |
| 192                |                              |                                                         |                                |             |          |         |                       |
| Perennials & Ferns |                              |                                                         |                                |             |          |         |                       |
| Qty                | Code                         | Scientific Name                                         | Common Name                    | Size        | Spec     | Remarks | Notes                 |
| 0                  | DM                           | DAYLILY MIX                                             |                                |             |          |         | 18"-30" O.C.          |
| 10                 | HRR                          | HEMEROCALLIS 'Rosy Returns'                             | Rosy Returns Daylily           | Clump       | #2 Cont. |         | 30" O.C.              |
| 10                 | HAW                          | HEMEROCALLIS 'Ann Warner'                               | Ann Warner Daylilies           | Clump       | #2 Cont. |         | 30" O.C.              |
| 10                 | HRR                          | HEMEROCALLIS 'Happy Returns'                            | Happy Returns Daylilies        | Clump       | #2 Cont. |         | 30" O.C.              |
| 10                 | HAF                          | HEMEROCALLIS 'Hearts Afire'                             | Hearts Afire Daylilies         | Clump       | #2 Cont. |         | 30" O.C.              |
| 10                 | HB                           | HEMEROCALLIS 'Prairie Blue Eyes'                        | Prairie Blue Eyes Daylilies    | Clump       | #2 Cont. |         | 30" O.C.              |
| 0                  | HSM                          | HEMEROCALLIS 'Stella d'oro, Ruby Stella, 'Rosy Returns' |                                | Clump       | #2 Cont. |         | 24" O.C.              |
| 0                  | HM                           | HOSTA MIX                                               |                                |             |          |         | 18"-24" O.C.          |
| HF                 | HOSTA 'Frances'              | Frances Hosta                                           | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| HF6                | HOSTA 'Fragrant Bouquet'     | Fragrant Bouquet Hosta                                  | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| HH                 | HOSTA 'Haleyon'              | Haleyon Hosta                                           | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| HLB                | HOSTA 'Lacy Belle'           | Lacy Belle Hosta                                        | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| HM                 | HOSTA 'Minuteman'            | Minuteman Hosta                                         | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| 0                  | IM                           | IRIS MIX                                                |                                |             |          |         | 18"-24" O.C.          |
| IPB                | IRIS c. Powder Blue Giant    | Powder Blue Giant Crested Iris                          | Clump                          | #2 Cont.    |          |         | 24" O.C.              |
| ISM                | IRIS sibirica 'Blue Moon'    | Blue Moon Iris                                          | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| ISP                | IRIS sibirica 'Perry's Blue' | Perry's Blue Iris                                       | Clump                          | #2 Cont.    |          |         | 18"-24" O.C.          |
| 0                  | RFG                          | RUBICECKIA fulgida ver. x. 'Goldsturm'                  | Black Eye Susan                | Clump       | #2 Cont. |         | 12" O.C.              |
| 0                  | RFV                          | RUBICECKIA fulgida 'Violet's Little Suzy'               | Little Suzy Black Eye Susan    | Clump       | #2 Cont. |         | 12" O.C.              |
| Ornamental Grasses |                              |                                                         |                                |             |          |         |                       |
| Qty                | Code                         | Scientific Name                                         | Common Name                    | Size        | Spec     | Remarks | Notes                 |
| 0                  | OGM                          | ORNAMENTAL MIX                                          |                                |             |          |         | 24"-36" O.C.          |
| 10                 | CAK                          | CALAMAGROTIS x.ac. 'Karl Foerster'                      | Karl Foerster Reed Grass       | Clump       | #2 Cont. | 3-5'    | 24"-30" O.C.          |
| 82                 | CAB                          | CALAMAGROTIS x.ac. 'Brachytricha'                       | Korean Feather Reed Grass      | Clump       | #2 Cont. | 3-4'    | 24"-30" O.C.          |
| 92                 |                              |                                                         |                                |             |          |         |                       |
| Groundcovers       |                              |                                                         |                                |             |          |         |                       |
| Qty                | Code                         | Scientific Name                                         | Common Name                    | Size        | Spec     | Remarks | Notes                 |
| 0                  | GM                           | GROUNDCOVER MIX                                         |                                |             |          |         | 12"-24" O.C.          |
| LS                 | LIRIOPE spicata              | Creeping Turf Lily                                      | Clump                          | #1 Cont.    |          |         | 15" O.C.              |
| PT                 | PACHYSANDRA terminalis       | Pachyandra                                              | Clump                          | Quart Cont. |          |         | 15" O.C.              |
| PQ                 | PARTHENOCISSUS quinquefolia  | Virginia Creeper                                        | Clump                          | #1 Cont.    |          |         | 24" O.C.              |

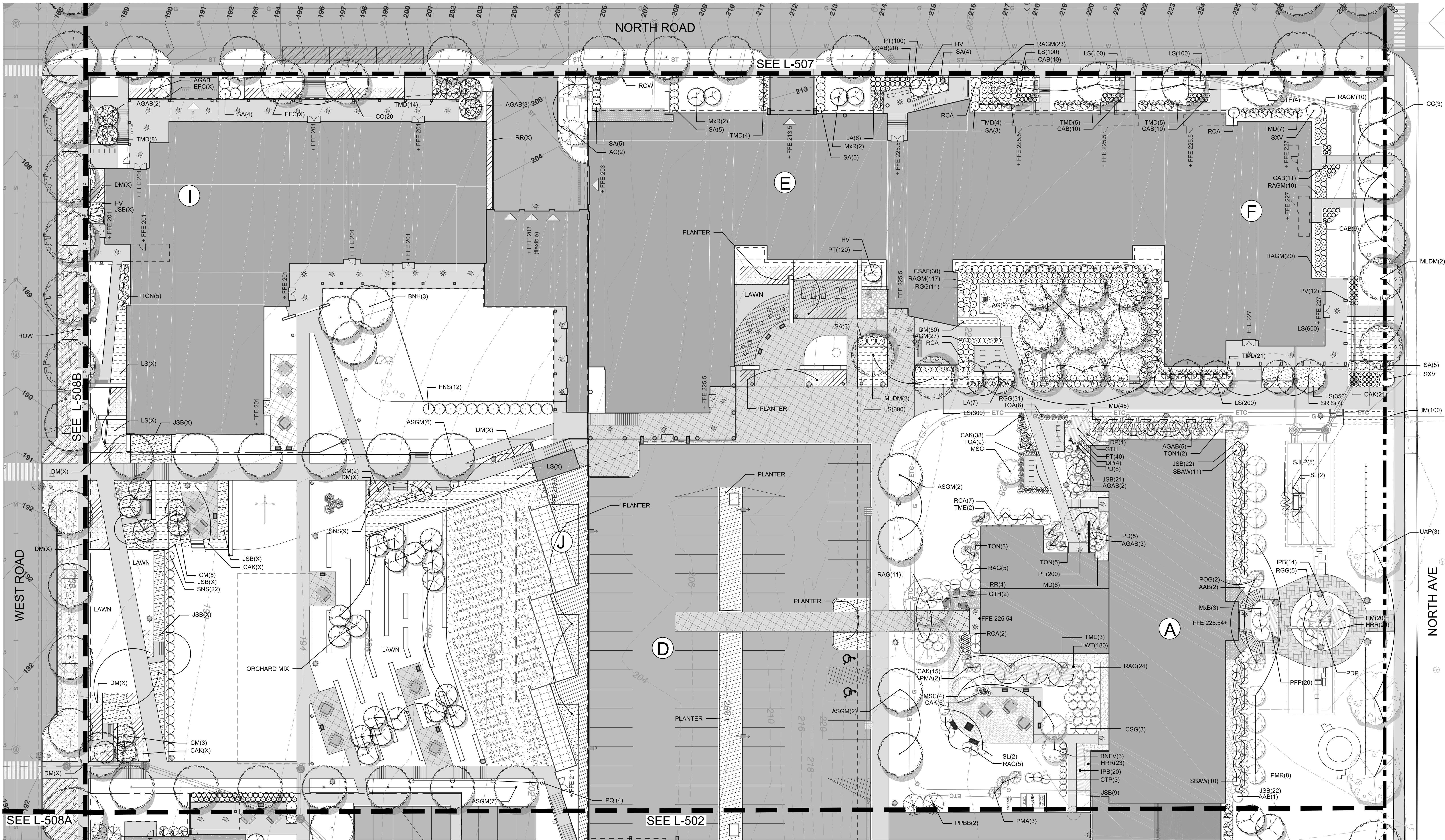
1 BUILDING H, C/D, B/G PLANTING SCHEDULES  
L-501

BLDG I

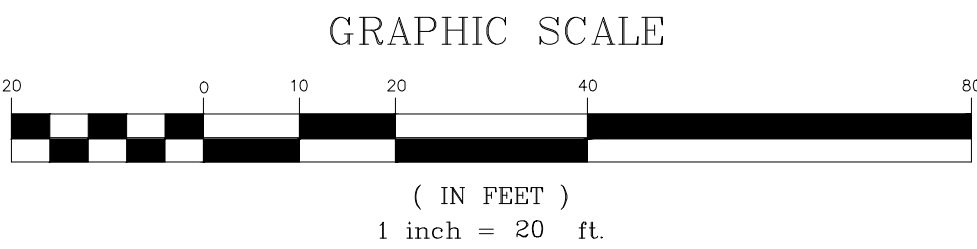
Building I Planting Schedule

| Trees              |      |                                      |                                |            |          |         |                       |
|--------------------|------|--------------------------------------|--------------------------------|------------|----------|---------|-----------------------|
| Qty                | Code | Scientific Name                      | Common Name                    | Size       | Spec     | Remarks | Notes                 |
| 6                  | ASGM | ACER saccharum 'Green Mountain'      | Green Mountain Sugar Maple     | 2 1/2" cal | B&B      |         | single stem           |
| 6                  | AGAB | AMELANCHIER x g. 'Autumn Brilliance' | Autumn Brilliance Serviceberry | 6" Ht.     | B&B      |         | multi-stem, 3-4 stems |
| 3                  | BNH  | BETULA nigra 'Heritage'              | Heritage River Birch           | 10-12" Ht. | B&B      |         | multi-stem, 3-4 stems |
| 2                  | CO   | CELTIS occidentalis                  | Common Hackberry               | 3" cal     | B&B      |         | single stem           |
| 17                 |      |                                      |                                |            |          |         |                       |
| Shrubs             |      |                                      |                                |            |          |         |                       |
| Qty                | Code | Scientific Name                      | Common Name                    | Size       | Spec     | Remarks | Notes                 |
| 0                  | EFC  | EUCONYMUS fortunei 'Coloratus'       | Purpleleaf Wintercreeper       | 18"        | #3 Cont. |         | single stem           |
| 12                 | FNS  | FORSYTHIA 'Northern Sun'             | Northern Sun Forsythia         | 3" Ht.     | B&B      |         | single stem           |
| 1                  | HV   | HAMAMELIS vernalis                   | Vernal Witchhazel              | 4" Ht.     | B&B      |         | single stem           |
| 0                  | JSS  | JUNIPERUS sabina 'Broadmoor'         | Broadmoor Juniper              | 24" Ht.    | #5 Cont. |         | single stem           |
| 15                 | RR   | ROSA rugosa                          | Rugosa Rose                    | 24"        | #3 Cont. |         | single stem           |
| 4                  | SA   | SYMPHORICARPOS alba                  | Common Snowberry               | 30" Ht.    | B&B      |         | single stem           |
| 22                 | TMD  | TAXUS x.m. 'Densiformis'             | Densform Yew                   | 36" Ht.    | B&B      |         | single stem           |
| 5                  | TON  | THUJA occidentalis 'Nigra'           | Dark Green Arborvitae          | 4" Ht.     | B&B      |         | 3 5" O.C.             |
| 59                 |      |                                      |                                |            |          |         |                       |
| Perennials & Ferns |      |                                      |                                |            |          |         |                       |
| Qty                | Code | Scientific Name                      | Common Name                    | Size       | Spec     | Remarks | Notes                 |
| 0                  | DM   | DAYLILY MIX                          |                                |            |          |         | 18"-30" O.C.          |
| 0                  | HRR  | HE                                   |                                |            |          |         |                       |





NOTE:  
SEE SHEET L-500 FOR PLANT SCHEDULE



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11/23/2016

date  
Owner:  
BC Community Housing

landscape architects planning consultants  
301 college street burlington vermont 05401 802 658 3555



MJB  
design by  
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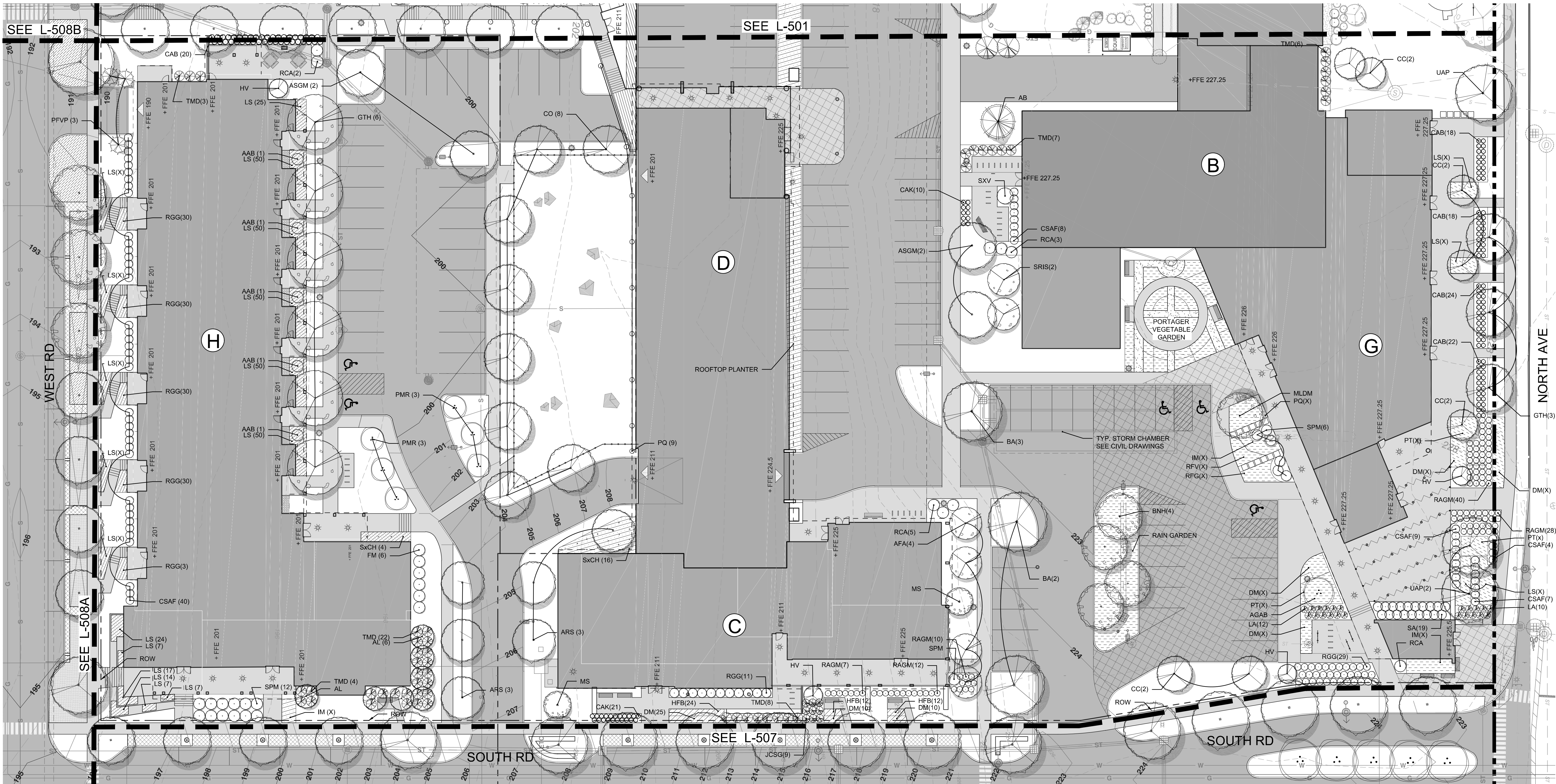
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T. J. Boyle Associates, LLC  
CAMBRIAN RISE  
PLANTING PLAN - ADEFI

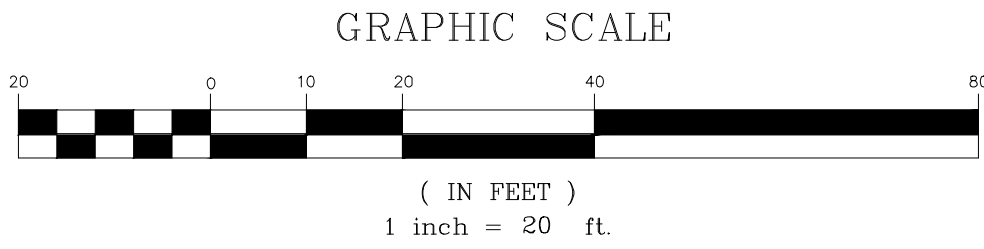
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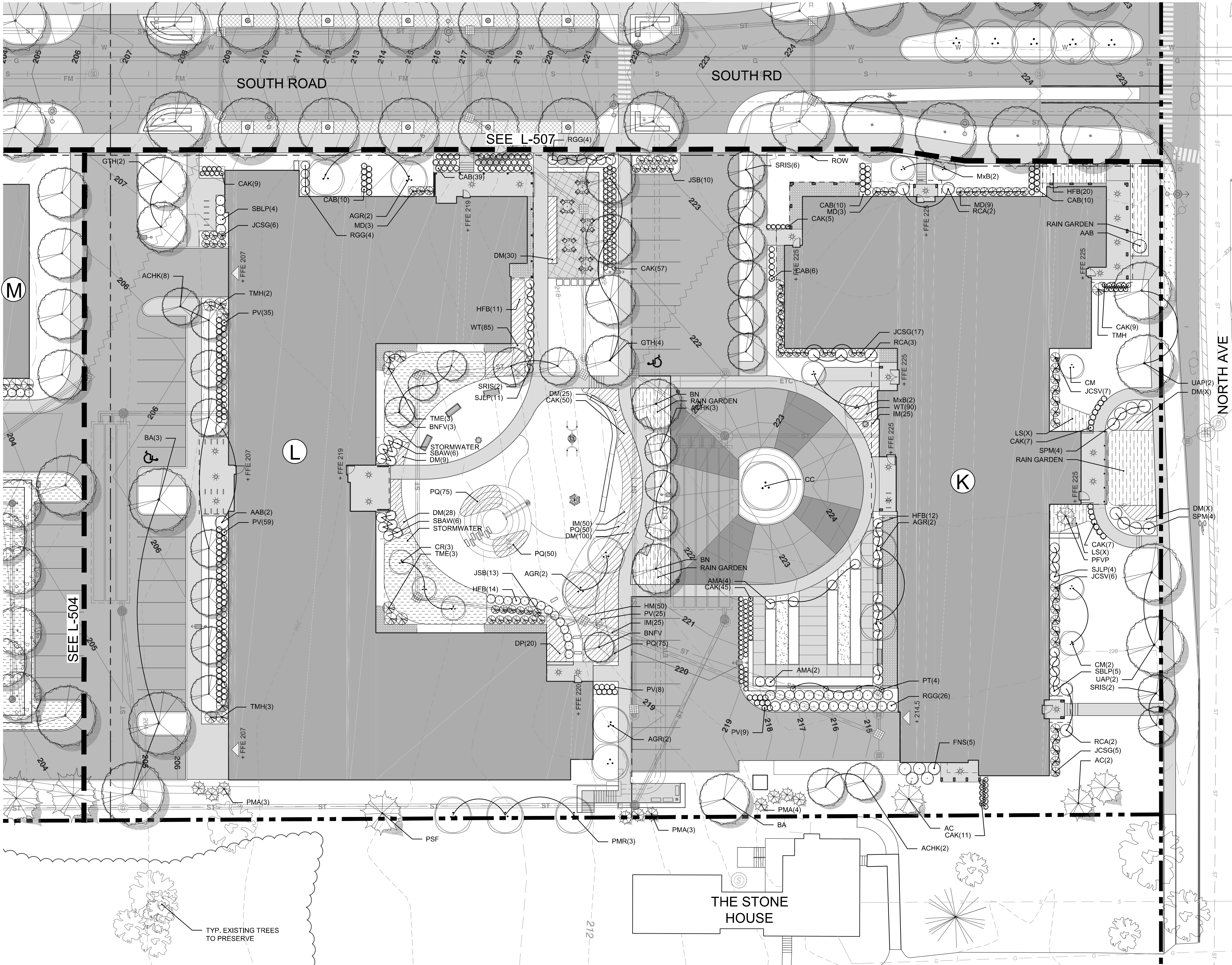




NOTE:  
SEE SHEET L-500 FOR PLANT SCHEDULE







| L Planting Schedule |      |                                |                         |             |               |      |                       |
|---------------------|------|--------------------------------|-------------------------|-------------|---------------|------|-----------------------|
| Trees               | Qty  | Code                           | Scientific Name         | Common Name | Size          | Spec | Remarks               |
| 2                   | ACHK | ACER campestre 'Hedge King'    | Hedge King Maple        | 3" cal.     | B&B           |      | single stem           |
| 11                  | AGR  | AMELANCHIER x g. 'Robin Hill'  | Robin Hill Serviceberry | 6" Ht.      | B&B           |      | multi-stem, 3-4 stems |
| 3                   | BA   | BETULA alleghaniensis          | Yellow Birch            | 3" cal.     | B&B           |      | single stem           |
| 2                   | BN   | BETULA nigra                   | River Birch             | 3" cal.     | B&B           |      | single stem           |
| 4                   | BNVU | BETULA nigra 'Fox Valley'      | Fox Valley River Birch  | 4" Ht.      | B&B           |      | multi-stem, 3-4 stems |
| 3                   | CR   | CORNUS rosmosa                 | Gray Dogwood            | 3" Ht.      | B&B           |      | single stem           |
| 6                   | GTH  | GLADSTONIA l. 'Halka'          | Halka Honeylocust       | 3" cal.     | B&B           |      | single stem           |
| 1                   | PSF  | PRUNUS sibirica 'Fastigata'    | Pyramidal White Pine    | 10" Ht.     | B&B           |      |                       |
| 3                   | PMR  | PRUNUS domestica 'Mount Royal' | Mount Royal Plum        | 1.5" Cal.   | 15 Cal. Cont. |      |                       |
| 2                   | SRIS | SYRINGA l. 'Honey Silk'        | Honey Silk Tree Lilac   | 8" Ht.      | B&B           |      | tree form             |

| Strubs |      |                                      |                            |         |          |         |           |
|--------|------|--------------------------------------|----------------------------|---------|----------|---------|-----------|
| Qty    | Code | Scientific Name                      | Common Name                | Size    | Spec     | Remarks | Notes     |
| 2      | AAB  | ARONIA arbutifolia 'Brilliantissima' | Brilliant Red Chokeberry   | 4" Ht.  | #5 Cont. |         |           |
| 6      | JCSG | JUNIPERUS chinensis 'Sea Green'      | Sea Green Juniper          | 18" Ht. | #3 Cont. |         |           |
| 13     | JSB  | JUNIPERUS sabina 'Broadmoor'         | Broadmoor Juniper          | 24" Ht. | #5 Cont. |         |           |
| 6      | PMA  | PRUNUS mugo 'Aurea'                  | Golden Mugo Pine           | 30"     | B&B      |         |           |
| 8      | RGS  | RHUS aromatica 'Green Globe'         | Green Globe Fragrant Sumac | 18" Ht. | #3 Cont. |         | 4" O.C.   |
| 3      | MD   | MICROBIOTA decussata                 | Siberian Cypress           | 15" Ht. | #3 Cont. |         | 4" O.C.   |
| 4      | SBLP | SPRAEA x bumalda 'Lemon Princess'    | Lemon Princess Spirea      | 18"     | B&B      |         |           |
| 11     | SJLP | SPRAEA japonica 'Little Princess'    | Little Princess Spirea     | 18"     | #3 Cont. |         |           |
| 12     | SSAW | SPRAEA x bumalda 'Anthony Waterer'   | Anthony Waterer Spirea     | 24"     | B&B      |         |           |
| 6      | TME  | TAXUS x m. 'Everlow'                 | Everlow Yew                | 24" Ht. | B&B      |         | 3.5" O.C. |
| 5      | TMH  | TAXUS x m. 'Hicksii'                 | Hick's Yew                 | 3" Ht.  | B&B      |         |           |

| Perennials & Ferns |      |                                                         |                                |       |          |         |              |
|--------------------|------|---------------------------------------------------------|--------------------------------|-------|----------|---------|--------------|
| Qty                | Code | Scientific Name                                         | Common Name                    | Size  | Spec     | Remarks | Notes        |
| 20                 | DP   | DENNISTAEZIA punctiloba                                 | Hay Scented Fern               | Clump | #2 Cont. |         | 30" O.C.     |
| 40                 | HRR  | HEMEROCALLIS 'Rosy Returns'                             | Rosy Returns Daylily           | Clump | #2 Cont. |         | 18"-30" O.C. |
| 40                 | HAW  | HEMEROCALLIS 'Ann Warner'                               | Ann Warner Daylilies           | Clump | #2 Cont. |         | 30" O.C.     |
| 30                 | HHR  | HEMEROCALLIS 'Happy Returns'                            | Happy Returns Daylilies        | Clump | #2 Cont. |         | 30" O.C.     |
| 30                 | HAF  | HEMEROCALLIS 'Hearts Afire'                             | Hearts Afire Daylilies         | Clump | #2 Cont. |         | 30" O.C.     |
| 40                 | HB   | HEMEROCALLIS 'Prairie Blue Eyes'                        | Prairie Blue Eyes Daylilies    | Clump | #2 Cont. |         | 30" O.C.     |
| 30                 | HSM  | HEMEROCALLIS 'Stella d'oro, Ruby Stella, 'Rosy Returns' | Rosy Returns Daylily           | Clump | #2 Cont. |         | 24" O.C.     |
| 30                 | HM   | HOSTA 'Mantleman'                                       | Mantleman Hosta                | Clump | #2 Cont. |         | 18"-24" O.C. |
| 25                 | HFB  | HOSTA 'Gold Standard'                                   | Fragrant Bouquet Hosta         | Clump | #2 Cont. |         | 36" O.C.     |
| 20                 | HFB  | HOSTA 'Gold Standard'                                   | Fragrant Bouquet Hosta         | Clump | #2 Cont. |         | 18"-24" O.C. |
| 20                 | HLB  | HOSTA 'Lacy Belle'                                      | Lacy Belle Hosta               | Clump | #2 Cont. |         | 18"-24" O.C. |
| 10                 | HM   | HOSTA 'Mantleman'                                       | Mantleman Hosta                | Clump | #2 Cont. |         | 18"-24" O.C. |
| 10                 | IPB  | IRIS c. Powder Blue Giant                               | Powder Blue Giant Crested Iris | Clump | #2 Cont. |         | 18"-24" O.C. |
| 15                 | ISM  | IRIS sibirica 'Blue Moon'                               | Blue Moon Iris                 | Clump | #2 Cont. |         | 18"-24" O.C. |
| 15                 | ISP  | IRIS sibirica 'Perry's Blue'                            | Perry's Blue Iris              | Clump | #2 Cont. |         | 18"-24" O.C. |

| Ornamental Grasses |      |                                    |                           |       |          |         |              |
|--------------------|------|------------------------------------|---------------------------|-------|----------|---------|--------------|
| Qty                | Code | Scientific Name                    | Common Name               | Size  | Spec     | Remarks | Notes        |
| 127                | PV   | PANICUM virgatum                   | Switch Grass              | Clump | #2 Cont. | 4-5'    | 24" O.C.     |
| 40                 | CAK  | CALAMAGROTIS x ac. 'Brachytrich'   | Korean Feather Reed Grass | Clump | #2 Cont. | 3-4'    | 24"-30" O.C. |
| 116                | CAK  | CALAMAGROTIS x ac. 'Karl Foerster' | Karl Foerster Reed Grass  | Clump | #2 Cont. | 3-5'    | 24"-30" O.C. |

| Groundcovers & Vines |      |                             |                   |       |          |         |          |
|----------------------|------|-----------------------------|-------------------|-------|----------|---------|----------|
| Qty                  | Code | Scientific Name             | Common Name       | Size  | Spec     | Remarks | Notes    |
| 275                  | PQ   | PARTHENOCISSUS quinquefolia | Virginia Creeper  | Clump | #1 Cont. |         | 24" O.C. |
| 85                   | WT   | WALDS TEINIA ternata        | Barren Strawberry | Clump | #1 Cont. |         | 18" O.C. |

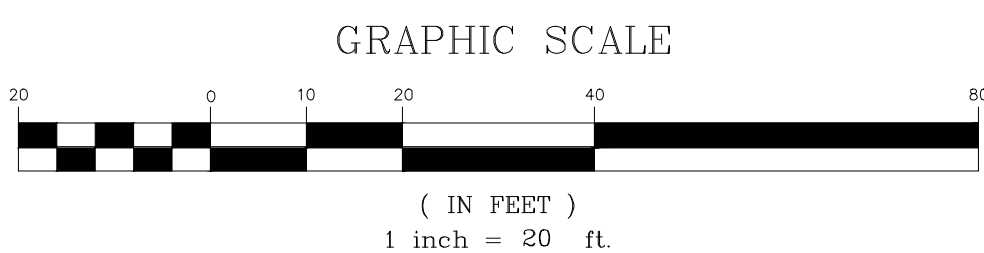
| K Planting Schedule |      |                                |                         |             |      |      |                       |
|---------------------|------|--------------------------------|-------------------------|-------------|------|------|-----------------------|
| Trees               | Qty  | Code                           | Scientific Name         | Common Name | Size | Spec | Remarks               |
| 3                   | AC   | ABIES concolor                 | White Fir               | 6" Ht.      | B&B  |      |                       |
| 2                   | ACHK | ACER campestre 'Hedge King'    | Hedge King Maple        | 3" cal.     | B&B  |      | single stem           |
| 2                   | AGR  | AMELANCHIER x g. 'Robin Hill'  | Robin Hill Serviceberry | 6" Ht.      | B&B  |      | multi-stem, 3-4 stems |
| 4                   | BA   | BETULA alleghaniensis          | Yellow Birch            | 3" cal.     | B&B  |      | single stem           |
| 1                   | BNVU | BETULA nigra 'Fox Valley'      | Fox Valley River Birch  | 4" Ht.      | B&B  |      | multi-stem, 3-4 stems |
| 3                   | CM   | CORNUS mas                     | Cornelian Cherry        | 1.5" cal.   | B&B  |      | tree form             |
| 4                   | IMB  | IMBIGNA x. 'Isobornii' Jane'   | Jane Magnolia           | 8" Ht.      | B&B  |      | tree form             |
| 1                   | PMR  | PRUNUS domestica 'Mount Royal' | Mount Royal Plum        | 8" Ht.      | B&B  |      | tree form             |
| 8                   | SRIS | SYRINGA l. 'Honey Silk'        | Honey Silk Tree Lilac   | 8" Ht.      | B&B  |      | tree form             |
| 4                   | UAP  | ULMUS americana 'Princeton'    | Princeton Elm           | 2.5" cal.   | B&B  |      | single stem           |

| Strubs |      |                                         |                               |         |          |         |         |
|--------|------|-----------------------------------------|-------------------------------|---------|----------|---------|---------|
| Qty    | Code | Scientific Name                         | Common Name                   | Size    | Spec     | Remarks | Notes   |
| 1      | AAB  | ARONIA arbutifolia 'Brilliantissima'    | Brilliant Red Chokeberry      | 4" Ht.  | #5 Cont. |         |         |
| 6      | AMA  | ARONIA melanocarpa 'Autumn Magic'       | Autumn Magic Black Chokeberry | 24" Ht. | #3 Cont. |         |         |
| 22     | JCSG | JUNIPERUS chinensis 'Sea Green'         | Sea Green Juniper             | 18" Ht. | #3 Cont. |         |         |
| 13     | JCSV | JUNIPERUS ch. Var. 'sargentii' 'Vindis' | Green Sargent Juniper         | 18" Ht. | #3 Cont. |         |         |
| 10     | JSB  | JUNIPERUS sabina 'Broadmoor'            | Broadmoor Juniper             | 24" Ht. | #5 Cont. |         |         |
| 12     | MD   | MICROBIOTA decussata                    | Siberian Cypress              | 18" Ht. | #3 Cont. |         |         |
| 4      | PMA  | PRUNUS mugo 'Aurea'                     | Golden Mugo Pine              | 30"     | B&B      |         |         |
| 26     | RGS  | RHUS aromatica 'Green Globe'            | Green Globe Fragrant Sumac    | 18" Ht. | #3 Cont. |         | 4" O.C. |
| 7      | RCA  | RHODOENDRON 'Catawbiense Album'         | White Catawba Rhododendron    | 24"     | B&B      |         |         |
| 8      | SPM  | SYRINGA patula 'Miss Kim'               | Miss Kim Lilac                | 3" Ht.  | B&B      |         |         |
| 5      | SBLP | SPRAEA x bumalda 'Lemon Princess'       | Lemon Princess Spirea         | 18"     | B&B      |         |         |
| 4      | SJLP | SPRAEA japonica 'Little Princess'       | Little Princess Spirea        | 18"     | #3 Cont. |         |         |
| 1      | TMH  | TAXUS x m. 'Hicksii'                    | Hick's Yew                    | 4" Ht.  | B&B      |         |         |

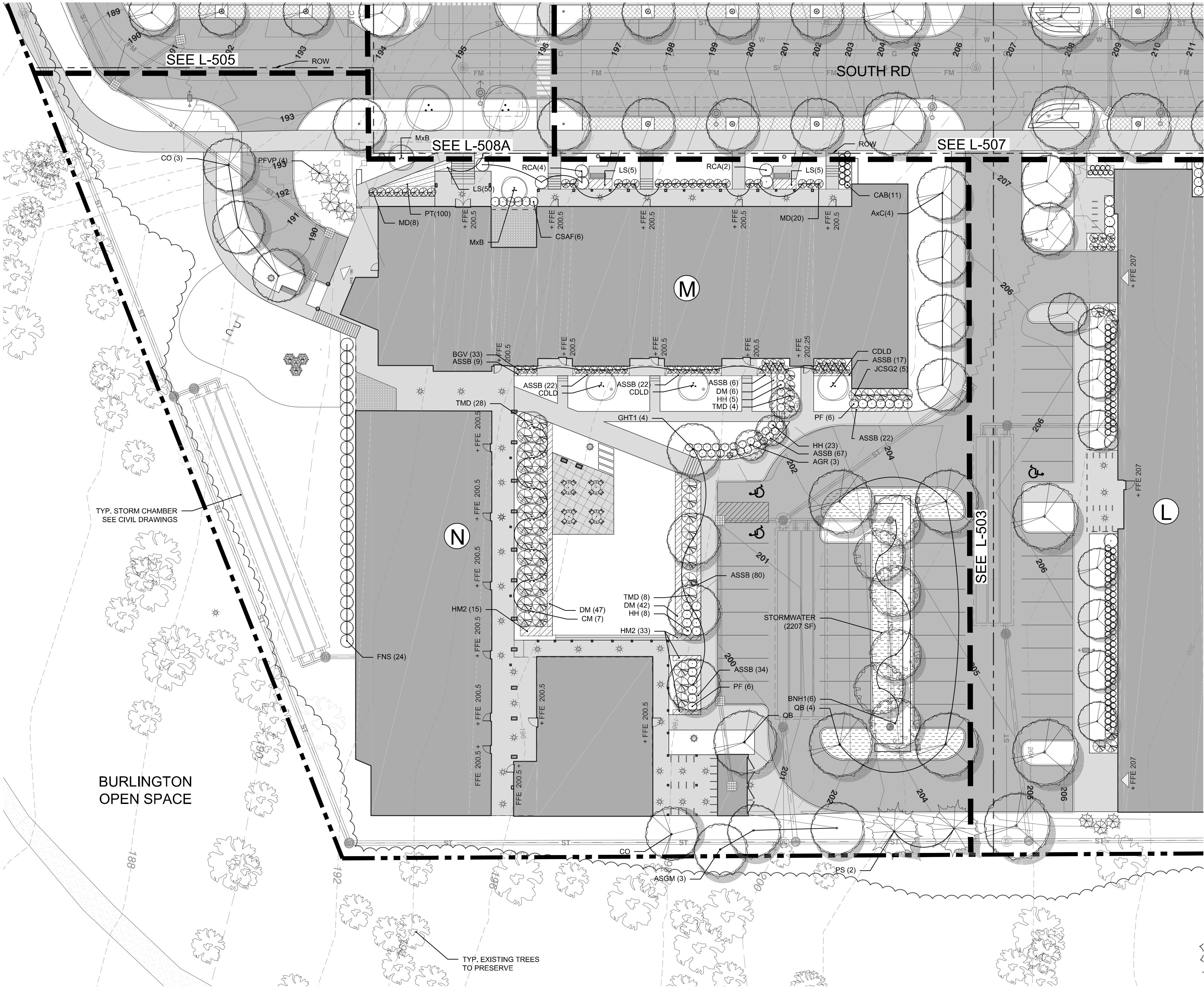
| Perennials & Ferns |      |                                  |                                |       |          |         |              |
|--------------------|------|----------------------------------|--------------------------------|-------|----------|---------|--------------|
| Qty                | Code | Scientific Name                  | Common Name                    | Size  | Spec     | Remarks | Notes        |
| 32                 | HFB  | HOSTA 'Gold Standard'            | Fragrant Bouquet Hosta         | Clump | #2 Cont. |         | 36" O.C.     |
| 40                 | HRR  | HEMEROCALLIS 'Rosy Returns'      | Rosy Returns Daylily           | Clump | #2 Cont. |         | 18"-30" O.C. |
| 10                 | HAW  | HEMEROCALLIS 'Ann Warner'        | Ann Warner Daylilies           | Clump | #2 Cont. |         | 30" O.C.     |
| 10                 | HHR  | HEMEROCALLIS 'Happy Returns'     | Happy Returns Daylilies        | Clump | #2 Cont. |         | 30" O.C.     |
| 10                 | HAF  | HEMEROCALLIS 'Hearts Afire'      | Hearts Afire Daylilies         | Clump | #2 Cont. |         | 30" O.C.     |
| 10                 | HB   | HEMEROCALLIS 'Prairie Blue Eyes' | Prairie Blue Eyes Daylilies    | Clump | #2 Cont. |         | 30" O.C.     |
| 10                 | IPB  | IRIS c. Powder Blue Giant        | Powder Blue Giant Crested Iris | Clump | #2 Cont. |         | 18"-24" O.C. |
| 10                 | ISM  | IRIS sibirica 'Blue Moon'        | Blue Moon Iris                 | Clump | #2 Cont. |         | 18"-24" O.C. |
| 15                 | ISP  | IRIS sibirica 'Perry's Blue'     | Perry's Blue Iris              | Clump | #2 Cont. |         | 18"-24" O.C. |

| Ornamental Grasses |      |                                    |                           |       |          |         |              |
|--------------------|------|------------------------------------|---------------------------|-------|----------|---------|--------------|
| Qty                | Code | Scientific Name                    | Common Name               | Size  | Spec     | Remarks | Notes        |
| 26                 | CAK  | CALAMAGROTIS x ac. 'Brachytrich'   | Korean Feather Reed Grass | Clump | #2 Cont. |         | 24"-30" O.C. |
| 39                 | CAK  | CALAMAGROTIS x ac. 'Karl Foerster' | Karl Foerster Reed Grass  | Clump | #2 Cont. |         | 24"-30" O.C. |

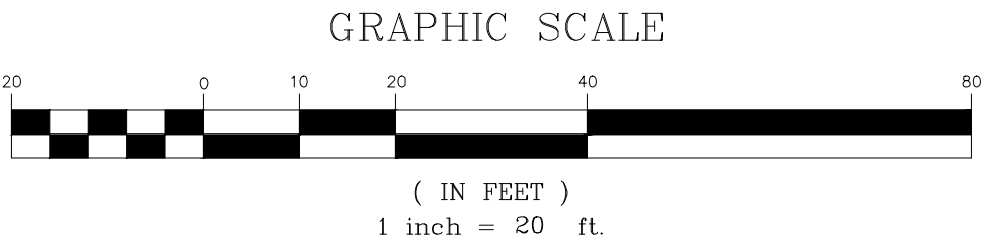
| Groundcovers & Vines |      |                        |                    |       |             |         |          |
|----------------------|------|------------------------|--------------------|-------|-------------|---------|----------|
| Qty                  | Code | Scientific Name        | Common Name        | Size  | Spec        | Remarks | Notes    |
| 4                    | PT   | PACHYSANDRA terminalis | Pachysandra        | Clump | Quart Cont. |         | 15" O.C. |
| 40                   | LS   | LIRIOPE spicata        | Creeping Lily Turf | Clump | #1 Cont.    |         | 18" O.C. |
| 90                   | WT   | WALDS TEINIA ternata   | Barren Strawberry  | Clump | #1 Cont.    |         | 18" O.C. |



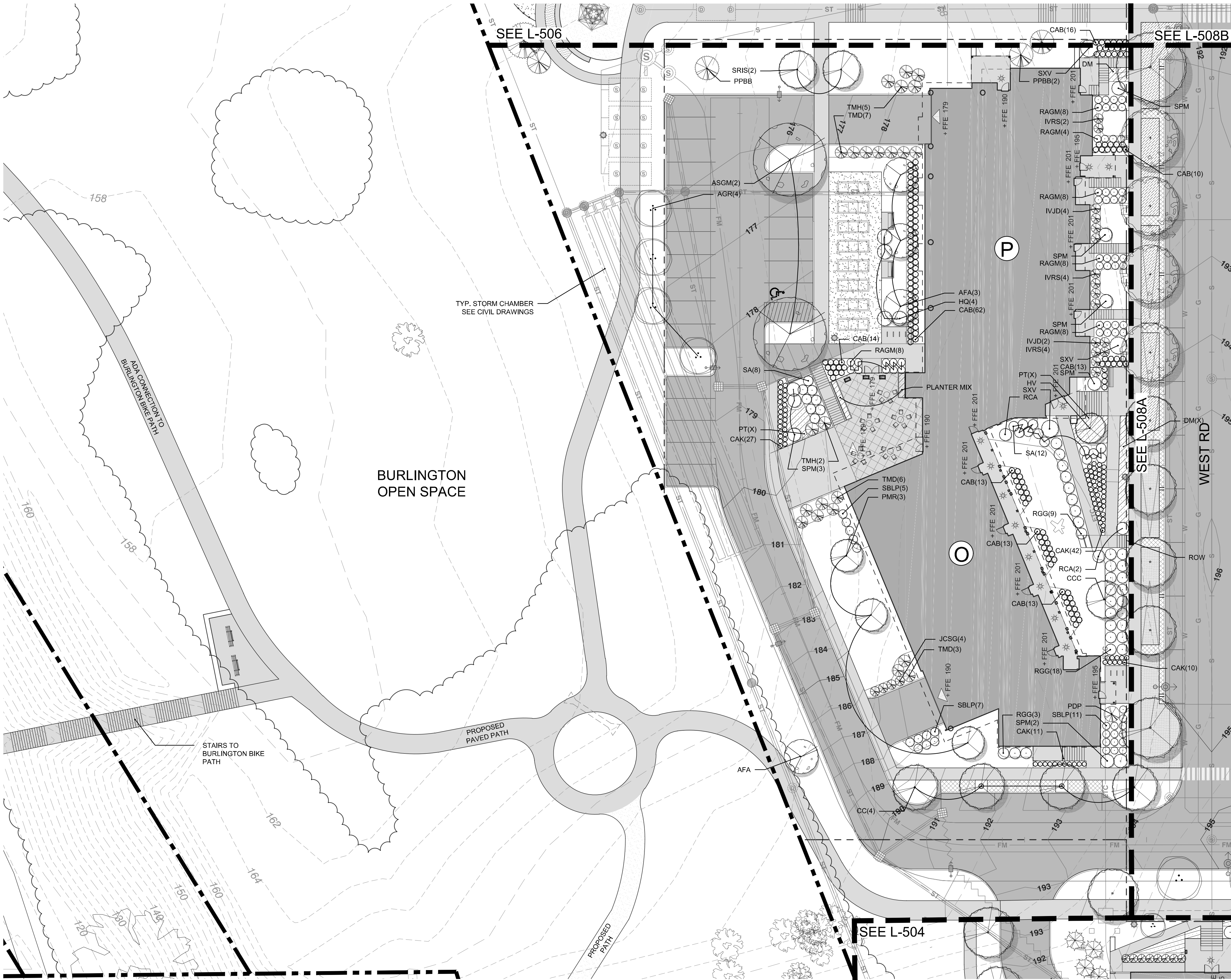




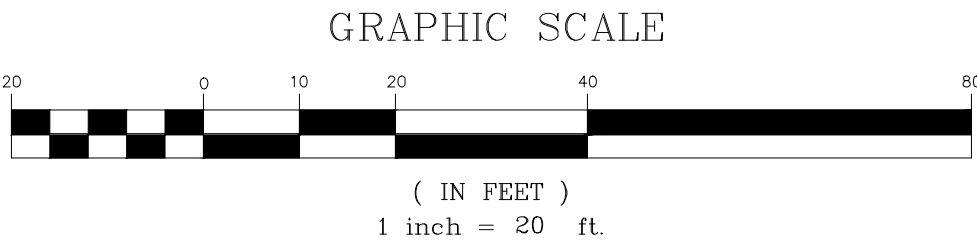
| Planting Schedule  |       |                                       |                                  |         |             |                       |
|--------------------|-------|---------------------------------------|----------------------------------|---------|-------------|-----------------------|
| Trees              |       |                                       |                                  |         |             |                       |
| Qty.               | Code  | Scientific Name                       | Common Name                      | Size    | Spec        | Remarks               |
| 4                  | AxC   | ACER X freemanii 'Celebration'        | Celebration Maple                | 3" cal. | B&B         | single stem           |
| 3                  | ASGM  | ACER saccharum 'Green Mountain'       | Green Mountain Sugar Maple       | 3" cal. | B&B         | single stem           |
| 3                  | AGR   | AMELANCHIER x g. 'Robin Hill'         | Robin Hill Serviceberry          | 6" Ht.  | B&B         | multi-stem, 3-4 stems |
| 6                  | BNH1  | BETULA nigra 'Heritage'               | Heritage River Birch             | 3" cal. | B&B         | multi-stem            |
| 3                  | CO    | CELSTIS occidentalis                  | Common Hackberry                 | 3" cal. | B&B         | single stem           |
| 7                  | CM    | CORNUS mas                            | Cornelian Cherry                 | 8" Ht.  | B&B         | multi-stem, 3-4 stems |
| 3                  | CDLD  | CORNUS Drummondii 'Lemon Drops'       | Pagoda Dogwood                   | 2" cal. | B&B         | tree form             |
| 4                  | GTH1  | GLEDITSIA l. 'Halka'                  | Halka Honeylocust                | 3" cal. | B&B         | single stem           |
| 2                  | M&B   | MAGNOLIA x. loebneri 'Jane'           | Jane Magnolia                    | 8" Ht.  | B&B         |                       |
| 4                  | PFVP  | PINUS flexilis 'Vanderwolf's Pyramid' | Vanderwolf's Pyramid Limber Pine | 8" Ht.  | B&B         | tree form             |
| 2                  | PS    | PINUS strobus                         | Pyramidal White Pine             | 10" Ht. | B&B         | single stem           |
| 5                  | QB    | QUERCUS bicolor                       | Swamp White Oak                  | 3" cal. | B&B         | single stem           |
| 46                 |       |                                       |                                  |         |             |                       |
| Shrubs             |       |                                       |                                  |         |             |                       |
| Qty.               | Code  | Scientific Name                       | Common Name                      | Size    | Spec        | Remarks               |
| 33                 | BGV   | BUXUS 'Green Velvet'                  | Green Velvet Boxwood             | 18" Ht. | #3 Cont.    |                       |
| 6                  | CSAF  | CORNUS sericea 'Arctic Fire'          | Arctic Fire Dogwood              | 30" Ht. | #5 Cont.    |                       |
| 24                 | FNS   | FORSYTHIA 'Northern Sun'              | Northern Sun Forsythia           | 3' Ht.  | B&B         |                       |
| 5                  | JCSG2 | JUNIPERUS chinensis 'Sea Green'       | Seam Green Juniper               | 24" Ht. | B&B         |                       |
| 6                  | RCA   | RHODODENDRON 'Catawbiense Album'      | White Catawba Rhododendron       | 24"     | B&B         |                       |
| 36                 | HH    | HYPERICUM 'Hidcote'                   | Hidcote St. Johnswort            | 18" Ht. | #3 Cont.    |                       |
| 28                 | MD    | MICROBIOTA decussata                  | Siberian Cypress                 | 18" Ht. | #3 Cont.    |                       |
| 12                 | PF    | POTENTILLA fruticosa 'Goldfinger'     | Goldfinger Potentilla            | 18" Ht. | #3 Cont.    |                       |
| 40                 | TMD   | TAXUS x m. 'Densaformis'              | Dense Yew                        | 36" Ht. | B&B         |                       |
| 157                |       |                                       |                                  |         |             |                       |
| Perennials & Ferns |       |                                       |                                  |         |             |                       |
| Qty.               | Code  | Scientific Name                       | Common Name                      | Size    | Spec        | Remarks               |
| 279                | DM    | DAILY MIX                             | Beach Wormwood                   | Clump   | #2 Cont.    | 12" O.C.              |
| 19                 | HRR   | HEMEROCALLIS 'Rosy Returns'           | Rosy Returns Daylily             | Clump   | #2 Cont.    | 24" O.C.              |
| 19                 | HAW   | HEMEROCALLIS 'Ann Warner'             | Ann Warner Daylilies             | Clump   | #2 Cont.    |                       |
| 19                 | HHR   | HEMEROCALLIS 'Happy Returns'          | Happy Returns Daylilies          | Clump   | #2 Cont.    |                       |
| 19                 | HB    | HEMEROCALLIS 'Prairie Blue Eyes'      | Prairie Blue Eyes Daylilies      | Clump   | #2 Cont.    |                       |
| 19                 | HSM   | HEMEROCALLIS 'Stella d'oro'           | Stella Doro Daylilies            | Clump   | #2 Cont.    |                       |
|                    | HM2   | HOSTA MIX                             |                                  |         |             | 18" O.C.              |
| 8                  | HH    | HOSTA 'Haloyn'                        | Haloyn Hosta                     | Clump   | #2 Cont.    |                       |
| 7                  | HLB   | HOSTA 'Emerald Eyes'                  | Emerald Eyes Hosta               | Clump   | #2 Cont.    |                       |
| 389                |       |                                       |                                  |         |             |                       |
| Ornamental Grasses |       |                                       |                                  |         |             |                       |
| 11                 | CAB   | CALAMAGROTIS x ac. 'Brachytricha'     | Korean Feather Reed Grass        | Clump   | #2 Cont.    | 3-4'                  |
| Groundcovers       |       |                                       |                                  |         |             |                       |
| Qty.               | Code  | Scientific Name                       | Common Name                      | Size    | Spec        | Remarks               |
| 150                | LS    | LIRIOPE spicata                       | Creeping Turf Lilly              | Clump   | #1 Cont.    | 15" O.C.              |
| 100                | PT    | PACHYSANDRA terminalis                | Pachysandra                      | Clump   | Quart Cont. | 15" O.C.              |



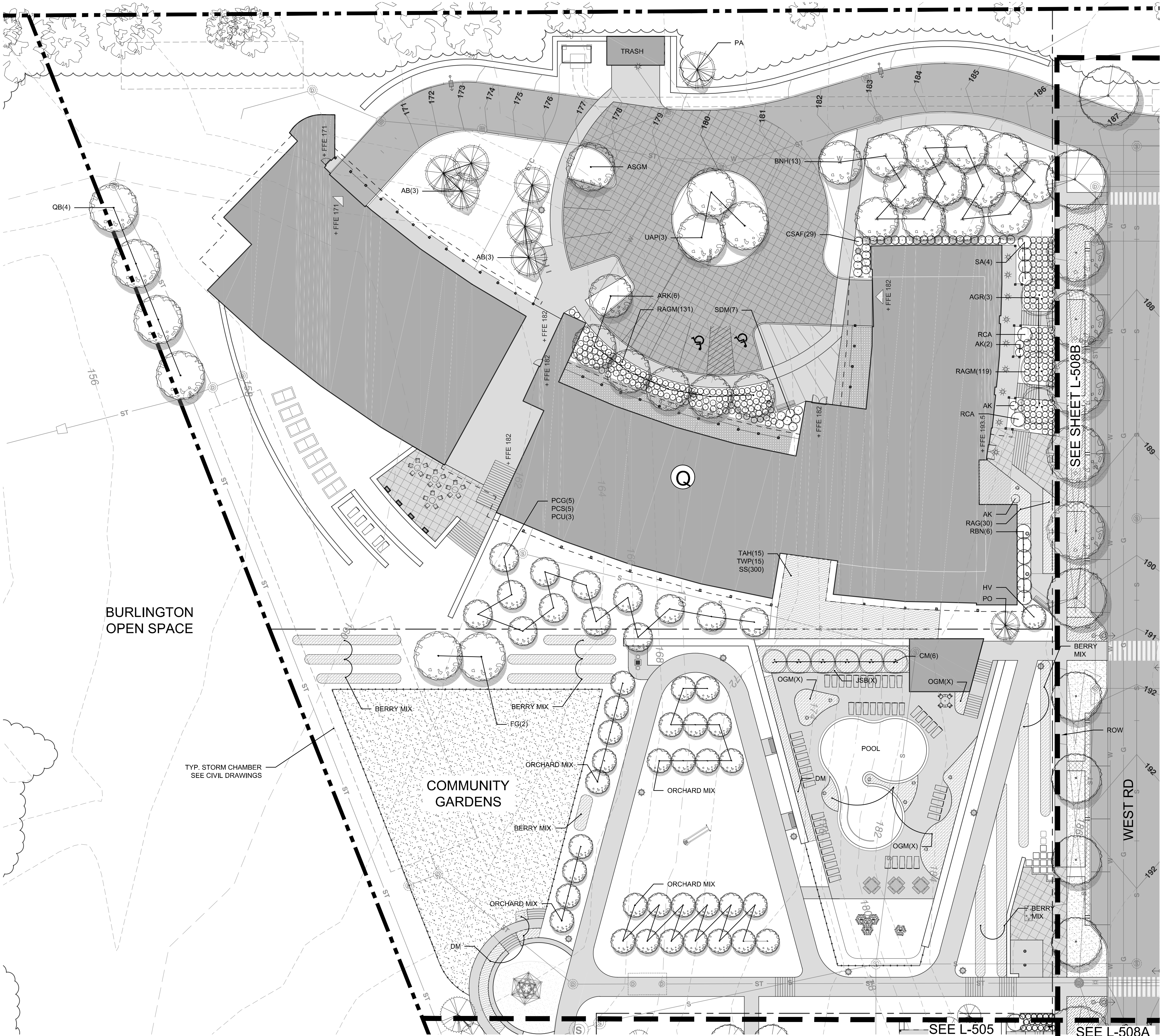




| O and P Building Planting Schedule |      |                                             |                                         |             |               |      |                          |
|------------------------------------|------|---------------------------------------------|-----------------------------------------|-------------|---------------|------|--------------------------|
| Trees                              | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 4                                  | AFA  | ACER x freemanii 'Armstrong'                | Armstrong Maple                         | 3" cal      | B&B           |      | single stem              |
| 2                                  | ASGM | ACER saccharum 'Green Mountain'             | Green Mountain Sugar Maple              | 2.5" cal    | B&B           |      | single stem              |
| 4                                  | AGR  | AMELANCHIER x g. 'Robin Hill'               | Robin Hill Serviceberry                 | 6" Ht.      | B&B           |      | multi-stem, 3-4 stems    |
| 4                                  | CC   | CARPINUS caroliniana                        | American Hornbeam                       | 2.5" cal    | B&B           |      | single stem              |
| 1                                  | CCC  | CRATAEGUS una-galli L. 'Inermis' 'Crusader' | Crusader Hawthorne                      | 2" cal      | B&B           |      | tree form, single stem   |
| 3                                  | PPBB | PICEA pungens 'Baby Blue Eyes'              | Baby Blue Eyes Spruce                   | 4" Ht.      | B&B           |      |                          |
| 1                                  | PDP  | PIRUS d. 'Pendula'                          | Weeping Japanese Red Pine               | 4" Ht.      | #10 Cont.     |      | specimen, spreading form |
| 3                                  | PMR  | PRUNUS domestica 'Mount Royal'              | Mount Royal Plum                        | 1.5" Cal.   | 15 Gal. Cont. |      |                          |
| 2                                  | SRIS | SYRINGA f. 'Ivory Silk'                     | Ivory Silk Tree Lilac                   | 8" Ht.      | B&B           |      | tree form                |
| 24                                 |      |                                             |                                         |             |               |      |                          |
| Shrubs                             | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 1                                  | HV   | HAMMELIS vernalis                           | Vernal Witch Hazel                      | 4" Ht.      | B&B           |      |                          |
| 4                                  | HQ   | HYDRANGEA asawakifolia                      | Oakleaf Hydrangea                       | 30" Ht.     | #5 Cont.      |      |                          |
| 10                                 | IVRS | ILEX verticillata 'Red Sprite'              | Red Sprite Winterberry                  | 36"         | #5 Cont.      |      | 3.5' O.C.                |
| 6                                  | IVJD | ILEX verticillata 'Jim Dandy'               | Jim Dandy Winterberry                   | 36"         | #5 Cont.      |      | 3.5' O.C.                |
| 1                                  | JCSG | JUNIPERUS chinensis 'Sea Green'             | Seas Green Juniper                      | 18" Ht.     | #3 Cont.      |      |                          |
| 20                                 | SA   | SAMPHORUS alba                              | Common Snowberry                        | 24" Ht.     | #3 Cont.      |      |                          |
| 3                                  | RCA  | RHOODOENDRON 'Catalawbiense Album'          | White Catalawba Rhododendron            | 24"         | B&B           |      |                          |
| 44                                 | RAGM | RIBES alpinum 'Green Mound'                 | Green Mound Alpine Currant              | 15"         | B&B           |      |                          |
| 30                                 | RGG  | RHUS aromatica 'Green Globe'                | Green Globe Fragrant Sumac              | 18" Ht.     | #3 Cont.      |      | 4' O.C.                  |
| 23                                 | SBLP | SPRAEA x bumalda 'Lemon Princess'           | Lemon Princess Spirea                   | 18"         | B&B           |      |                          |
| 3                                  | SVV  | SPRAEA x vanhouttei                         | Van Houttei Spirea                      | 36" Ht.     | B&B           |      |                          |
| 9                                  | SPM  | SYRINGA patula 'Miss Kim'                   | Miss Kim Lilac                          | 3" Ht.      | B&B           |      |                          |
| 16                                 | TMD  | TAXUS x m. 'Densiformis'                    | Dense Yew                               | 36" Ht.     | B&B           |      | 3.5' O.C.                |
| 7                                  | TMH  | TAXUS x m. 'Hicksii'                        | Hicks' Yew                              | 4" Ht.      | B&B           |      |                          |
| 180                                |      |                                             |                                         |             |               |      |                          |
| Perennials & Ferns                 | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 1                                  | DM   | DAYLILY MIX                                 |                                         |             |               |      | 18"-36" O.C.             |
| 10                                 | HRR  | HEMEROCALLIS 'Rosy Returns'                 | Rosy Returns Daylily                    | Clump       | #2 Cont.      |      | 30" O.C.                 |
| 20                                 | HAW  | HEMEROCALLIS 'Ann Warner'                   | Ann Warner Daylilies                    | Clump       | #2 Cont.      |      | 30" O.C.                 |
| 20                                 | HHR  | HEMEROCALLIS 'Happy Returns'                | Happy Returns Daylilies                 | Clump       | #2 Cont.      |      | 30" O.C.                 |
| 60                                 |      |                                             |                                         |             |               |      |                          |
| Ornamental Grasses                 | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 1                                  | OSM  | ORNAMENTAL MIX                              |                                         |             |               |      | 24"-36" O.C.             |
| 80                                 | CAK  | CALAMAGROTIS x ac. 'Karl Foerster'          | Karl Foerster Reed Grass                | Clump       | #2 Cont.      | 3-5' | 24"-30" O.C.             |
| 154                                | CAB  | CALAMAGROTIS x ac. 'Brachytricha'           | Korean Feather Reed Grass               | Clump       | #2 Cont.      | 3-4' | 24"-30" O.C.             |
| 244                                |      |                                             |                                         |             |               |      |                          |
| Groundcovers                       | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 1                                  | GM   | GROUNDCOVER MIX                             |                                         |             |               |      | 12"-24" O.C.             |
| 180                                | PT   | PACHYSANDRA terminalis                      | Pachysandra                             | Clump       | Quart Cont.   |      | 15" O.C.                 |
| 180                                |      |                                             |                                         |             |               |      |                          |
| Rooftop Planting/Planters          | Qty  | Code                                        | Scientific Name                         | Common Name | Size          | Spec | Remarks                  |
| 0                                  | AABs | ARONIA arbutifolia 'Brilliantissima'        | Brilliant Red Chokeberry                | 24" Ht.     | #3 Cont.      |      |                          |
| 0                                  | DMs  | DAYLILY MIX - HEMEROCALLIS                  | Stella d'oro, Ruby Stella, Rosy Returns | Clump       | #1 Cont.      |      | 2-3'                     |
| 0                                  | RRs  | ROSA rugosa                                 | Rugosa Rose                             | 15"         | #3 Cont.      |      | 18" O.C.                 |
| 0                                  | RRHs | ROSA rugosa 'Henry Hudson'                  | Henry Hudson Rugosa Rose                | 15"         | #3 Cont.      |      |                          |







| Building Q Planting Schedule |      |                                 |                            |            |      |         |                       |
|------------------------------|------|---------------------------------|----------------------------|------------|------|---------|-----------------------|
| Qty                          | Code | Scientific Name                 | Common Name                | Size       | Spec | Remarks | Notes                 |
| 6                            | AB   | ABIES balsamea                  | Balsam Fir                 | 6' Ht.     | B&B  |         |                       |
| 6                            | ARK  | ACER rubrum 'Karpik'            | Karpik Maple               | 2.5" cal   | B&B  |         | single stem           |
| 1                            | ASGM | ACER saccharum 'Green Mountain' | Green Mountain Sugar Maple | 2.5" cal   | B&B  |         | single stem           |
| 3                            | AGR  | AMELANCHIER x g. 'Robin Hill'   | Robin Hill Serviceberry    | 6' Ht.     | B&B  |         | multi-stem, 3-4 stems |
| 13                           | BNH  | BETULA nigra 'Heritage'         | Heritage River Birch       | 10-12' Ht. | B&B  |         | multi-stem, 3-4 stems |
| 2                            | FG   | FAGUS grandifolia               | American Beech             | 1.5" Cal.  | B&B  |         |                       |
| 1                            | PA   | PICEA abies                     | Norway Spruce              | 6' Ht.     | B&B  |         |                       |
| 1                            | PO   | PICEA omorika                   | Siberian Spruce            | 6' Ht.     | B&B  |         |                       |
| 5                            | POG  | PYRUS communis 'Golden Spice'   | Golden Spice Pear          | 7 Gal.     | B&B  |         |                       |
| 6                            | PCS  | PYRUS communis 'Summercrisp'    | Summercrisp Pear           | 7 Gal.     | B&B  |         |                       |
| 3                            | PCU  | PYRUS communis 'Ure'            | Ure Pear                   | 7 Gal.     | B&B  |         |                       |
| 4                            | GB   | QUERCUS bicolor                 | Swamp White Oak            | 2.5" cal.  | B&B  |         | single stem           |
| 3                            | UAP  | ULMUS americana 'Princeton'     | Princeton Elm              | 2.5" cal.  | B&B  |         | single stem           |

| Qty | Code | Scientific Name                        | Common Name                 | Size    | Spec     | Remarks | Notes |
|-----|------|----------------------------------------|-----------------------------|---------|----------|---------|-------|
| 4   | AK   | AZALEA 'Karen'                         | Karen Azalea                | 24" Ht. | #5 Cont. |         | 3-4'  |
| 29  | CSAF | CORNUS sericea 'Ardic Fire'            | Ardic Fire Dogwood          | 30" Ht. | #5 Cont. |         |       |
| 10  | FNS  | FORSYTHIA Northern Sun'                | Northern Sun Forsythia      | 3' Ht.  | B&B      |         |       |
| 1   | HV   | HAWWELIS vernalis                      | Vernal Witchhazel           | 4' Ht.  | B&B      |         |       |
| 6   | RBN  | RHODODENDRON 'Boule de Neige'          | Boule de Neige Rhododendron | 30"     | B&B      |         |       |
| 2   | RCA  | RHODODENDRON Catalpaense Album'        | White Catalpa Rhododendron  | 24"     | B&B      |         |       |
| 256 | RAGM | RIBES alpinum 'Green Mound'            | Green Mound Alpine Currant  | 15"     | B&B      |         |       |
| 4   | SA   | SYMPHORICARPOS alba                    | Common Snowberry            | 30" Ht. | B&B      |         |       |
| 7   | SDM  | SYMPHORICARPOS x doorenbosii 'Marleen' | Marleen Snowberry           | 30" Ht. | B&B      |         |       |

| Qty | Code | Scientific Name             | Common Name        | Size          | Spec | Remarks | Notes                    |
|-----|------|-----------------------------|--------------------|---------------|------|---------|--------------------------|
| 15  | TAH  | TULIPA 'Albert Heijn'       | Albert Heijn Tulip | 100 Bulbs Ea. |      |         | 6" O.C. Between Blueslem |
| 15  | TWP  | TULIPA clusiana 'Lady Jane' | Westpoint Tulip    | 100 Bulbs Ea. |      |         | 6" O.C. Between Blueslem |

| Qty | Code | Scientific Name                    | Common Name              | Size  | Spec     | Remarks | Notes                  |
|-----|------|------------------------------------|--------------------------|-------|----------|---------|------------------------|
| 300 | SS   | SCHIZACHYRIUM scoparium            | Little Blueslem          | Clump | #2 Cont. | 3-4'    | no cultivars, 24" O.C. |
| 0   | CAK  | CALAMAGROTIS x ac. 'Karl Foerster' | Karl Foerster Reed Grass | Clump | #2 Cont. | 3-5'    | 24"-30" O.C.           |
| 0   | MSG  | MISCANTHUS sinensis 'Gracillima'   | Maiden Grass             | Clump | #2 Cont. | 5-7'    | 36" O.C.               |
| 0   | PV   | PANICUM virgatum                   | Switch Grass             | Clump | #2 Cont. | 4-5'    | 24" O.C.               |
| 0   | PAP  | PHALARIS arundinacea 'Picta'       | Ribbon Grass             | Clump | #2 Cont. | 1-2'    | 24" O.C.               |
| 0   | SS   | SCHIZACHYRIUM scoparium            | Little Blueslem          | Clump | #2 Cont. | 3-4'    | no cultivars, 24" O.C. |

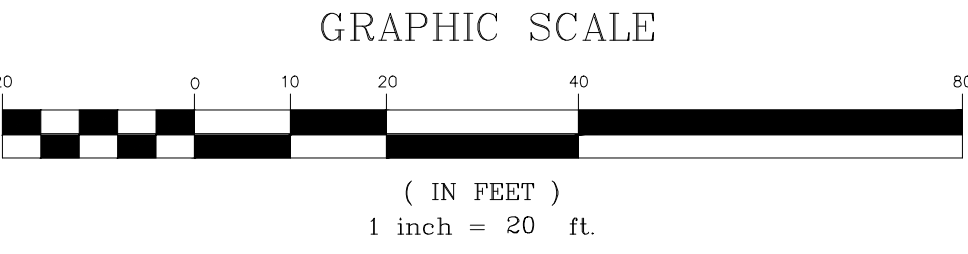
| Qty | Code | Scientific Name          | Common Name            | Size  | Spec     | Remarks | Notes    |
|-----|------|--------------------------|------------------------|-------|----------|---------|----------|
| 30  | RAG  | RHUS aromatica 'Gro-low' | Gro-low Fragrant Sumac | Clump | #3 Cont. |         | 18" O.C. |

| Qty | Code | Scientific Name         | Common Name          | Size       | Spec   | Remarks | Notes                 |
|-----|------|-------------------------|----------------------|------------|--------|---------|-----------------------|
| 6   | CM   | BETULA nigra 'Heritage' | Heritage River Birch | 10-12' Ht. | B&B    |         | multi-stem, 3-4 stems |
| 2   | FG   | FAGUS grandifolia       | American Beech       | 1.5" Cal.  | B&B    |         |                       |
| 8   | MD   | MALUS domestica         | Apple Tree           | 1.5" Cal   | #5 & 7 |         | 24" - 36" O.C.        |
| 8   | PScc | PRUNUS serpp.           | Sour Cherry          | 1.5" Cal   | #5 & 7 |         |                       |
| 7   | PSp  | PRUNUS serpp.           | Plum                 | 10-12' Ht. | #5 & 7 |         |                       |
| 7   | PC   | PYRUS communis          | Pear                 | 1.5" Cal.  | #5 & 7 |         |                       |

| Qty | Code | Scientific Name           | Common Name              | Size   | Spec     | Remarks | Notes          |
|-----|------|---------------------------|--------------------------|--------|----------|---------|----------------|
| 10  | JSB  | FORSYTHIA Northern Sun'   | Northern Sun Forsythia   | 3' Ht. | B&B      |         | 24" - 36" O.C. |
|     | RID  | RUBUS fruticosus 'Darrow' | Blackberry Bush 'Darrow' |        | #1 Cont. |         |                |
|     | RH   | RUBUS idaeus 'Heritage'   | Red Raspberry            |        | #1 Cont. |         |                |
|     | RIL  | RUBUS idaeus 'Latham'     | Latham Red Raspberry     |        | #1 Cont. |         |                |

| Qty | Code | Scientific Name                                         | Common Name                 | Size  | Spec     | Remarks | Notes        |
|-----|------|---------------------------------------------------------|-----------------------------|-------|----------|---------|--------------|
|     | DM   | HEMEROCALLIS 'Rosy Returns'                             | Rosy Returns Daylily        | Clump | #2 Cont. |         | 18"-30" O.C. |
|     | HAW  | HEMEROCALLIS 'Ann Warner'                               | Ann Warner Daylilies        | Clump | #2 Cont. |         | 24" O.C.     |
|     | HRH  | HEMEROCALLIS 'Happy Returns'                            | Happy Returns Daylilies     | Clump | #2 Cont. |         | 30" O.C.     |
|     | HAF  | HEMEROCALLIS 'Hearts Afire'                             | Hearts Afire Daylilies      | Clump | #2 Cont. |         | 30" O.C.     |
|     | HB   | HEMEROCALLIS 'Prairie Blue Eyes'                        | Prairie Blue Eyes Daylilies | Clump | #2 Cont. |         | 30" O.C.     |
|     | HSM  | HEMEROCALLIS 'Stella d'oro, Ruby Stella, 'Rosy Returns' |                             | Clump | #2 Cont. |         | 24" O.C.     |

| Qty | Code | Scientific Name                    | Common Name              | Size  | Spec     | Remarks | Notes                  |
|-----|------|------------------------------------|--------------------------|-------|----------|---------|------------------------|
| 0   | CAK  | CALAMAGROTIS x ac. 'Karl Foerster' | Karl Foerster Reed Grass | Clump | #2 Cont. | 3-5'    | 24"-30" O.C.           |
| 0   | MSG  | MISCANTHUS sinensis 'Gracillima'   | Maiden Grass             | Clump | #2 Cont. | 5-7'    | 36" O.C.               |
| 0   | PV   | PANICUM virgatum                   | Switch Grass             | Clump | #2 Cont. | 4-5'    | 24" O.C.               |
| 0   | PAP  | PHALARIS arundinacea 'Picta'       | Ribbon Grass             | Clump | #2 Cont. | 1-2'    | 24" O.C.               |
| 0   | SS   | SCHIZACHYRIUM scoparium            | Little Blueslem          | Clump | #2 Cont. | 3-4'    | no cultivars, 24" O.C. |



SUBMITTED FOR  
PERMITTING  
11/23/2016

date  
Owner:  
BC Community Housing

landscape architects planning consultants  
301 college street burlington vermont 05401 802 658 3555



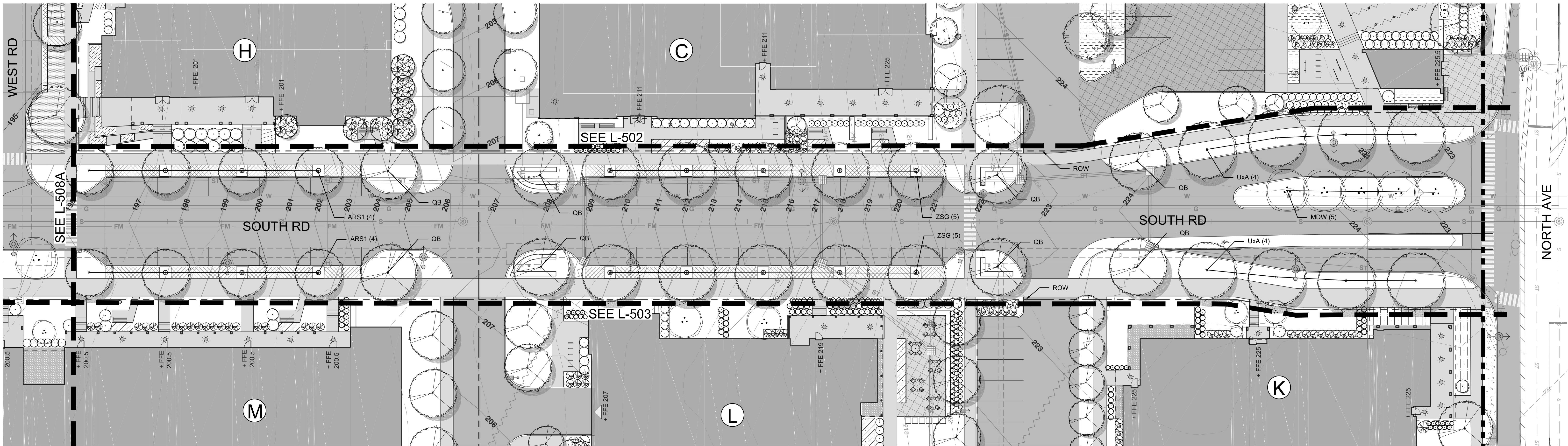
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drawn by  
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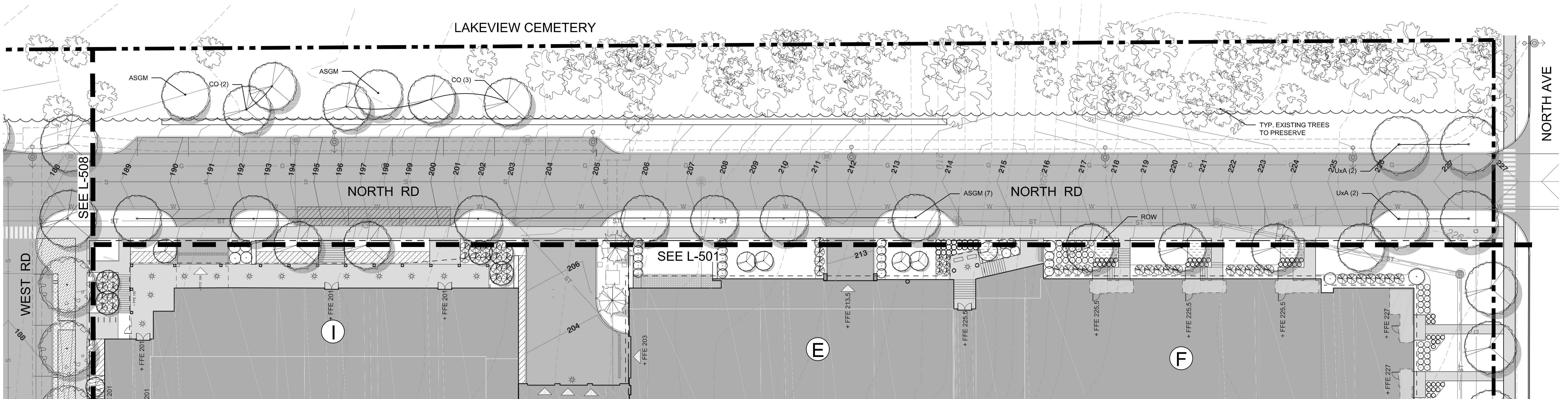
T. J. Boyle Associates, LLC  
11/23/2016  
CAMBRIAN RISE  
PLANTING PLAN - Q

sheet no.  
L-506



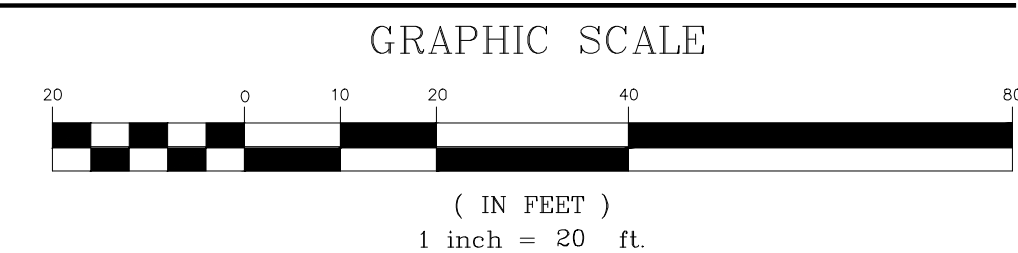


**A SOUTH ROAD**  
L-507

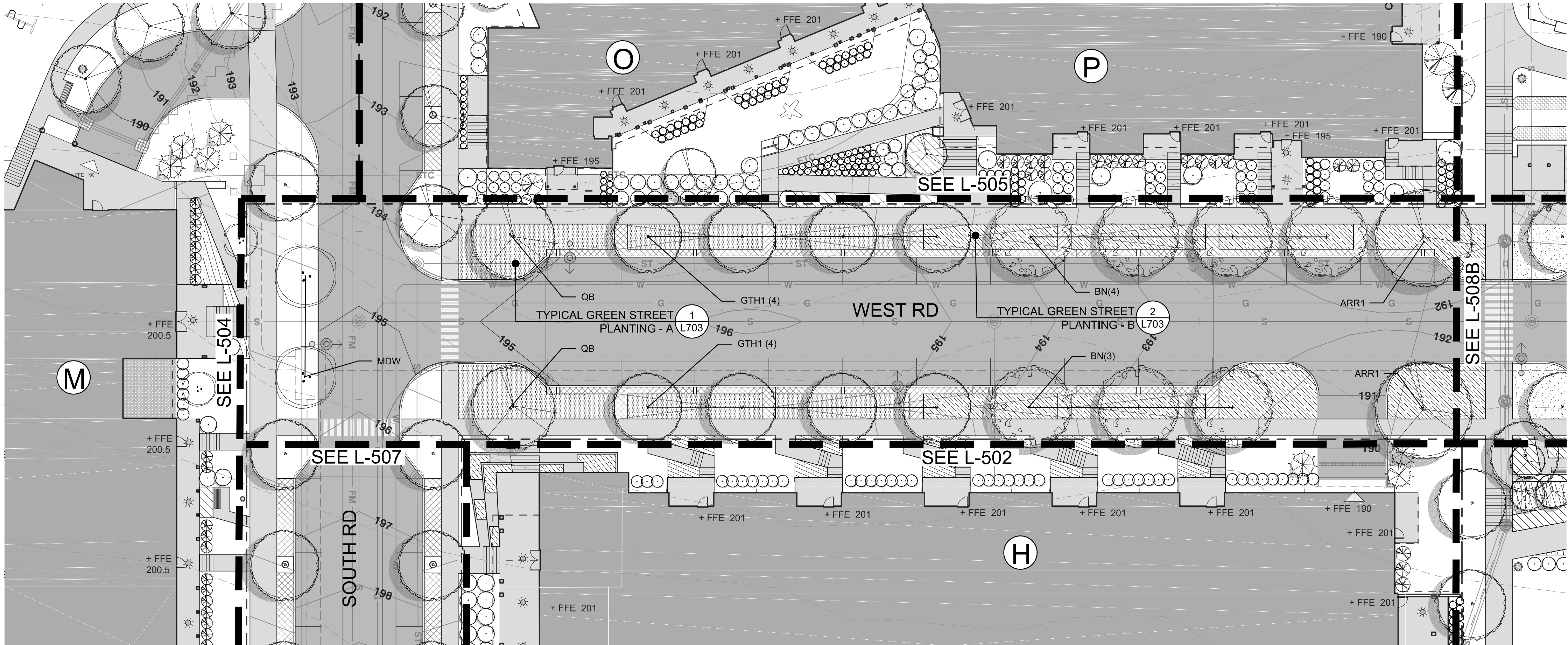


**B NORTH ROAD**  
L-507

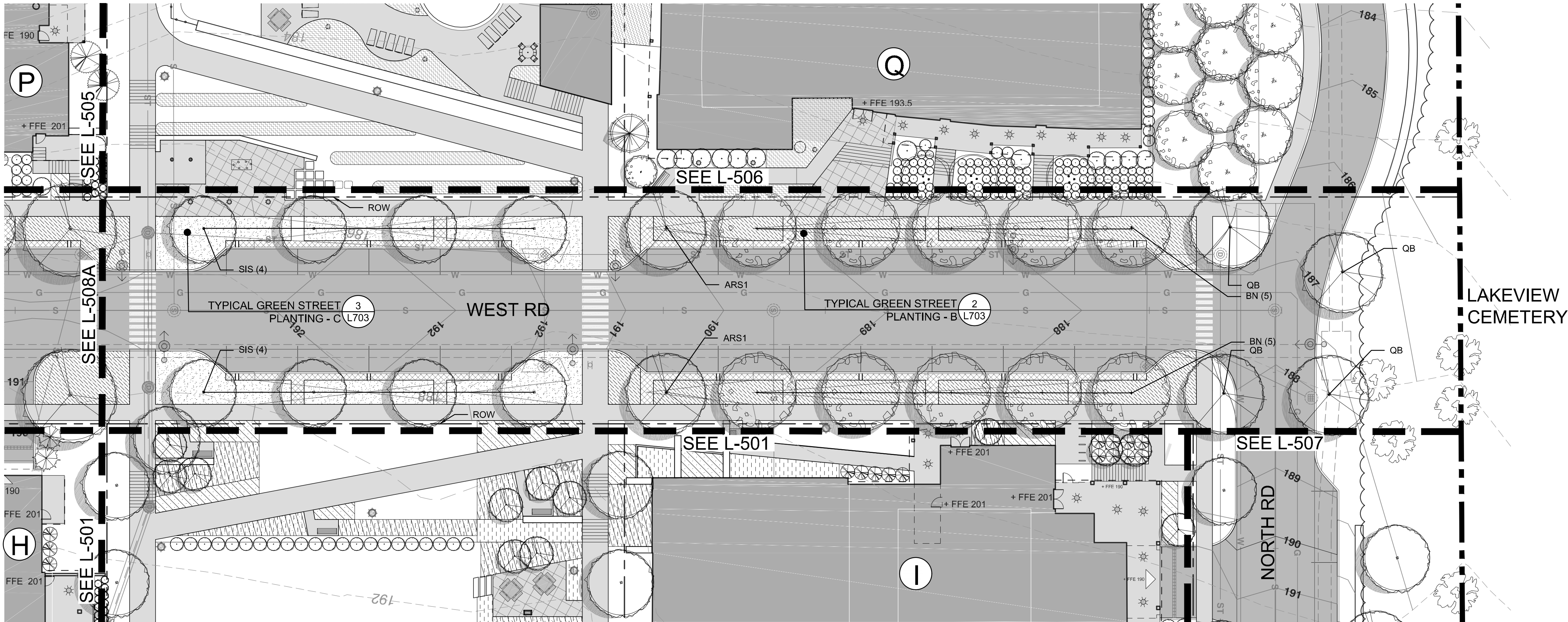
**NOTE:**  
SEE SHEET L-508 FOR PLANTING LEGEND AND SCHEDULE







A WEST ROAD (SOUTHERN END)  
L-508

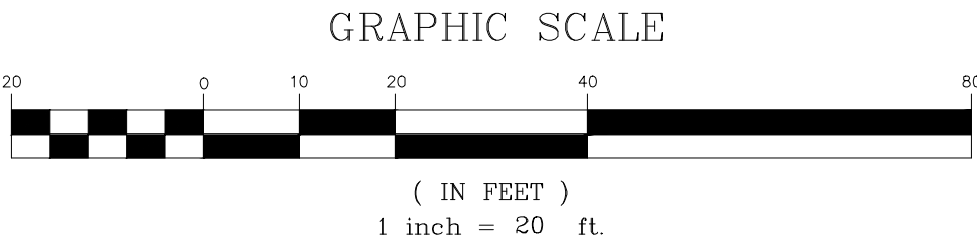


B WEST ROAD (NORTHERN END)  
L-508

| West Road Planting Schedule |      |                                 |                        |           |      |              |             |
|-----------------------------|------|---------------------------------|------------------------|-----------|------|--------------|-------------|
| Trees                       |      |                                 |                        |           |      |              |             |
| Qty.                        | Code | Scientific Name                 | Common Name            | Size      | Spec | Remarks      | Notes       |
| 2                           | ARR1 | ACER rubrum 'Red Sunset'        | Red Sunset Maple       | 3" cal.   | B&B  | green street | single stem |
| 2                           | ARR1 | ACER rubrum 'Somerset'          | Somerset Maple         | 3" cal.   | B&B  |              | single stem |
| 17                          | BN   | BETULA nigra                    | River Birch            | 3" cal.   | B&B  | green street | single stem |
| 8                           | GTH1 | GLEDTISIA L. 'Halka'            | Halka Honeylocust      | 3" cal.   | B&B  | green street | single stem |
| 8                           | SIS  | SYRINGA reticulata 'Ivory Silk' | Ivory Silk Tree Lilac  | 3" cal.   | B&B  | green street | single stem |
| 1                           | MDW  | MALUS 'Donald Wyman'            | Donald Wyman Crabapple | 2.5" cal. | B&B  |              | single stem |
| 6                           | QB   | QUERCUS bicolor                 | Swamp White Oak        | 3" cal.   | B&B  | green street | single stem |
| 44                          |      |                                 |                        |           |      |              |             |

| North-South Road Planting Schedule |      |                                        |                            |           |      |              |             |
|------------------------------------|------|----------------------------------------|----------------------------|-----------|------|--------------|-------------|
| Trees                              |      |                                        |                            |           |      |              |             |
| Qty.                               | Code | Scientific Name                        | Common Name                | Size      | Spec | Remarks      | Notes       |
| 8                                  | ARR1 | ACER rubrum 'Somerset'                 | Somerset Maple             | 3" cal.   | B&B  |              | single stem |
| 9                                  | ASGM | ACER saccharum 'Green Mountain'        | Green Mountain Sugar Maple | 3" cal.   | B&B  |              | single stem |
| 5                                  | CO   | CELTIS occidentalis                    | Common Hackberry           | 3" cal.   | B&B  |              | single stem |
| 5                                  | MDW  | MALUS 'Donald Wyman'                   | Donald Wyman Crabapple     | 2.5" cal. | B&B  |              | single stem |
| 8                                  | QB   | QUERCUS bicolor                        | Swamp White Oak            | 3" cal.   | B&B  | green street | single stem |
| 10                                 | UKA  | ULMUS japonica x wilsoniana 'Accolade' | Accolade Elm               | 3" cal.   | B&B  |              | single stem |
| 10                                 | ZSG  | ZELKOVA serrata 'Green vase'           | Green vase Zelkova         | 3" cal.   | B&B  |              | single stem |

NOTE: SEE SHEET L-701 FOR GREEN STREET PLANTING INFORMATION



T. J. Boyle Associates, LLC

CAMBRIAN RISE  
PLANTING PLAN - W ROAD

sheet no.  
L-508

SUBMITTED FOR  
PERMITTING  
11/23/2016

date  
Owner:  
BC Community Housing

landscape architects planning consultants  
301 college street burlington vermont 05401 802 658 3555

MJB  
design by  
TKD  
checked by

TKD / EB / JS  
drawn by  
11/23/2016  
date  
1" = 20'  
scale

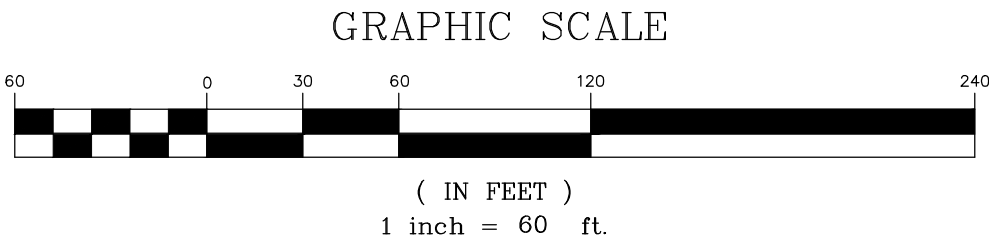
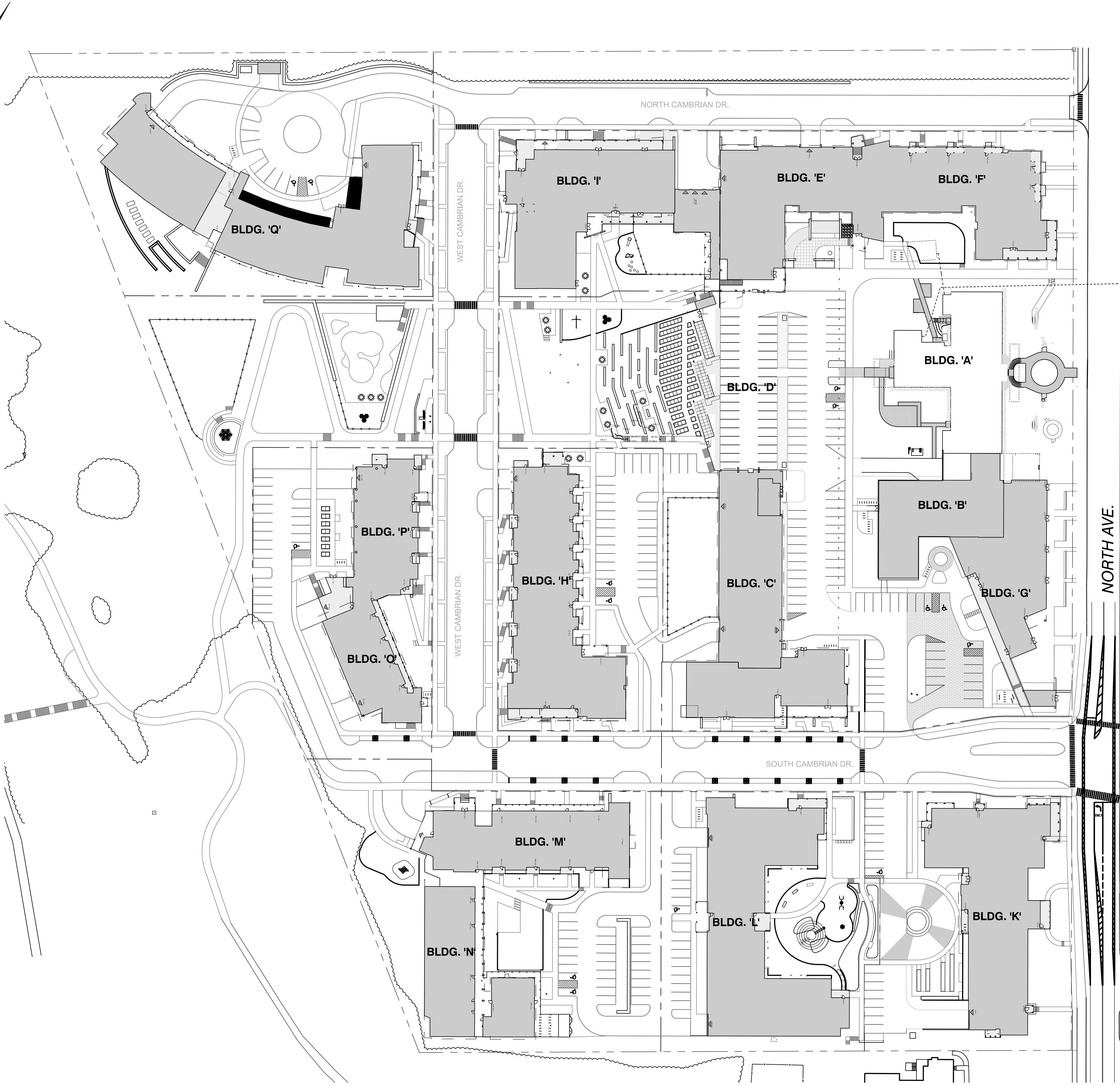


GENERAL NOTES

1. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
2. ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL MAINTAIN AS-BUILT PLANS (WITH TIES) FOR ALL UNDERGROUND UTILITIES. THOSE PLANS SHALL BE SUBMITTED TO THE OWNER AT THE COMPLETION OF THE PROJECT.
4. THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
5. ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
6. MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
8. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL ITEMS AND MATERIALS INCORPORATED INTO THE SITE WORK. WORK SHALL NOT BEGIN ON ANY ITEM UNTIL SHOP DRAWING APPROVAL IS GRANTED.
9. IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE WITH ALL PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
10. THE TOLERANCE FOR FINISH GRADES FOR ALL PAVEMENT, WALKWAYS AND LAWN AREAS SHALL BE 0.1 FEET.
11. ANY DEWATERING NECESSARY FOR THE COMPLETION OF THE SITEWORK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
13. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
14. EXISTING PAVEMENT AND TREE STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
15. IF THERE ARE ANY CONFLICTS OR INCONSISTENCIES WITH THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR VERIFICATION BEFORE WORK CONTINUES ON THE ITEM IN QUESTION.
16. PROPERTY LINE INFORMATION IS BASED PLAT ENTITLED "LOT LINE ADJUSTMENT BETWEEN 329 & 351 NORTH AVE BURLINGTON COLLEGE" PREPARED BY CIVIL ENGINEERING ASSOCIATES, INC., DATED DECEMBER 18, 2014. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO USED AS ONE. MONUMENTATION RECOVERED IS CONSISTENT WITH RECORDED DOCUMENTS.
17. IF THE BUILDING IS TO BE SPRINKLERED, BACKFLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH AWWA M14. THE SITE CONTRACTOR SHALL CONSTRUCT THE WATER LINE TO TWO FEET ABOVE THE FINISHED FLOOR. SEE MECHANICAL PLANS FOR RISER DETAIL.
18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
19. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT AND FIELD ENGINEERING REQUIRED FOR COMPLETION OF THE PROJECT. CIVIL ENGINEERING ASSOCIATES WILL PROVIDE AN AUTOCAD FILE WHERE APPLICABLE.
20. THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ANY AND ALL SAFETY FENCES OR RAILS ABOVE EXISTING AND PROPOSED WALLS. THE OWNER SHALL VERIFY LOCAL, STATE AND INSURANCE REQUIREMENT GUIDELINES FOR THE INSTALLATION AND VERIFY ANY AND ALL PERMITTING REQUIREMENTS.

LEGEND

|  |                           |  |                              |
|--|---------------------------|--|------------------------------|
|  | APPROXIMATE PROPERTY LINE |  | PROPOSED PROPERTY LINE       |
|  | APPROXIMATE SETBACK LINE  |  | PROPOSED SETBACK LINE        |
|  | EXISTING CONTOUR          |  | PROPOSED CONTOUR             |
|  | EXISTING CURB             |  | PROPOSED CURB                |
|  | EXISTING FENCE            |  | PROPOSED FENCE               |
|  | EXISTING GRAVEL           |  | PROPOSED GRAVEL              |
|  | EXISTING PAVEMENT         |  | PROPOSED PAVEMENT            |
|  | EXISTING GUARD RAIL       |  | PROPOSED GUARD RAIL          |
|  | EXISTING ELECTRIC         |  | PROPOSED ELECTRIC            |
|  | EXISTING FORCEMAIN        |  | PROPOSED FORCEMAIN           |
|  | EXISTING GAS              |  | PROPOSED GAS                 |
|  | EXISTING STORM            |  | PROPOSED STORM               |
|  | EXISTING GRAVITY SEWER    |  | PROPOSED GRAVITY SEWER       |
|  | EXISTING TELEPHONE        |  | PROPOSED TELEPHONE           |
|  | EXISTING WATER            |  | PROPOSED WATER               |
|  | EXISTING SWALE            |  | PROPOSED SWALE               |
|  | STREAM                    |  |                              |
|  | WETLANDS                  |  |                              |
|  | WETLANDS BUFFER           |  |                              |
|  | EXISTING SEWER MANHOLE    |  | PROPOSED SEWER MANHOLE       |
|  | EXISTING STORM MANHOLE    |  | PROPOSED STORM MANHOLE       |
|  | EXISTING CATCH BASIN      |  | PROPOSED CATCH BASIN         |
|  | EXISTING WELL             |  | PROPOSED WELL                |
|  | EXISTING HYDRANT          |  | PROPOSED HYDRANT             |
|  | EXISTING SHUT OFF         |  | PROPOSED SHUT OFF            |
|  | EXISTING UTILITY POLE     |  | PROPOSED UTILITY POLE        |
|  | EXISTING LIGHT POLE       |  | PROPOSED LIGHT POLE          |
|  | EXISTING GUY WIRE/POLE    |  | PROPOSED EDGE OF BRUSH/WOODS |
|  | EXISTING SIGN             |  | REBAR SET                    |
|  | EXISTING DECIDUOUS TREE   |  | CONCRETE MONUMENT SET        |
|  | EXISTING CONIFEROUS TREE  |  |                              |
|  | EDGE OF BRUSH/WOODS       |  |                              |
|  | IRON ROD/PIPE FOUND       |  |                              |
|  | CONCRETE MONUMENT FOUND   |  |                              |
|  | TEST PIT                  |  |                              |
|  | PERCOLATION TEST          |  |                              |
|  | PROJECT BENCHMARK         |  |                              |



PROGRESS PLANS  
11/22/2016

SITE ENGINEER:



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

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CHECKED

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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

1" = 2000'

| DATE | CHECKED | REVISION |
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OVERALL SITE  
PLAN

DATE

--

SCALE

1" = 60'

PROJ. NO.

14215

DRAWING NUMBER

C2.0





SITE ENGINEER:

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P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:  
  
**CAMBRIAN RISE**  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

LOCATION MAP  
1" = 2000'

| DATE | CHECKED | REVISION |
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PROPOSED GRADING & DRAINAGE PLAN - NORTHWEST QUADRANT

DATE  
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SCALE  
1" = 30'

PROJ. NO.  
14215

DRAWING NUMBER  
  
**C2.1**













|                                                           |  |
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CLIENT:

*BC COMMUNITY  
HOUSING, LLC*

*P.O. BOX 1335  
BURLINGTON VERMONT  
05402*

PROJECT:

*CAMBRIAN RISE*

311 & 329 NORTH AVE.  
BURLINGTON, VT



*LOCATION MAP*

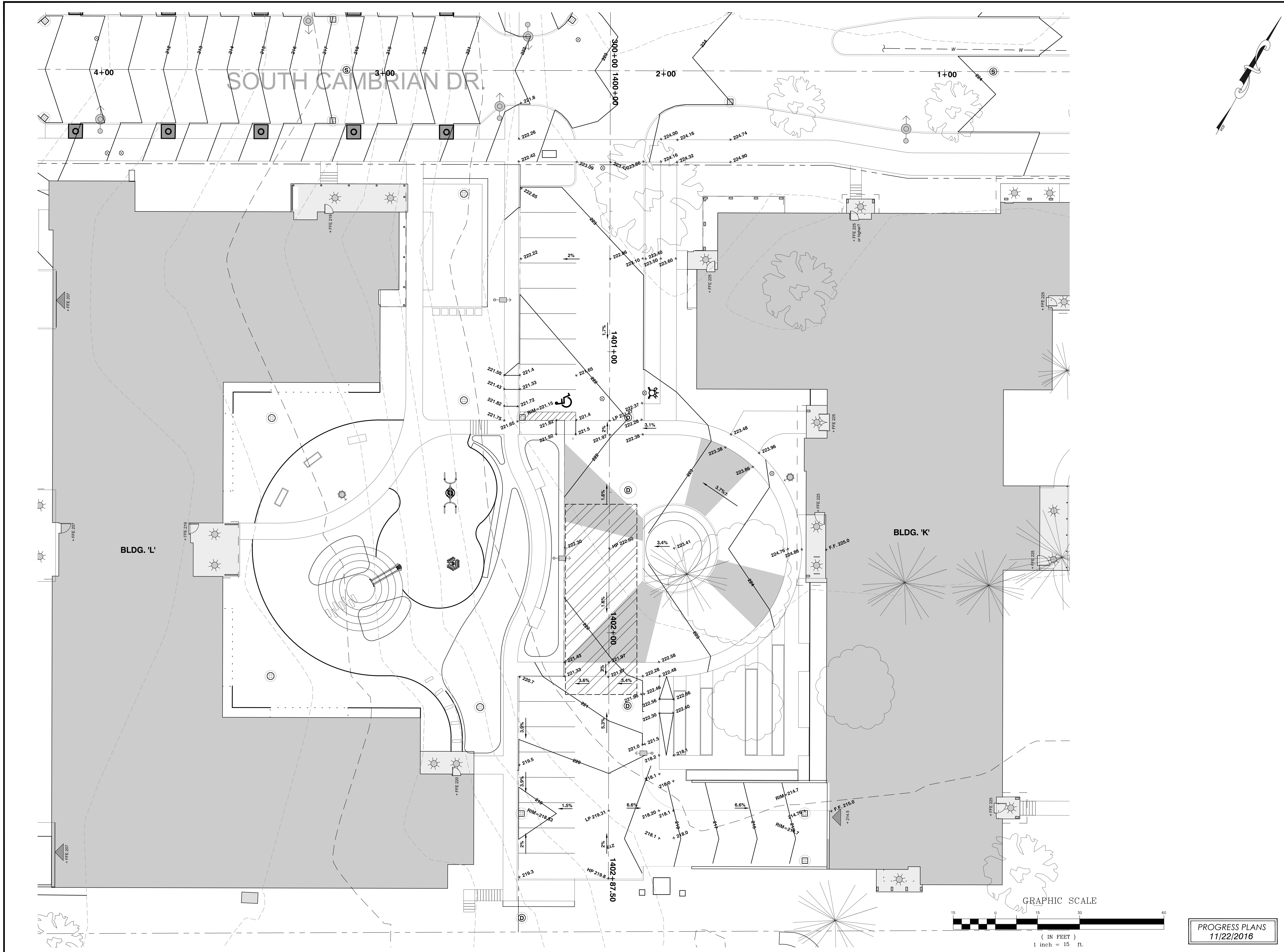
1" = 2000'

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**PROPOSED  
GRADING &  
DRAINAGE PLAN -  
SOUTHWEST  
GRADING**

|             |                |
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| SCALE       |                |
| $1'' = 30'$ | <b>C2.4</b>    |
| PROJ. NO.   |                |
| 14215       |                |





SITE ENGINEER:  


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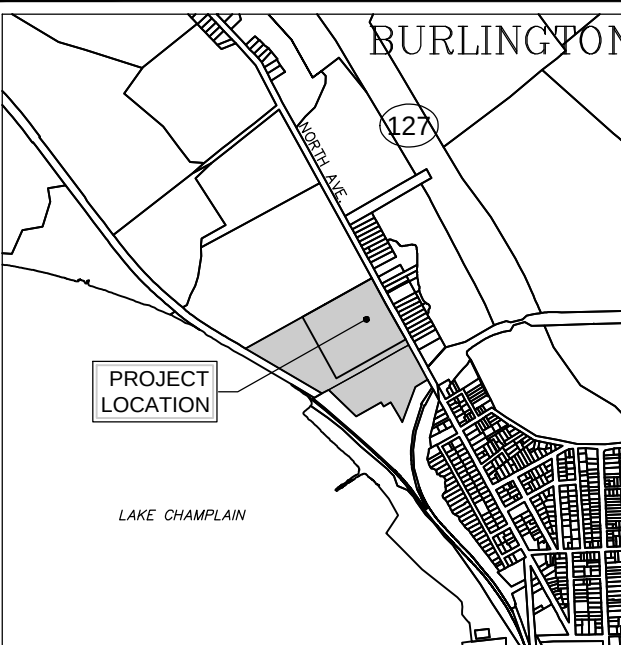
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CLIENT:  
  
**BC COMMUNITY HOUSING, LLC**  
  
P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:  
  
**CAMBRIAN RISE**  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

  
**LOCATION MAP**  
1" = 2000'

| DATE | CHECKED | REVISION |
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PROPOSED GRADING PLAN - BUILDING 'K' ACCESS

DATE  
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SCALE  
1" = 15'

PROJ. NO.  
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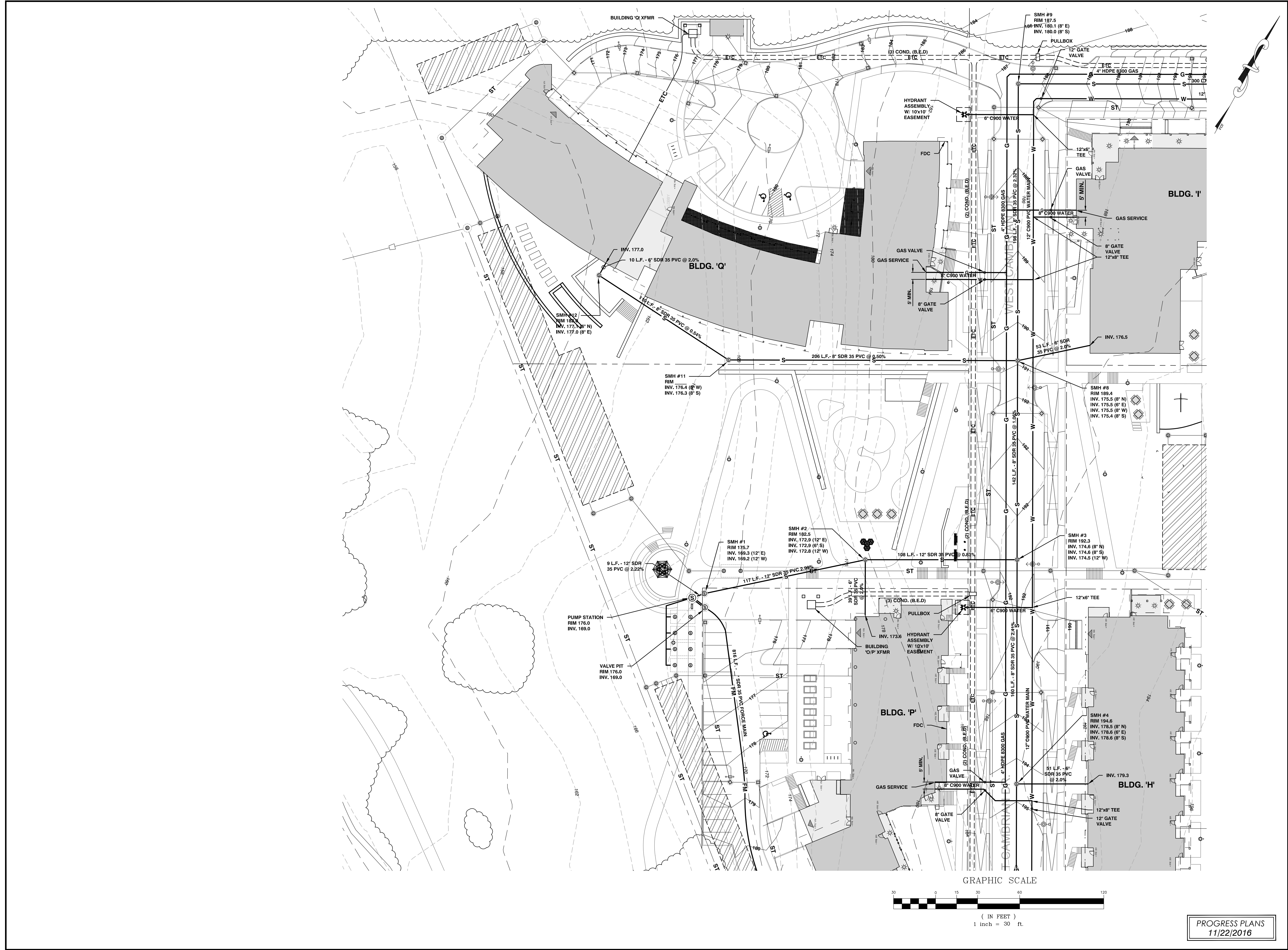
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BURLINGTON VERMONT

05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.

BURLINGTON, VT

LOCATION MAP

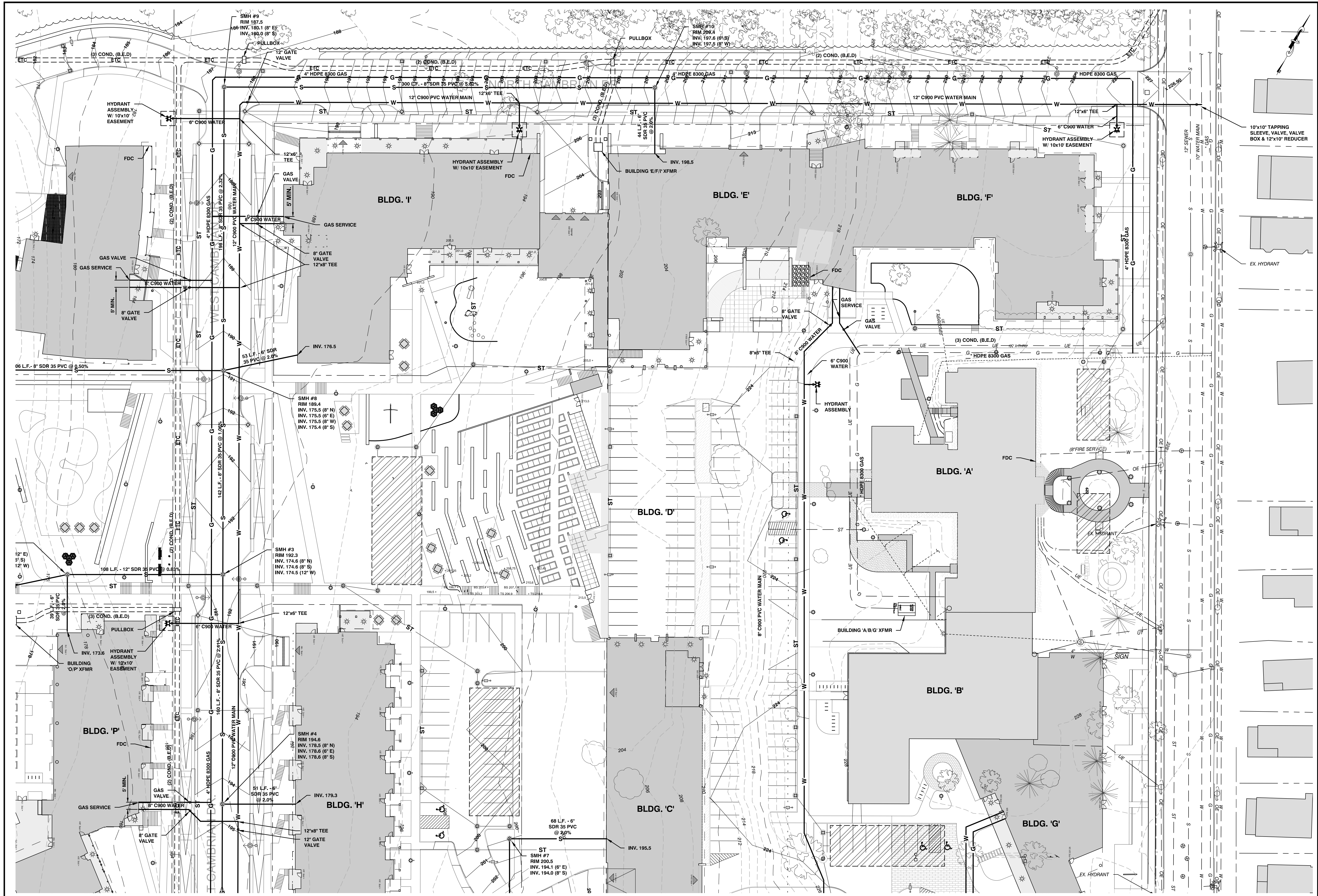
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PROPOSED UTILITY PLAN - NORTHWEST QUADRANT

|                                                                                                          |                                           |
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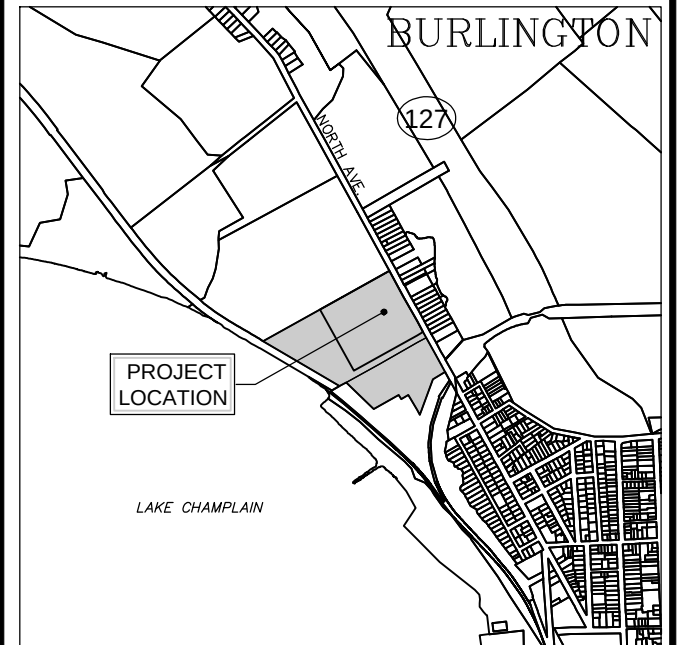

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BURLINGTON VERMONT  
05402

PROJECT:  
  
**CAMBRIAN RISE**  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

  
LOCATION MAP  
1" = 2000'

| DATE | CHECKED | REVISION |
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PROPOSED  
UTILITY PLAN -  
NORTHEAST  
QUADRANT

| DATE | DRAWING NUMBER |
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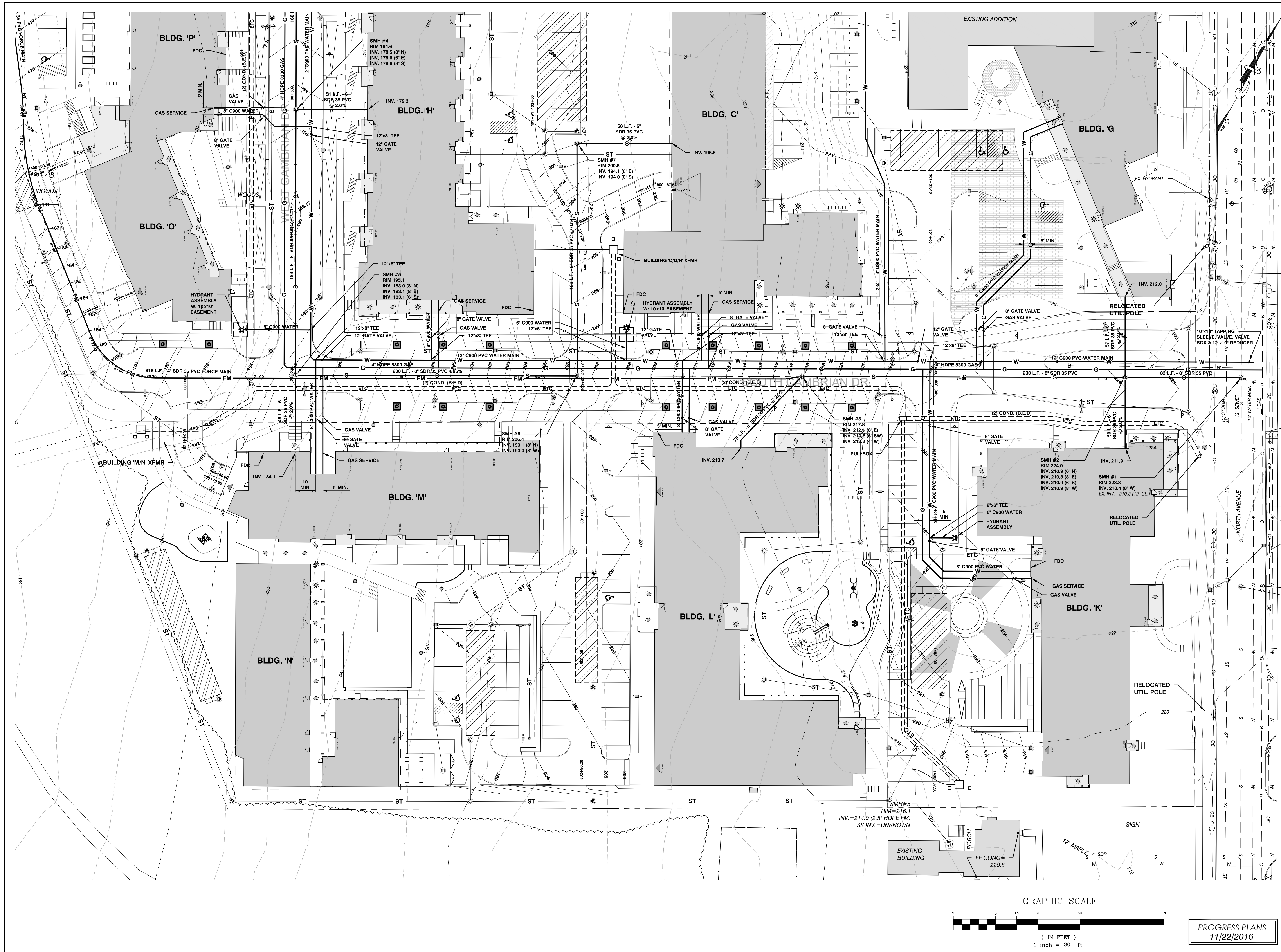
GRAPHIC SCALE  
  
( IN FEET )  
1 inch = 30 ft.

PROGRESS PLANS  
11/22/2016

SCALE  
1" = 30'  
PROJ. NO.  
14215

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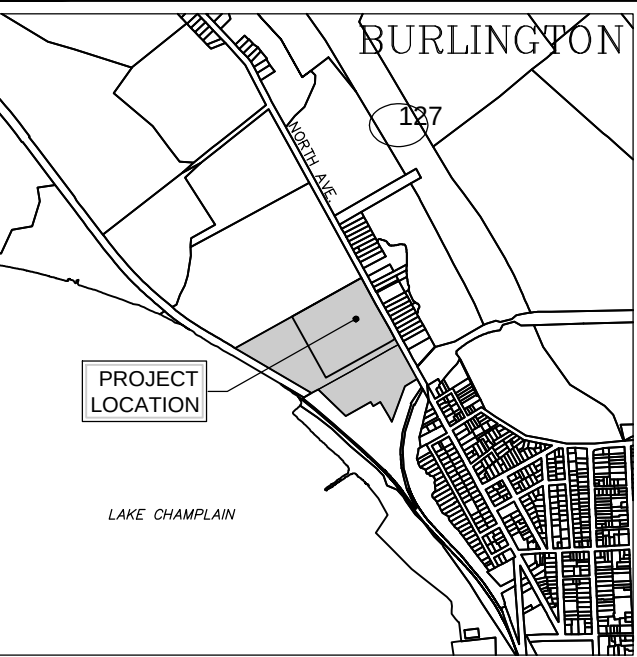
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CLIENT:  
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P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:  
**CAMBRIAN RISE**  
311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

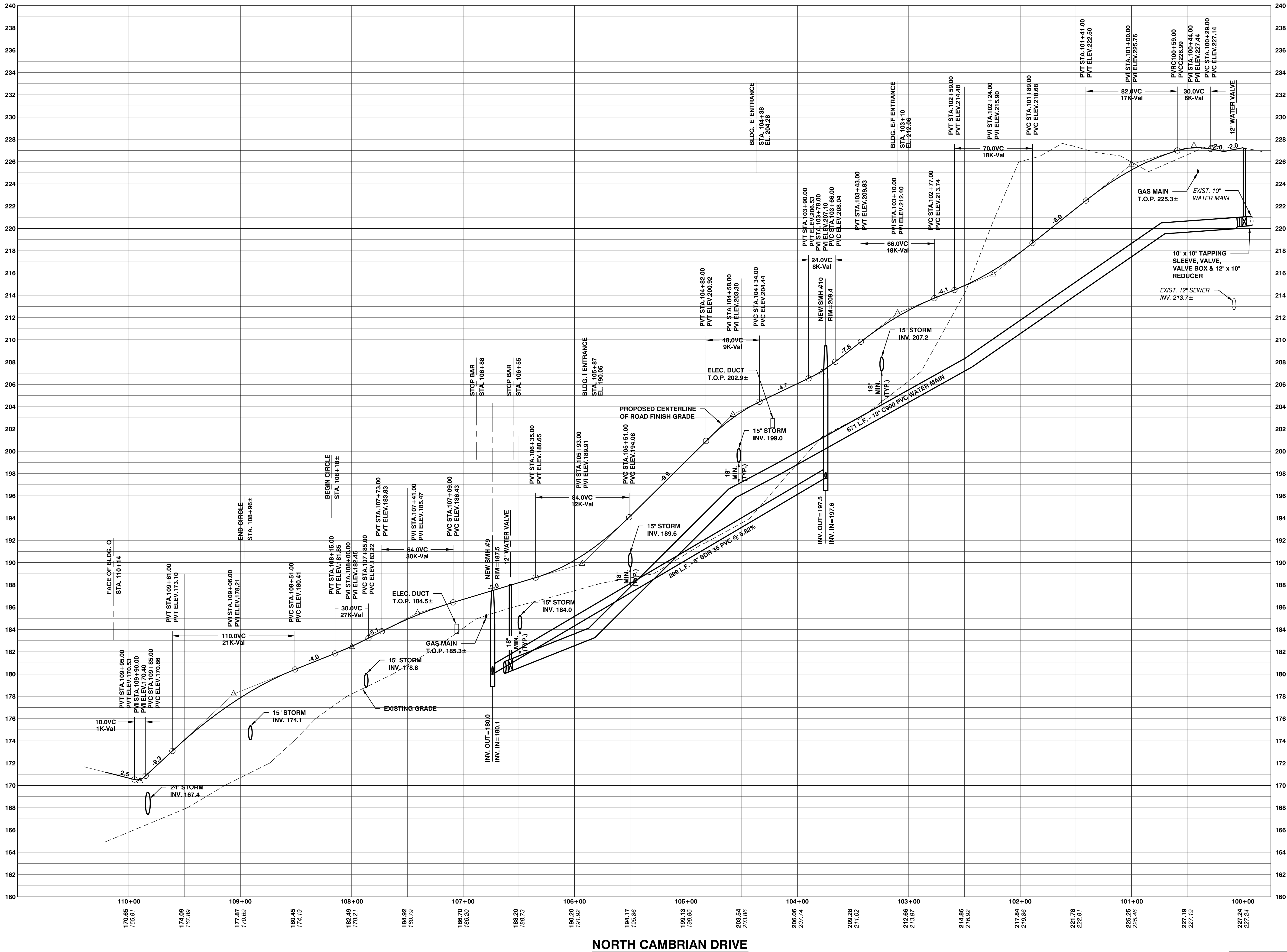
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**PROPOSED UTILITY PLAN - SOUTH QUADRANT**

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| DATE<br>--         | DRAWING NUMBER<br><b>C2.8</b> |
| SCALE<br>1" = 30'  |                               |
| PROJ. NO.<br>14215 |                               |





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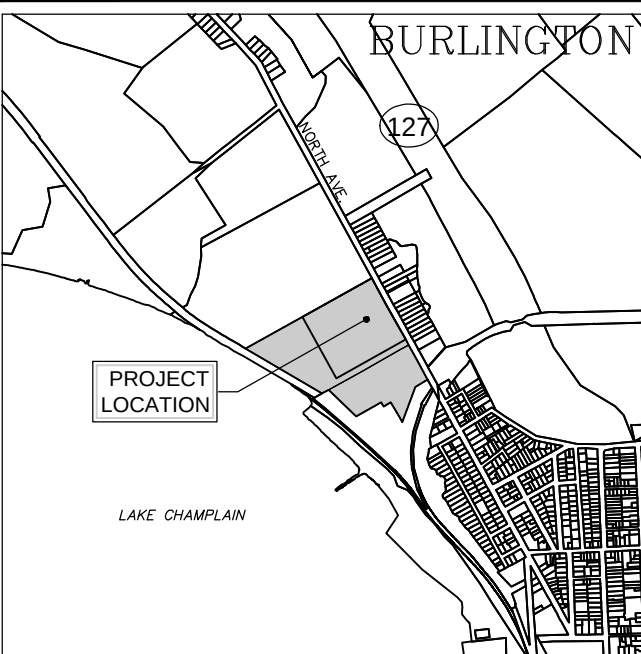
BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

1" = 2000'

| DATE | CHECKED | REVISION |
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PROPOSED ROAD &  
UTILITY PROFILE -  
NORTH CAMBRIAN  
DRIVE

DATE  
FEB., 2016

SCALE  
1" = 40' HORIZ.  
1" = 4' VERT.  
PROJ. NO.  
14215

DRAWING NUMBER

C3.0

PROGRESS PLANS  
11/22/2016



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APPROVED  
DCM

A map of Burlington, Vermont, showing the project location. The map includes Lake Champlain, Route 127, and a shaded area labeled 'PROJECT LOCATION'.

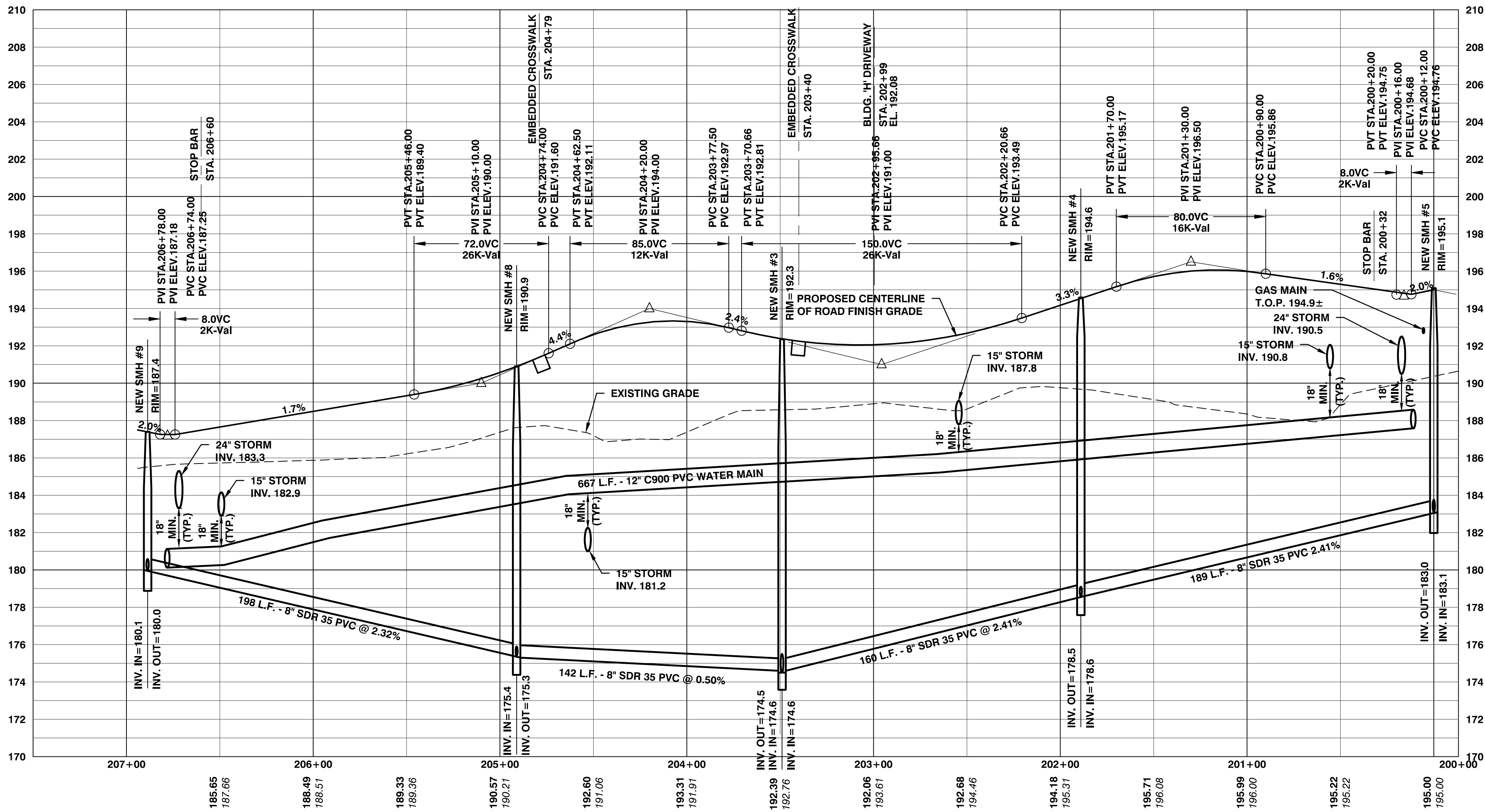
$$= 2000'$$

## PROPOSED ROAD & UTILITY PROFILE - SOUTH CAMBRIAN DRIVE

### C3.1

PROGRESS PLANS  
11/22/2016





WEST CAMBRIAN DRIVE

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.  
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403  
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| DRAWN<br>SAL    |  |
| CHECKED<br>DSM  |  |
| APPROVED<br>DSM |  |

CLIENT:  
**BC COMMUNITY HOUSING, LLC**  
P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:  
**CAMBRIAN RISE**  
311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP  
1" = 2000'

| DATE | CHECKED | REVISION |
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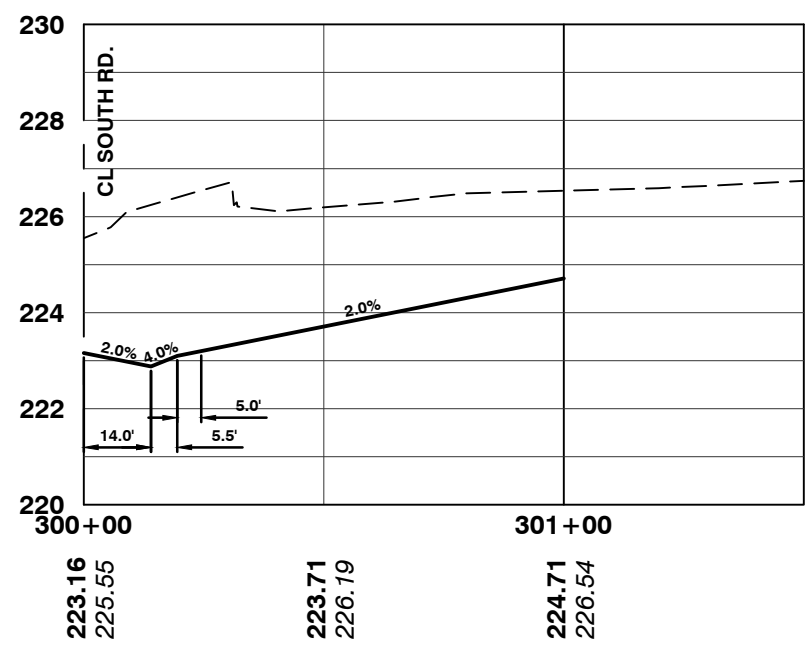
**PROPOSED ROAD & UTILITY PROFILE - WEST CAMBRIAN DRIVE**

|                                                                 |                               |
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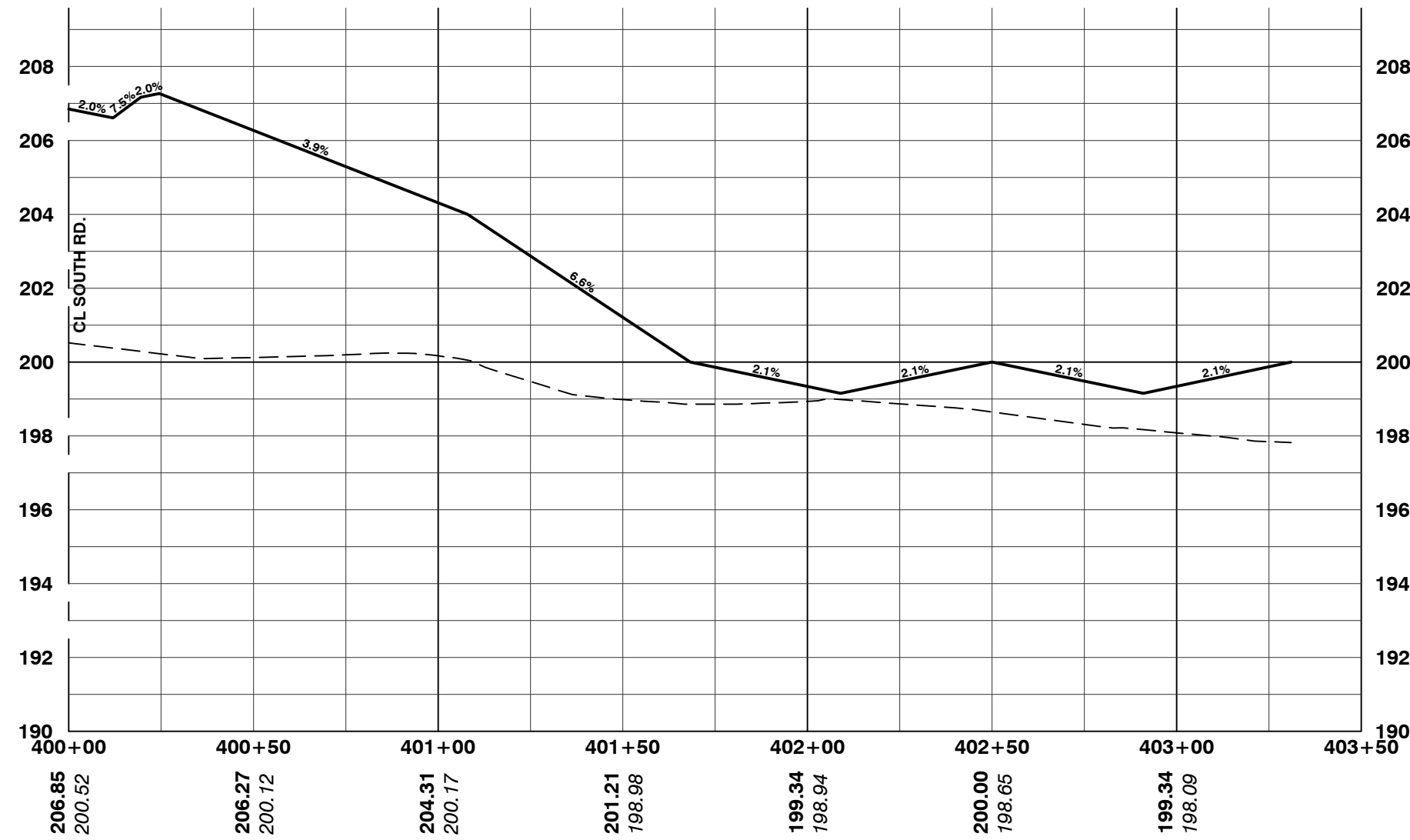
PROGRESS PLANS  
11/22/2016



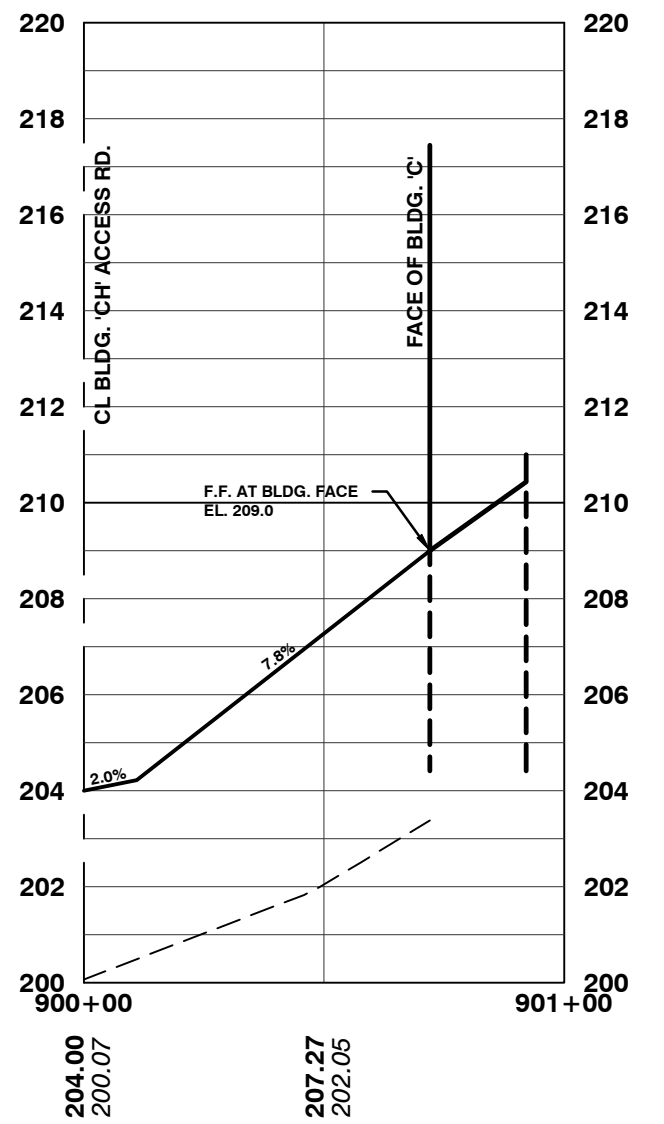
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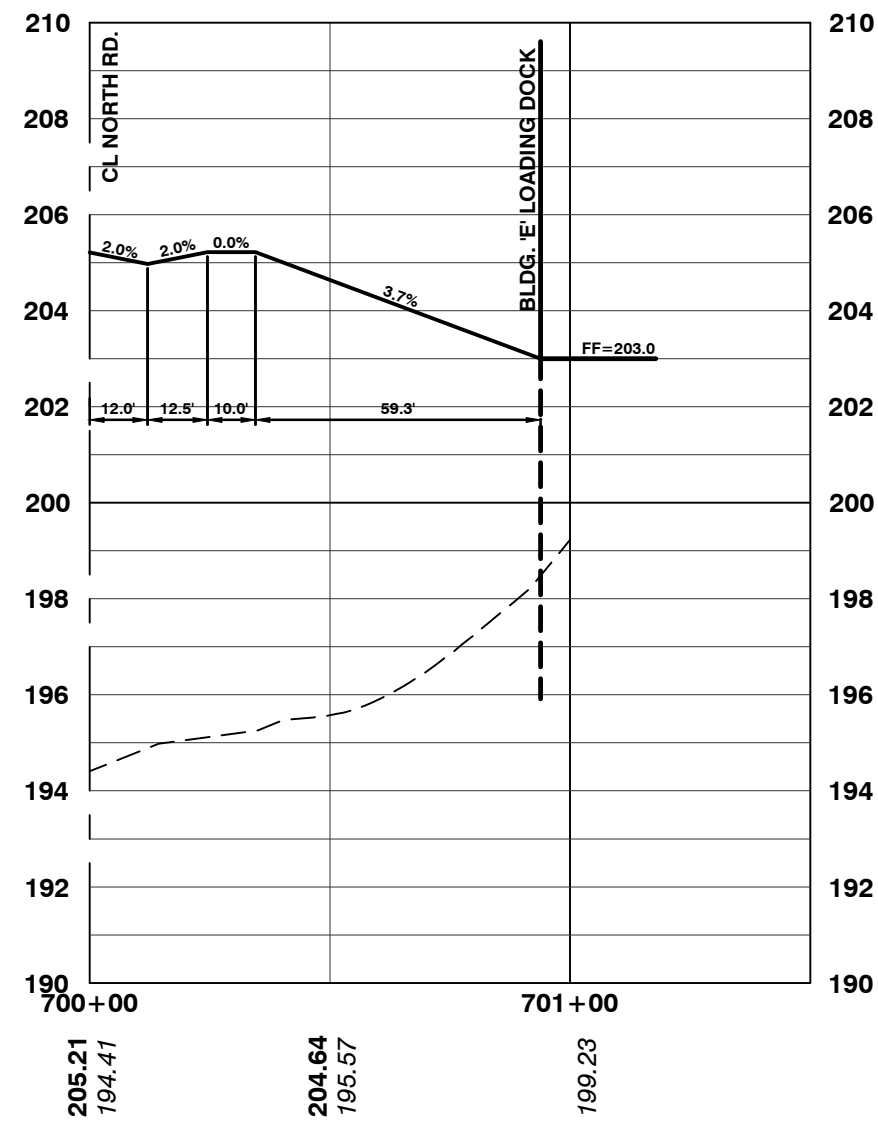
BLDG. 'B/C' ACCESS ROAD



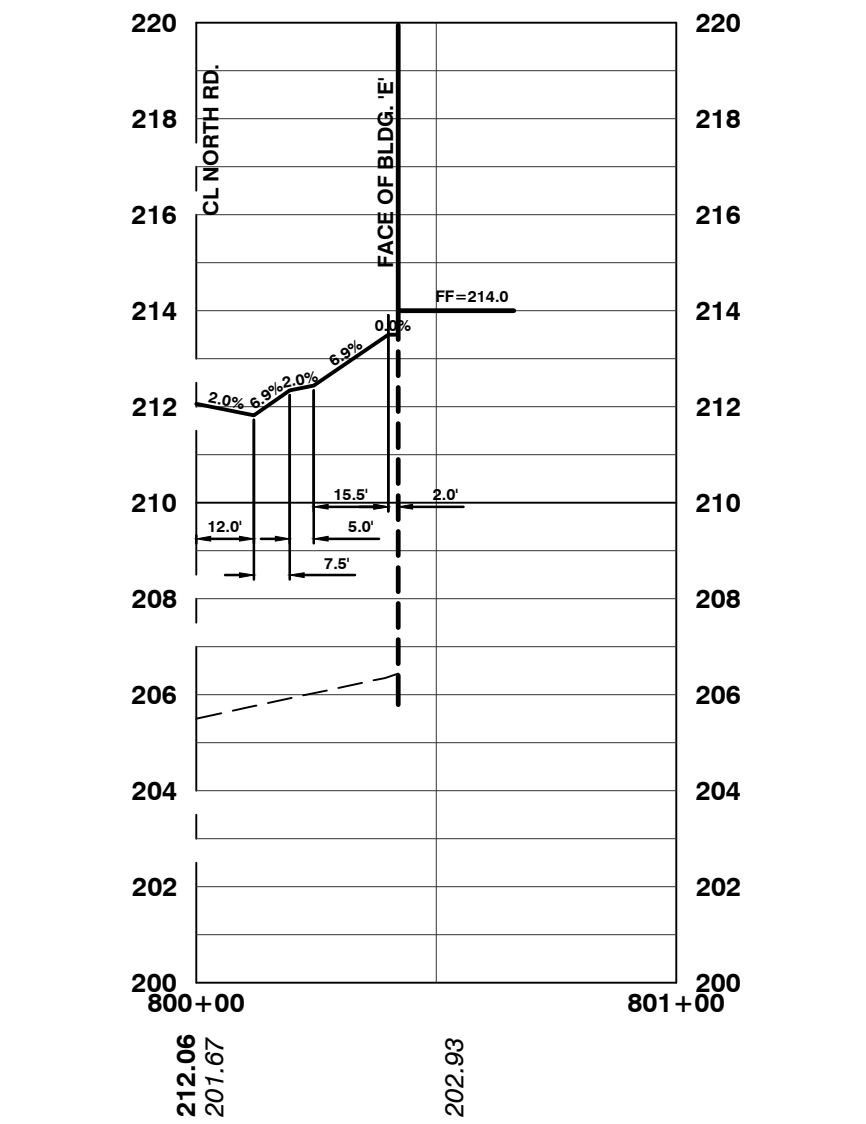
BLDG. 'C/H' ACCESS ROAD



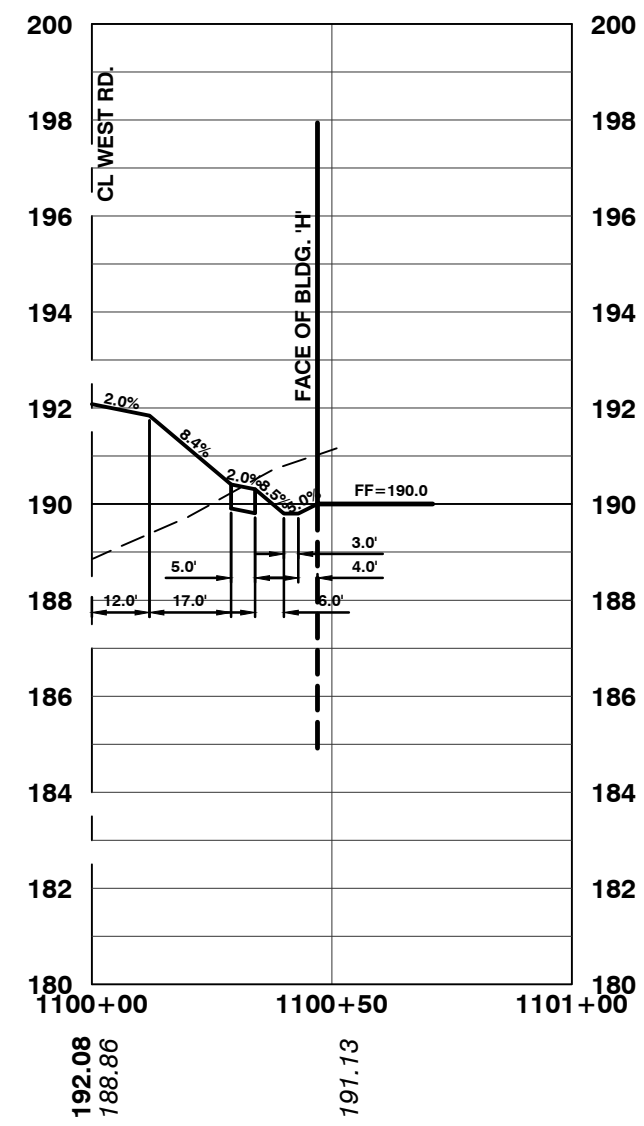
BLDG. 'C' GARAGE RAMP



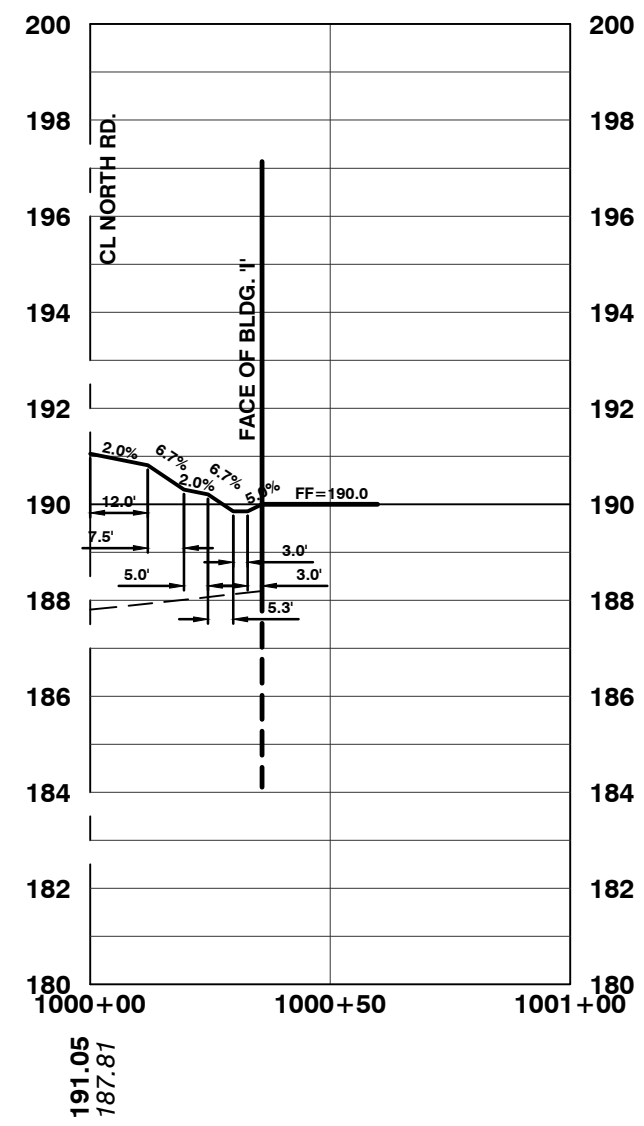
BLDG. 'E' LOWER GARAGE RAMP



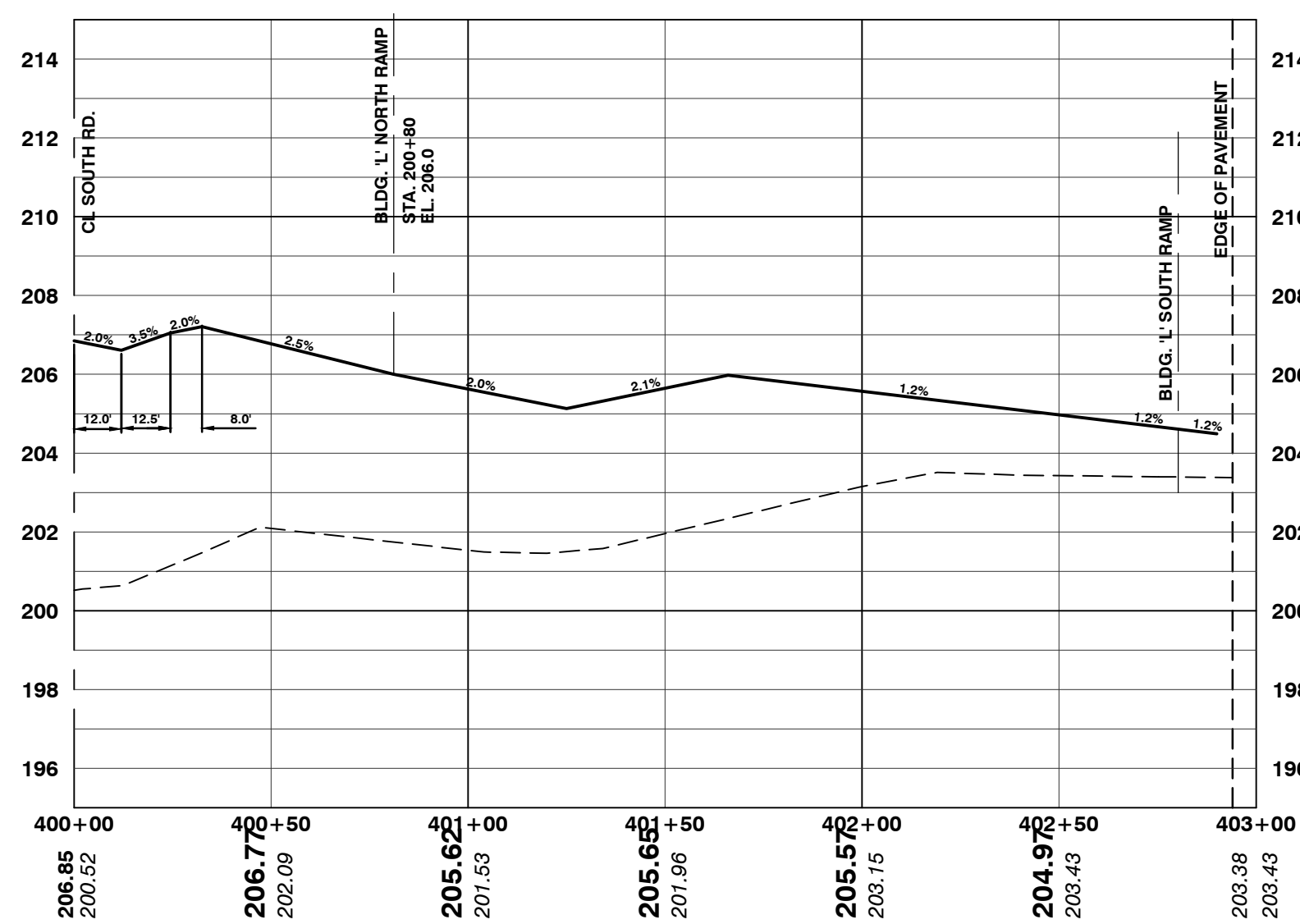
BLDG. 'E' UPPER GARAGE RAMP



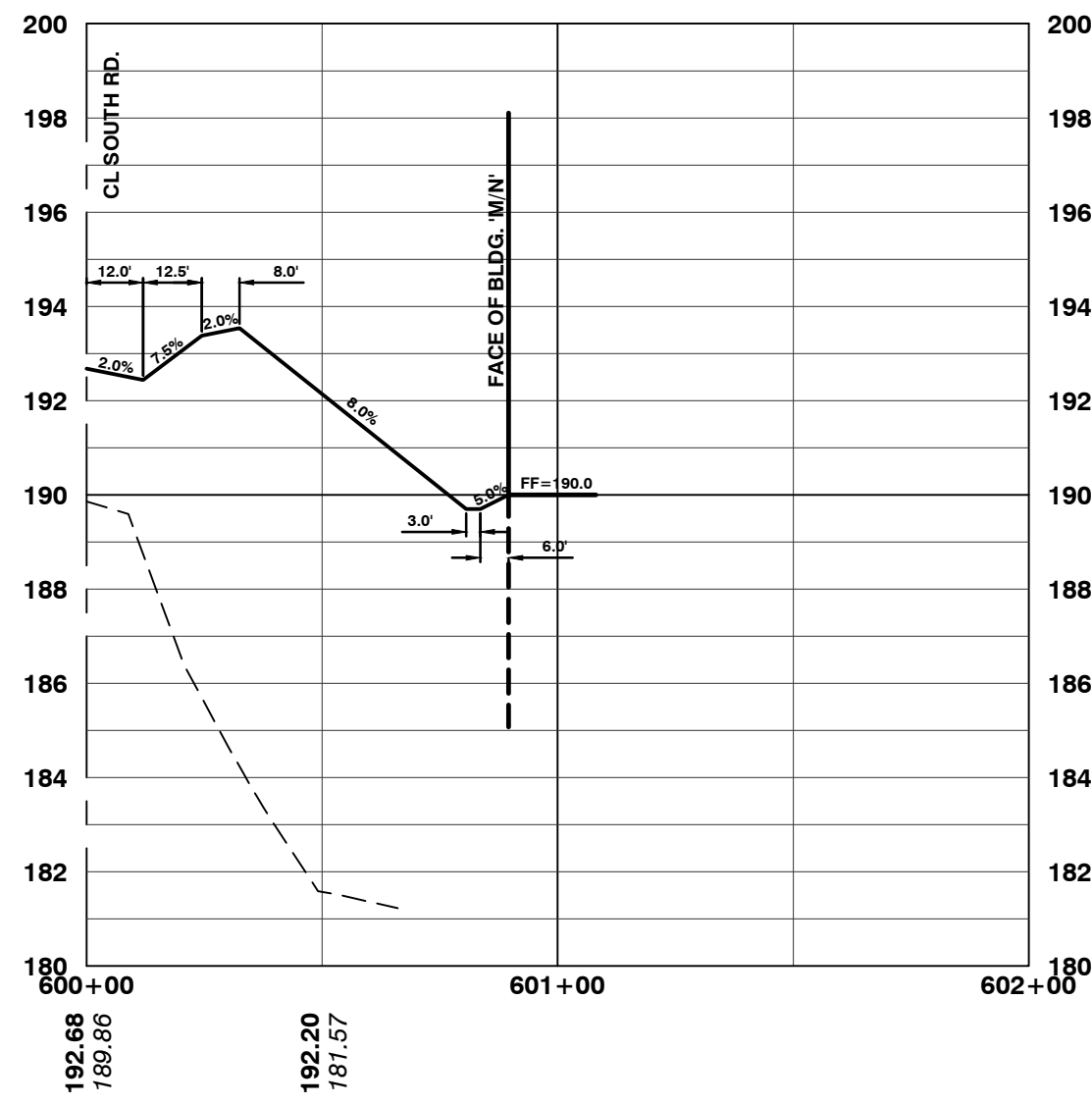
BLDG. 'H' GARAGE RAMP



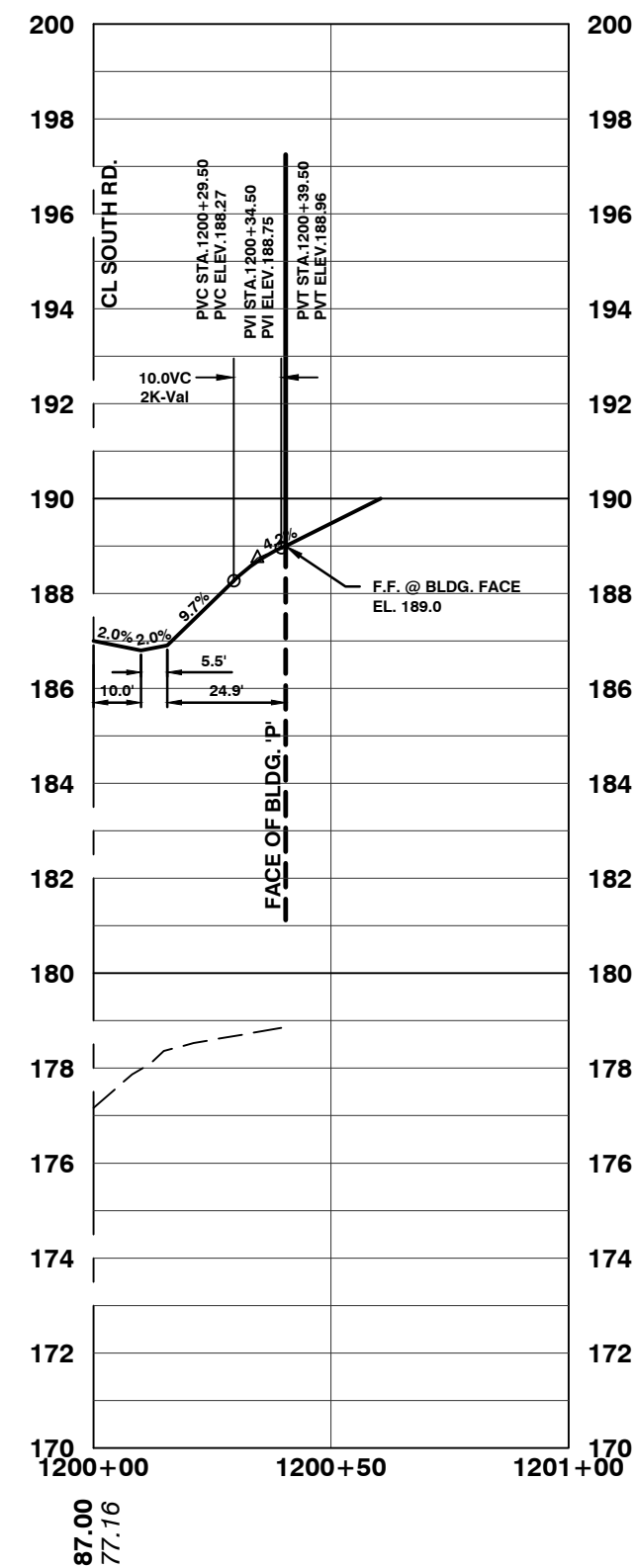
BLDG. 'I' GARAGE RAMP



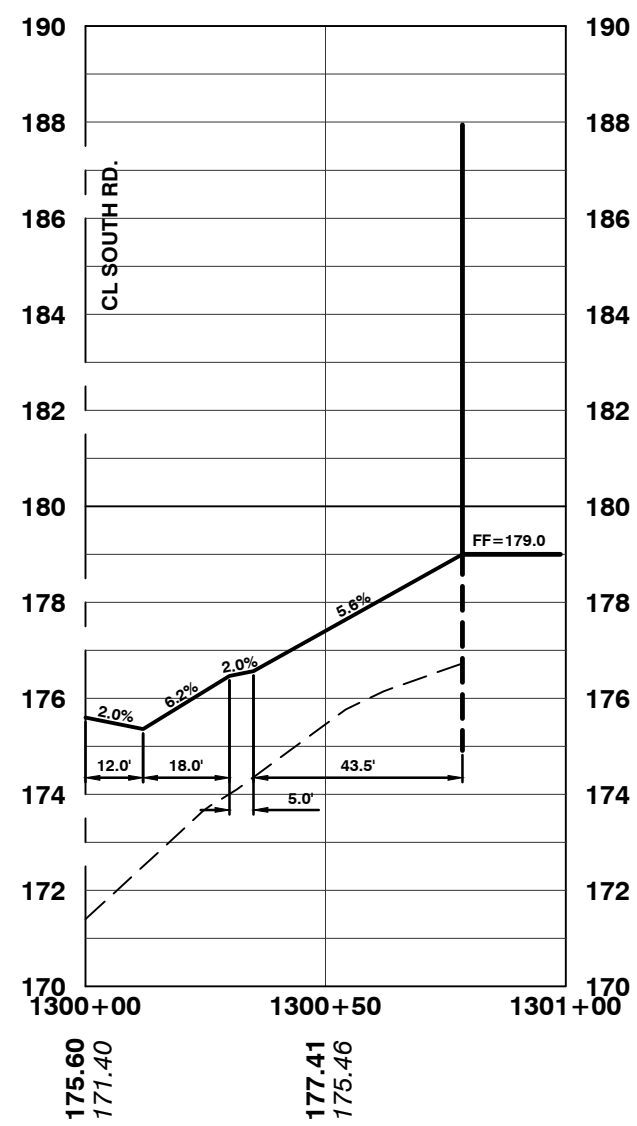
BLDG. 'L/M' ACCESS ROAD



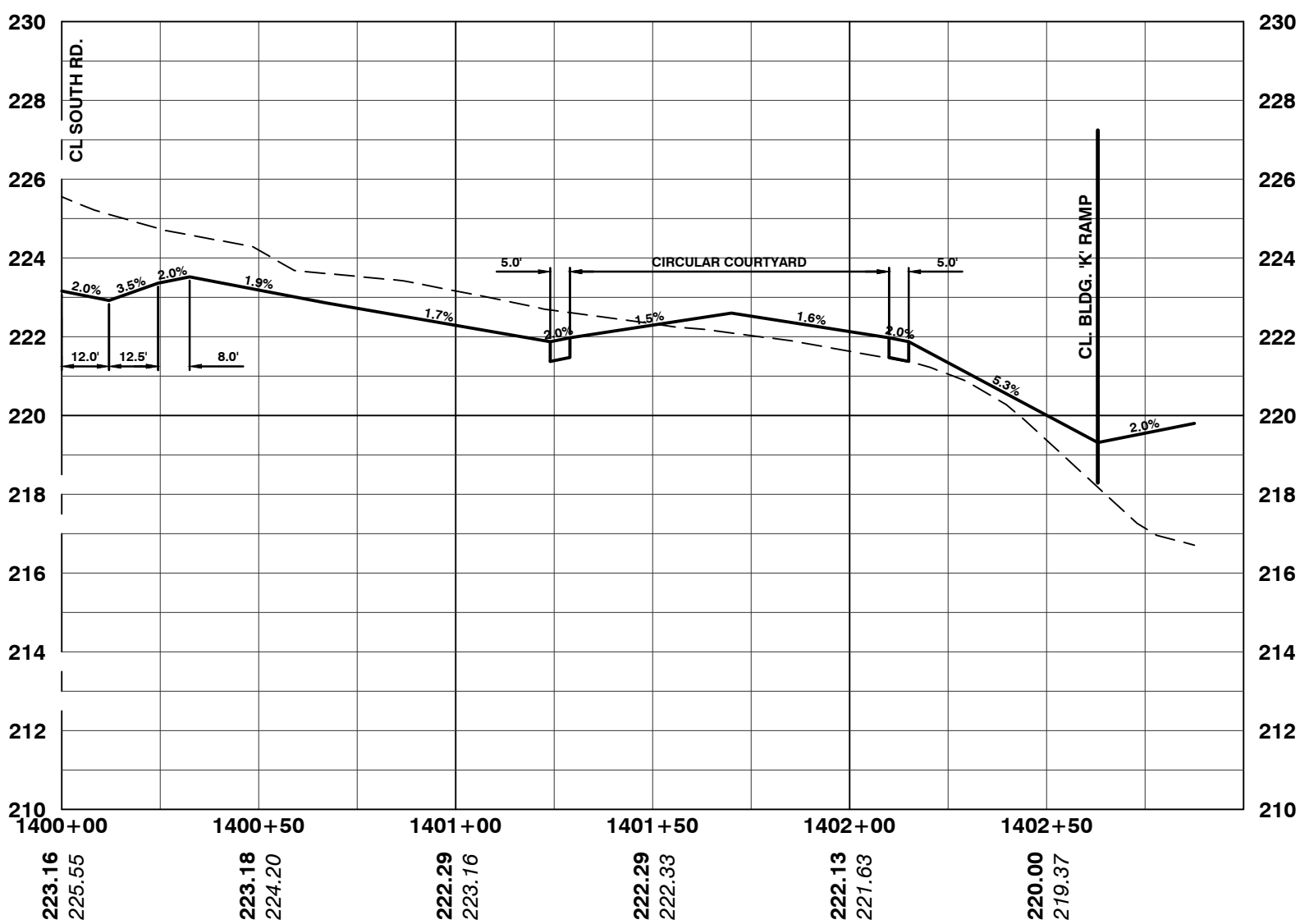
BLDG. 'M/N' GARAGE RAMP



BLDG. 'O' GARAGE RAMP



BLDG. 'P' GARAGE RAMP



BLDG. 'K' ACCESS ROAD

SITE ENGINEER:



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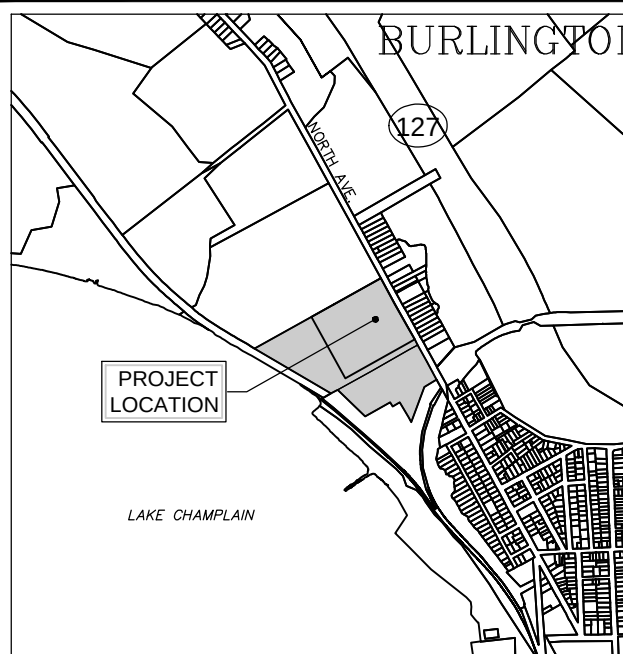
**BC COMMUNITY  
HOUSING, LLC**

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

**CAMBRIAN RISE**

311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

1" = 2000'

DATE CHECKED REVISION

| DATE | CHECKED | REVISION |
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**PROPOSED ROAD &  
UTILITY PROFILE -  
MISC.**

DATE

FEB., 2016

SCALE

1" = 40' HORIZ.

1" = 4' VERT.

PROJ. NO.

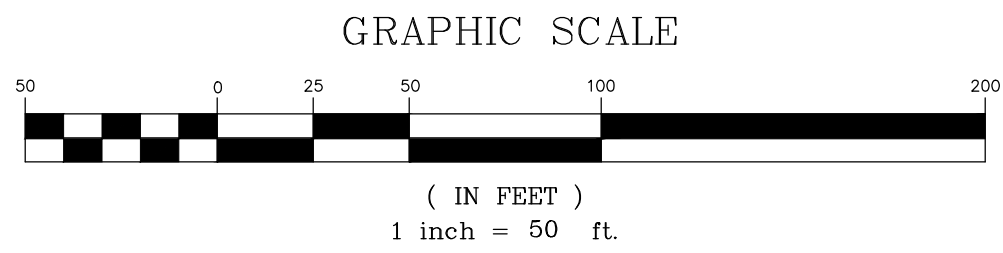
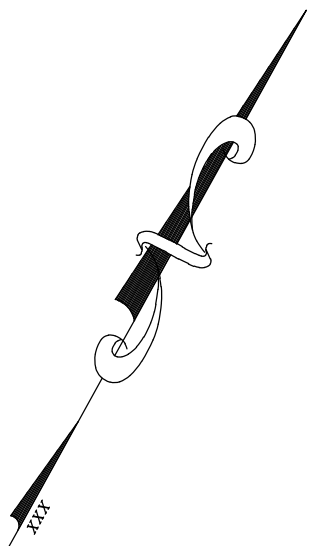
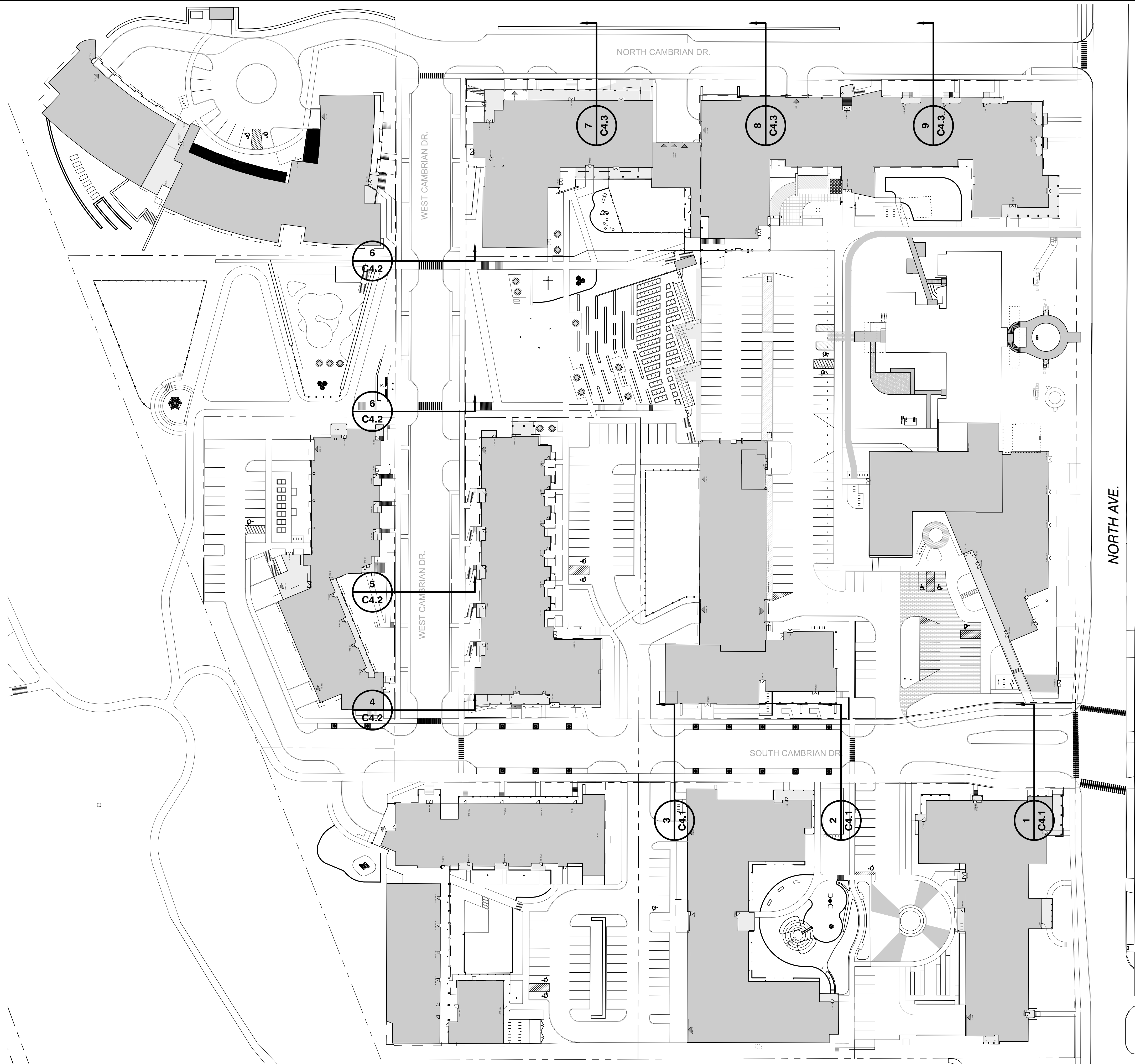
14215

DRAWING NUMBER

**C3.3**

PROGRESS PLANS  
11/22/2016





PROGRESS PLANS  
11/22/2016

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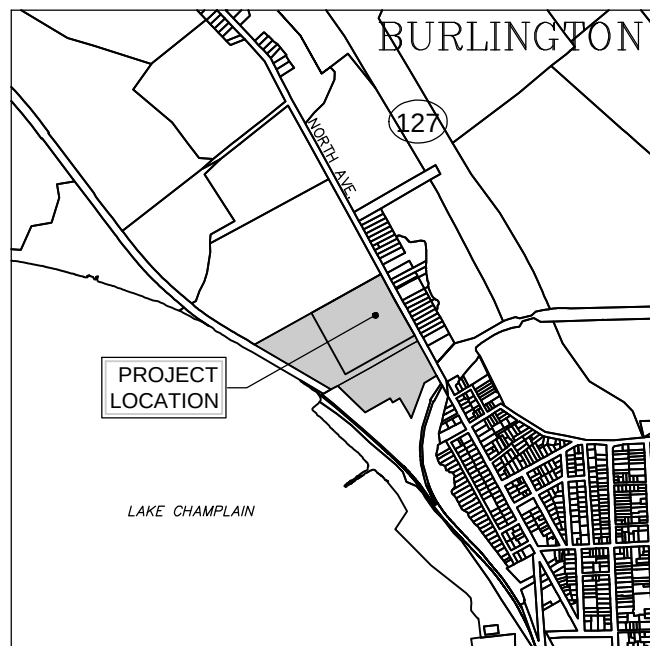
BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT



LOCATION MAP

1" = 2000'

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TYPICAL ROAD  
SECTION  
LOCATION PLAN

DATE  
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SCALE  
1" = 50'

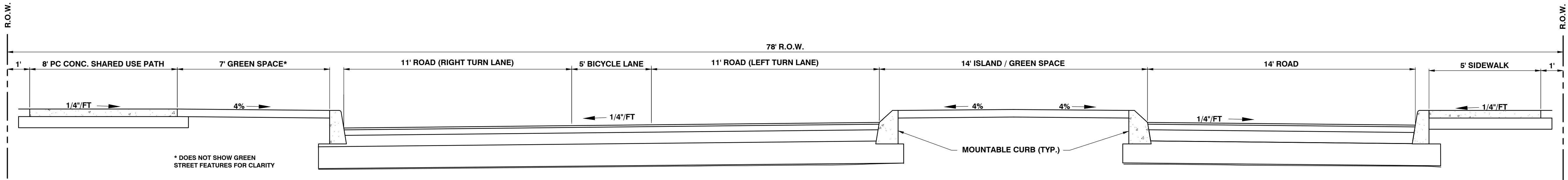
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14215

DRAWING NUMBER  

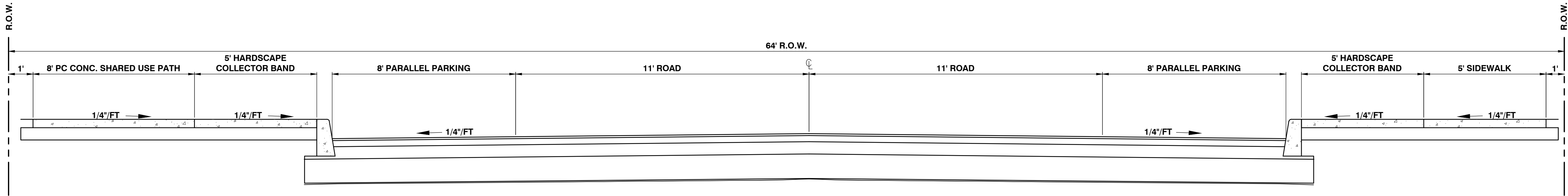
C4.0

P:\MISC\2016\14215\14215-C4.0.dwg 11/22/2016 1:22:42 PM

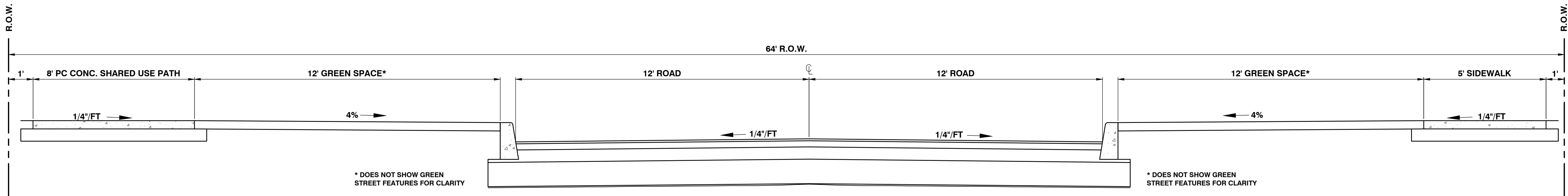




1 SOUTH CAMBRIAN DR. SECTION WITH CENTER ISLAND  
N.T.S



2 SOUTH CAMBRIAN DR. SECTION WITH PARALLEL PARKING  
N.T.S



3 SOUTH CAMBRIAN DR. SECTION WITHOUT PARALLEL PARKING  
N.T.S



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05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

| DATE | CHECKED | REVISION |
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ROAD SECTIONS -  
SOUTH CAMBRIAN  
DRIVE

DATE

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SCALE

NONE

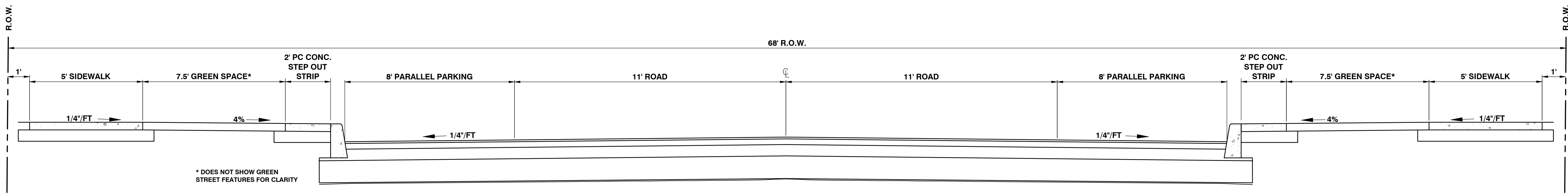
PROJ. NO.

14215

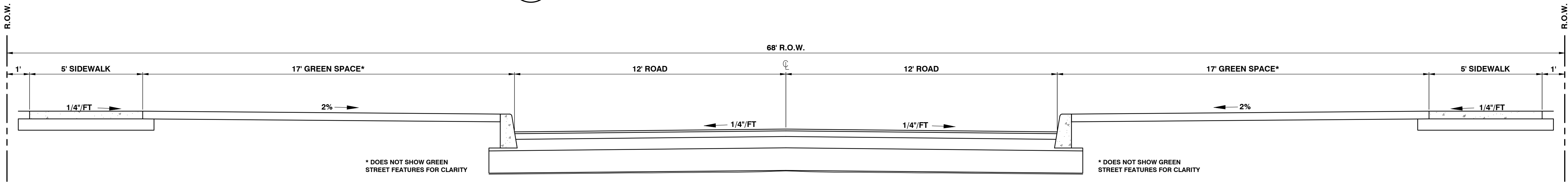
DRAWING NUMBER

C4.1

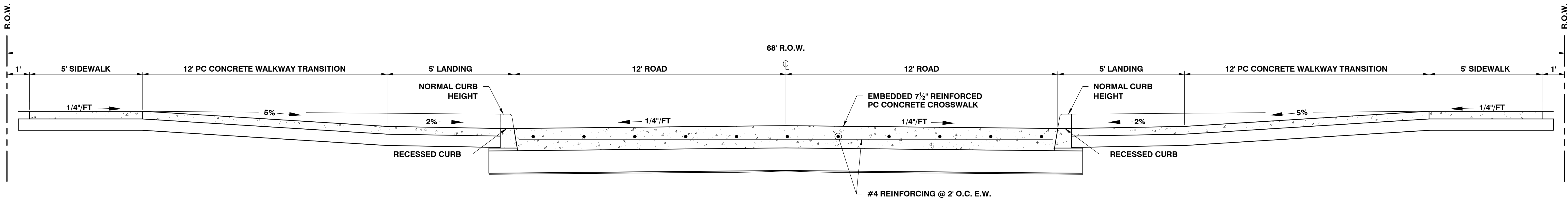




4 WEST CAMBRIAN DR. SECTION WITH PARALLEL PARKING  
N.T.S



5 WEST CAMBRIAN DR. SECTION WITHOUT PARALLEL PARKING  
N.T.S



6 WEST CAMBRIAN DR. SECTION WITH  
EMBEDDED PC CONCRETE CROSSWALK  
N.T.S

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PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

| DATE | CHECKED | REVISION |
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ROAD SECTIONS -  
WEST CAMBRIAN  
DRIVE

DATE

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SCALE

NONE

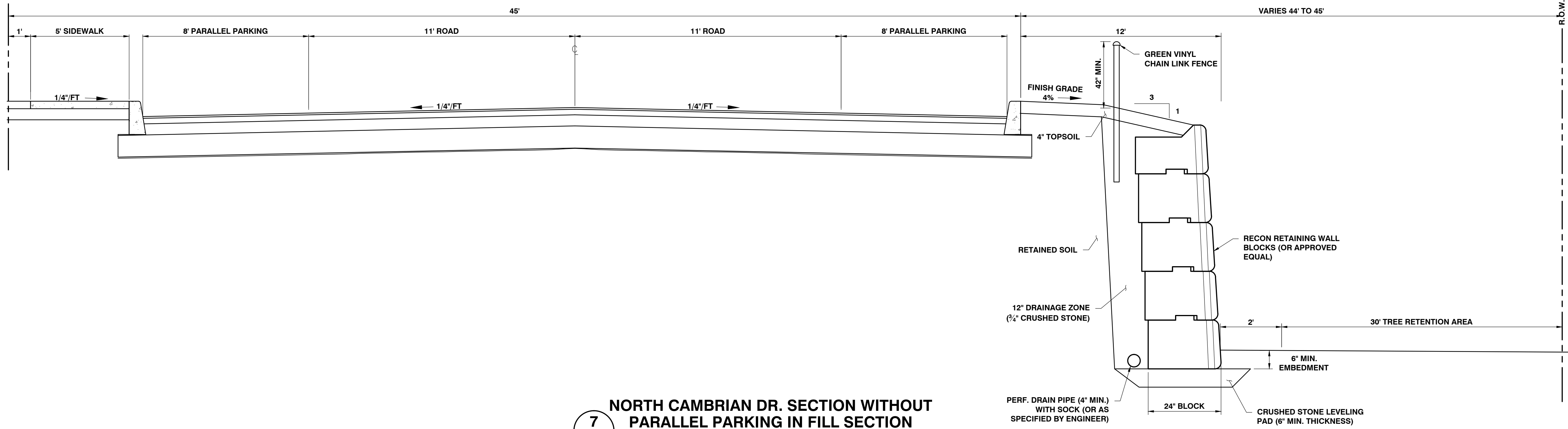
PROJ. NO.

14215

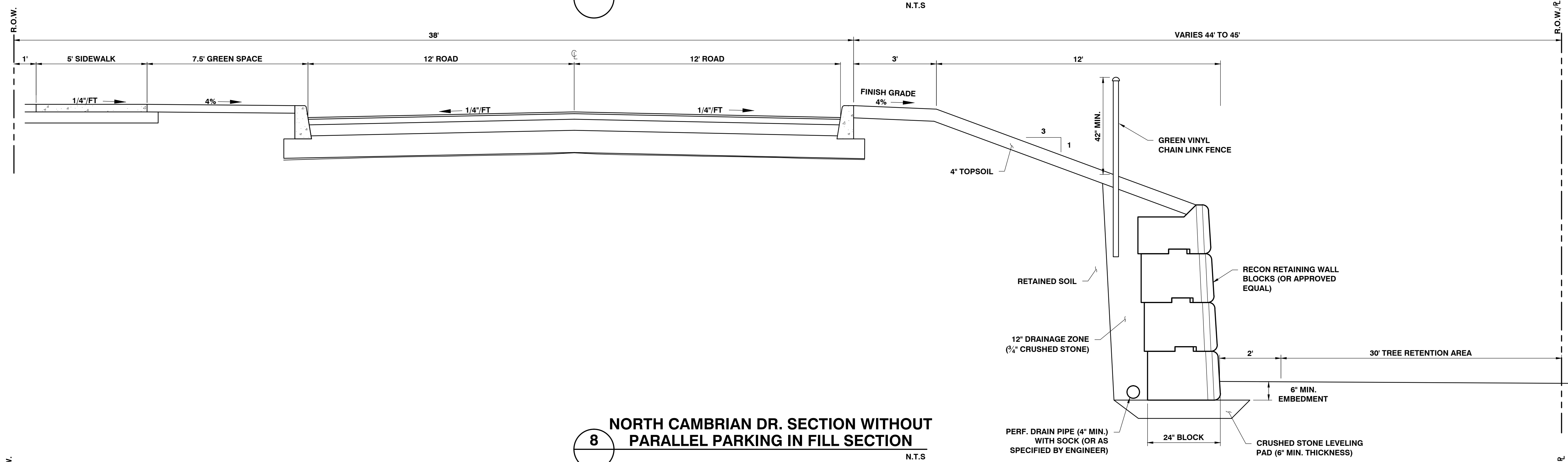
DRAWING NUMBER

C4.2

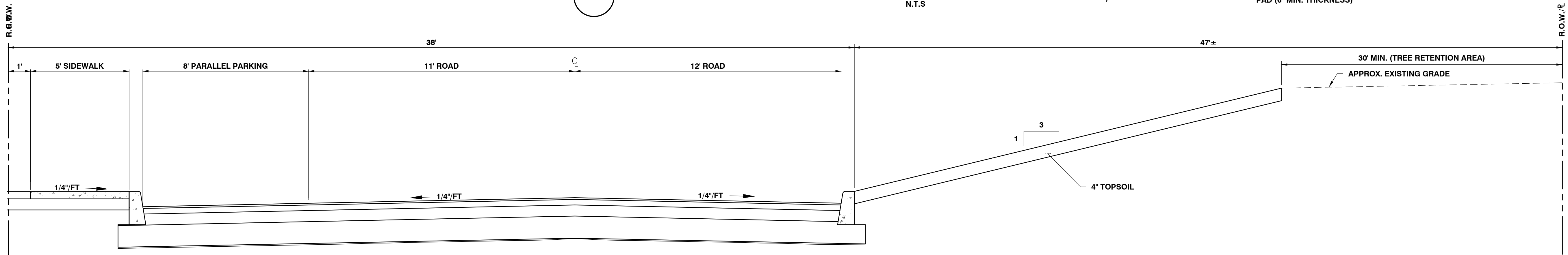




7 NORTH CAMBRIAN DR. SECTION WITHOUT  
PARALLEL PARKING IN FILL SECTION  
N.T.S



8 NORTH CAMBRIAN DR. SECTION WITHOUT  
PARALLEL PARKING IN FILL SECTION  
N.T.S



9 NORTH CAMBRIAN DR. SECTION WITH  
PARALLEL PARKING IN CUT SECTION  
N.T.S

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PROJECT:

CAMBRIAN RISE  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

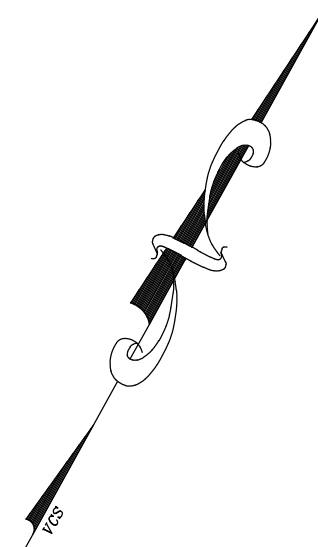
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ROAD SECTIONS - NORTH CAMBRIAN DRIVE

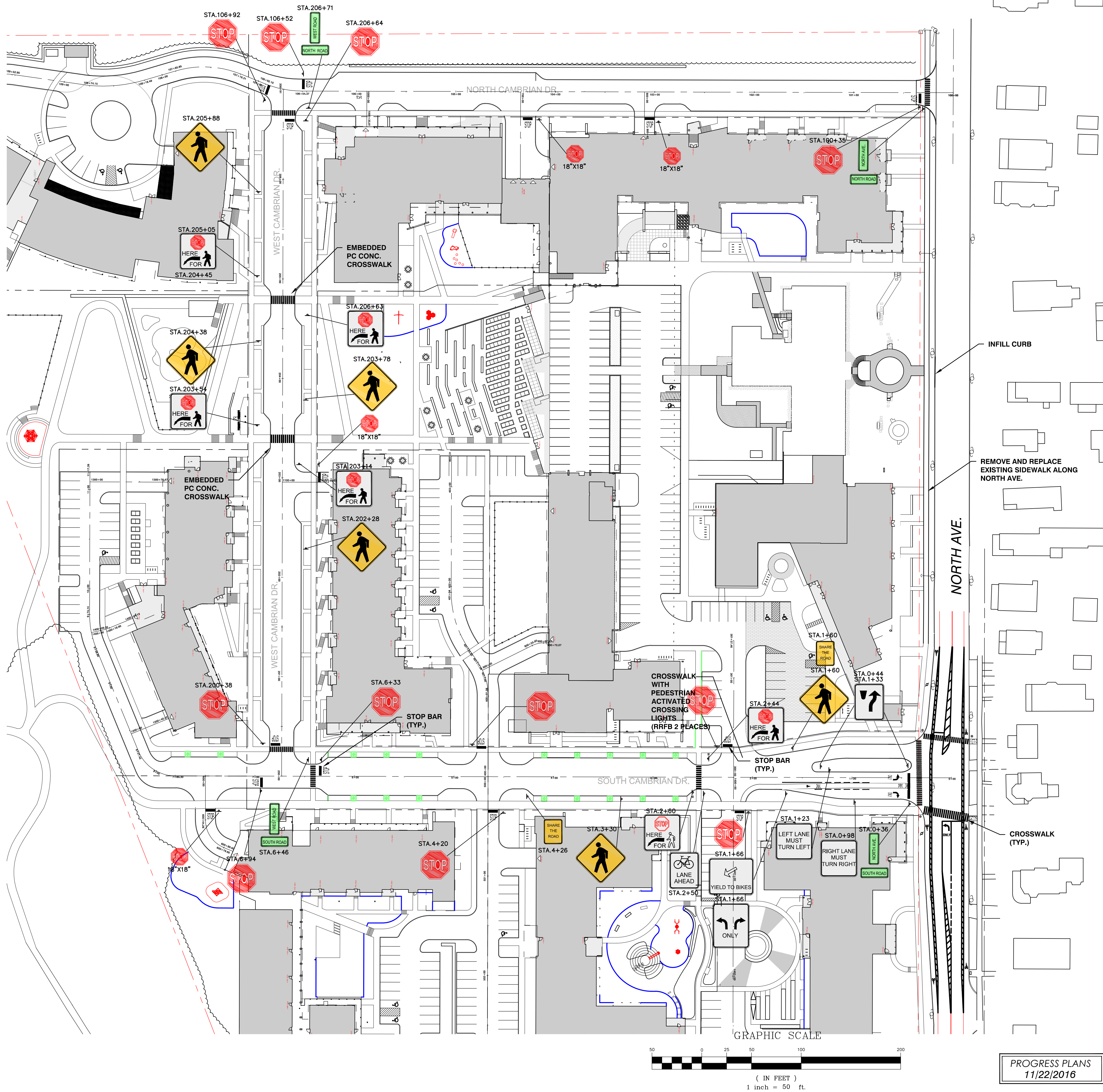
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SCALE  
NONE  
  
PROJ. NO.  
14215

DRAWING NUMBER  
  
C4.3





| SIGN | MUTCD CODE      | SIZE    | TOTAL QUANTITY |
|------|-----------------|---------|----------------|
|      | R1-1            | 30"x30" | 11             |
|      |                 | 18"x18" | 3              |
|      | R5-3 (MODIFIED) | 36"x30" | 1              |
|      | R4-4            | 36"x30" | 1              |
|      | R3-7            | 30"x30" | 1              |
|      | R3-7R           | 30"x30" | 1              |
|      | R3-16           | 24"x30" | 1              |
|      | R4-7            | 24"x30" | 2              |
|      | R1-5L           |         | 6              |
|      | W11-2           | 30"x30" | 6              |
|      | W16-1           | 15"x20" | 2              |
|      | D-3             |         | 8              |



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PROJECT:  
  
**CAMBRIAN RISE**  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

LOCATION MAP  
1" = 2000'

| DATE | CHECKED | REVISION |
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SIGNAGE AND STRIPING PLAN

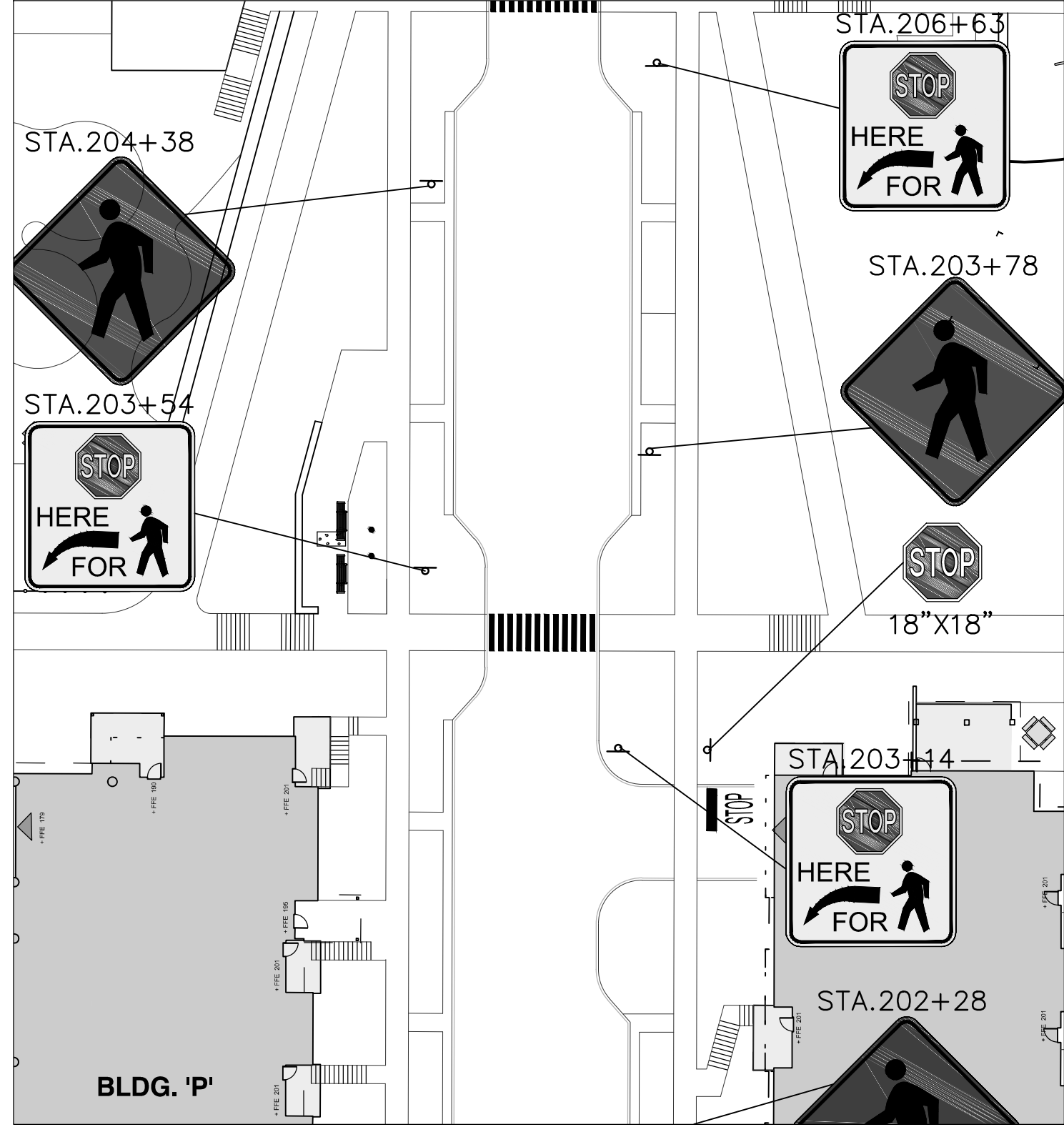
DATE  
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SCALE  
1" = 50'

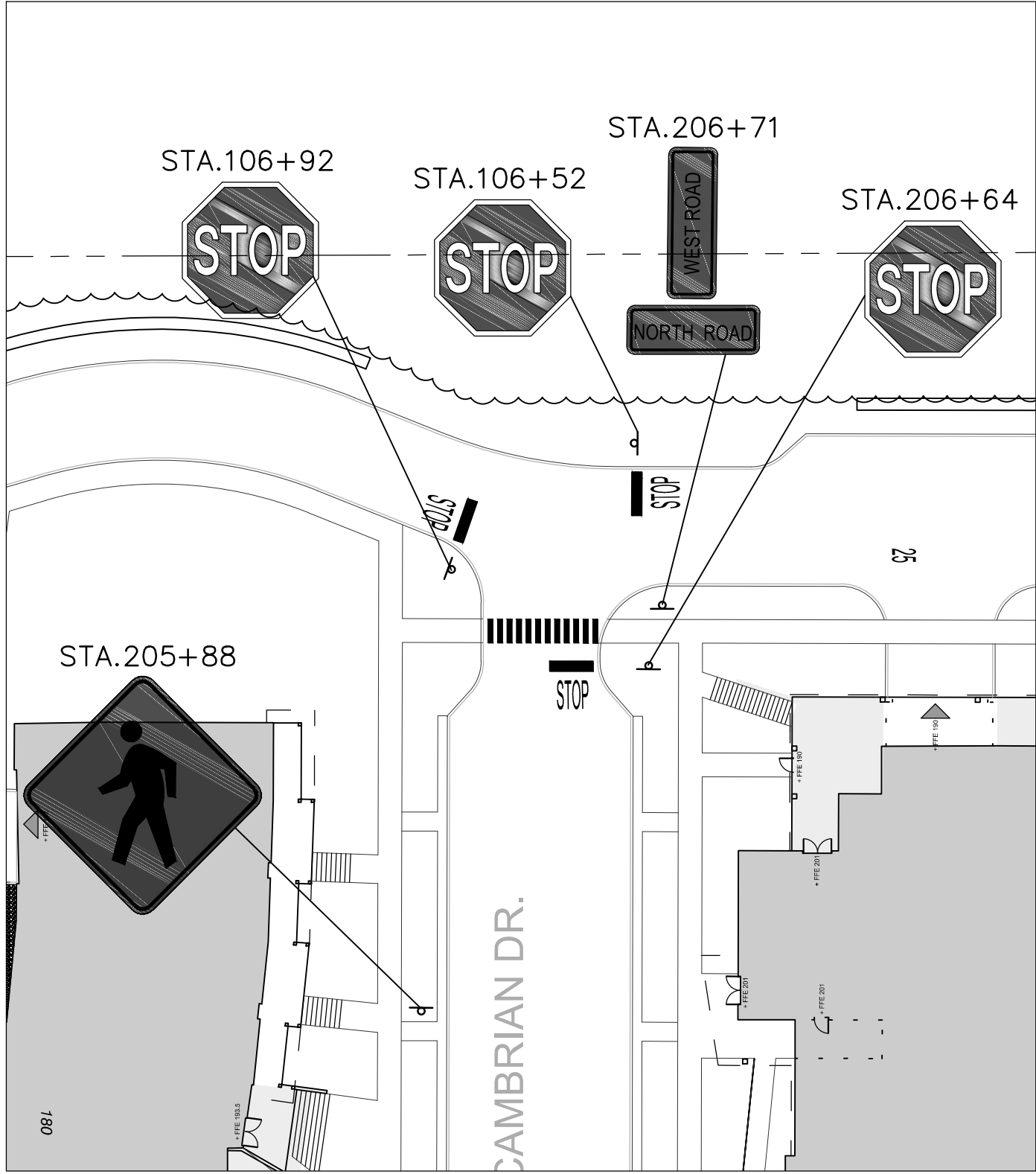
PROJ. NO.  
14215

DRAWING NUMBER  
**C5.0**

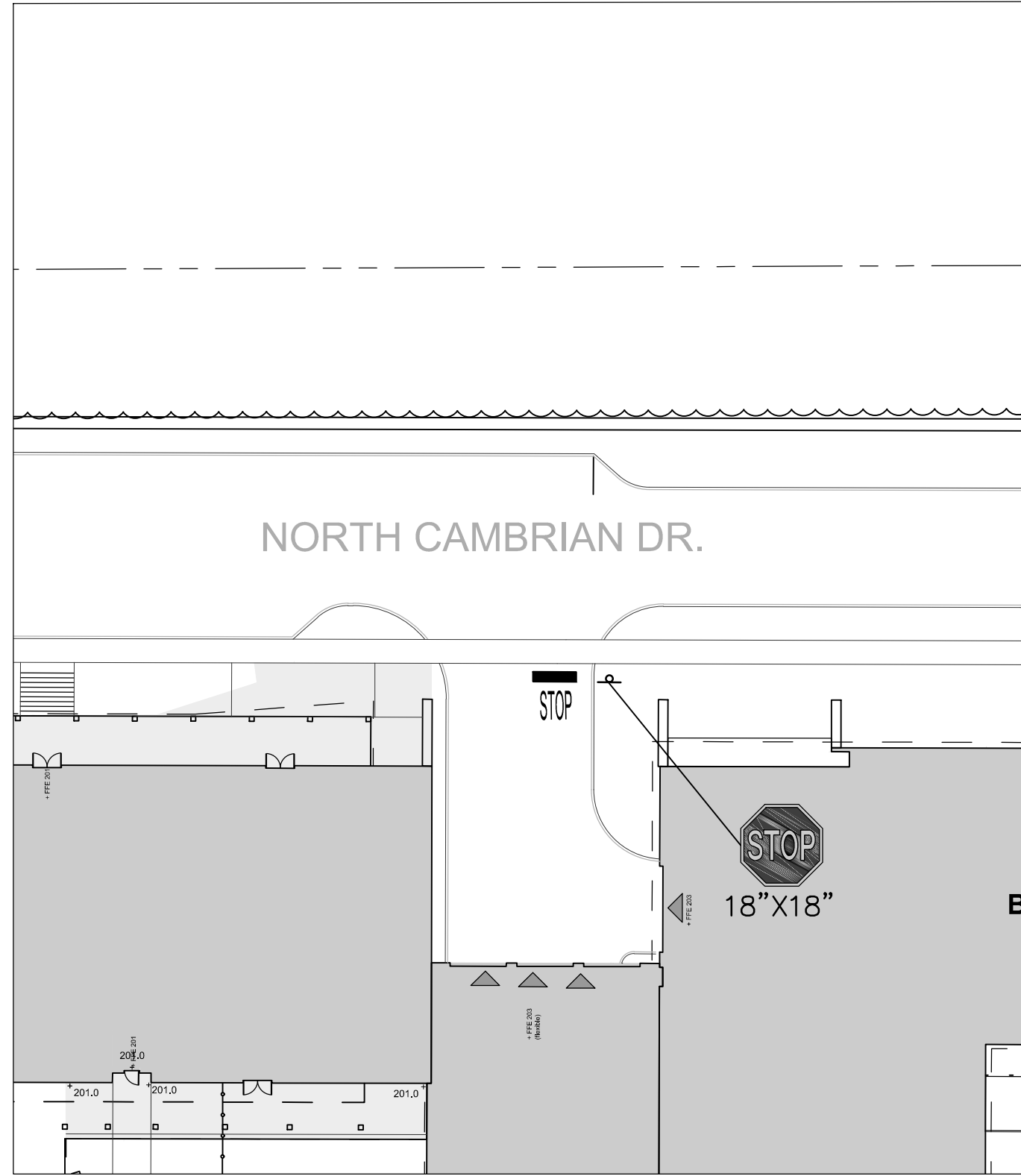




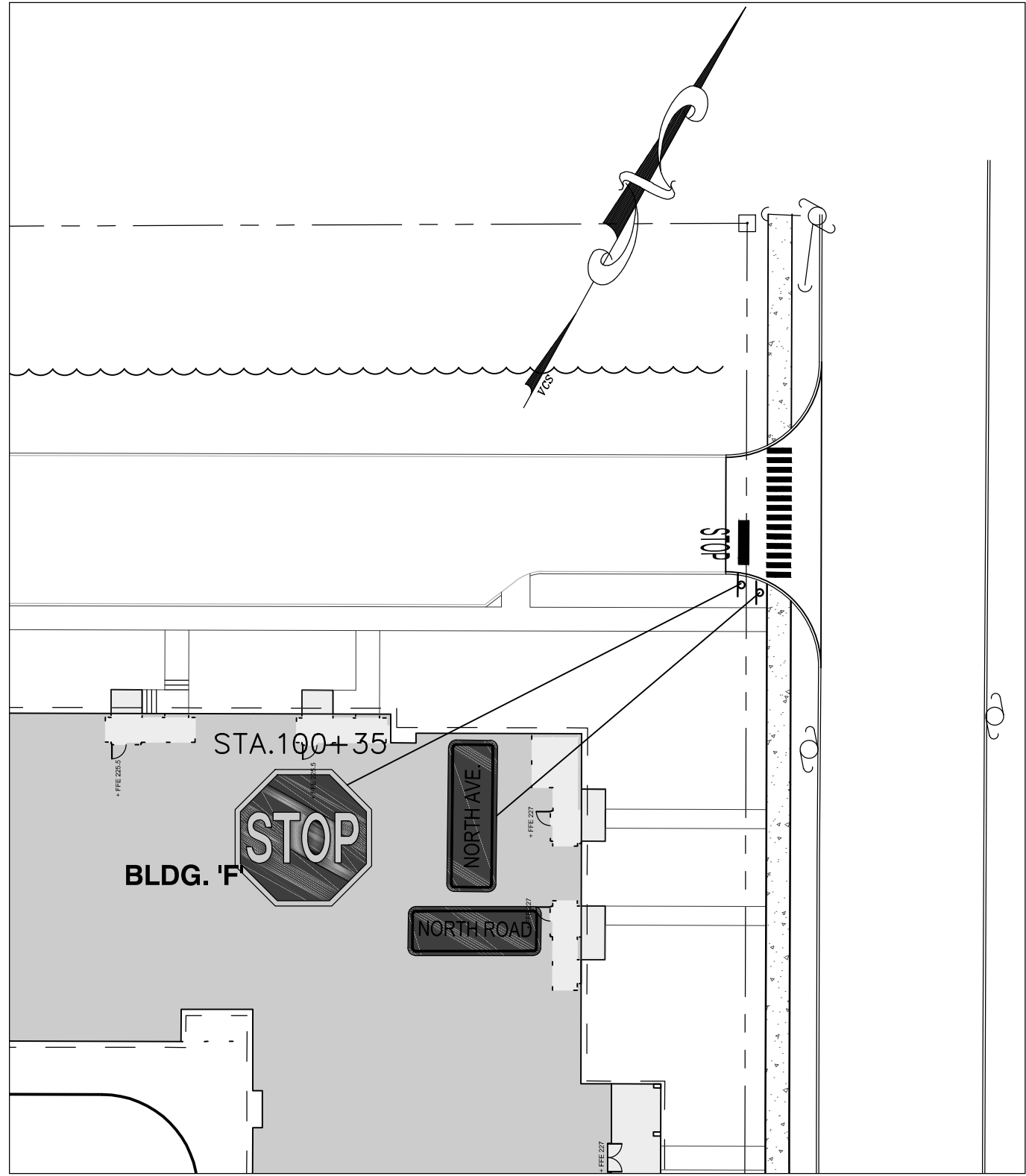
WEST ROAD STA. 203+03  
SCALE: 1" = 30'



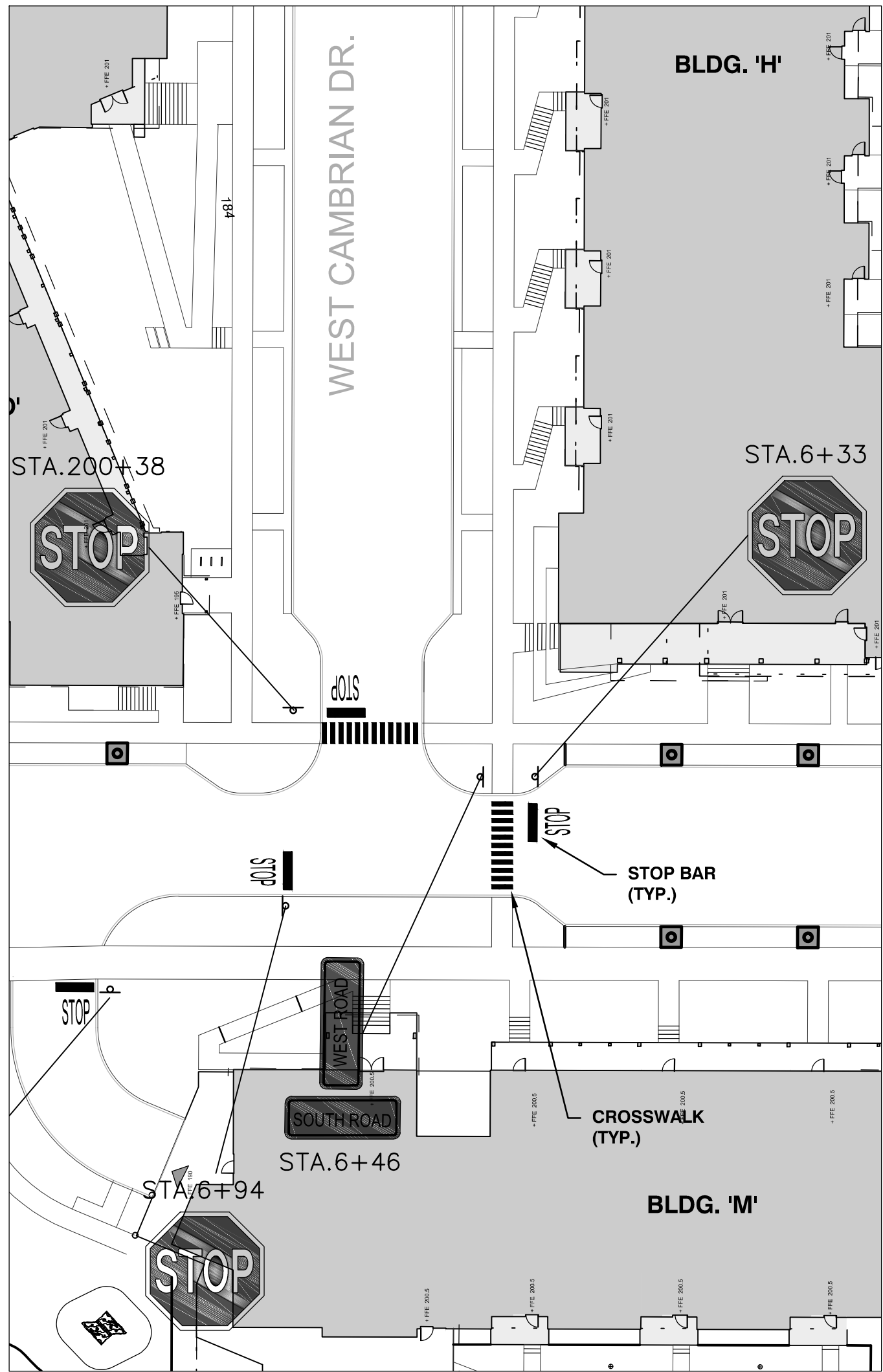
NORTH ROAD & WEST ROAD INTERSECTION  
SCALE: 1" = 30'



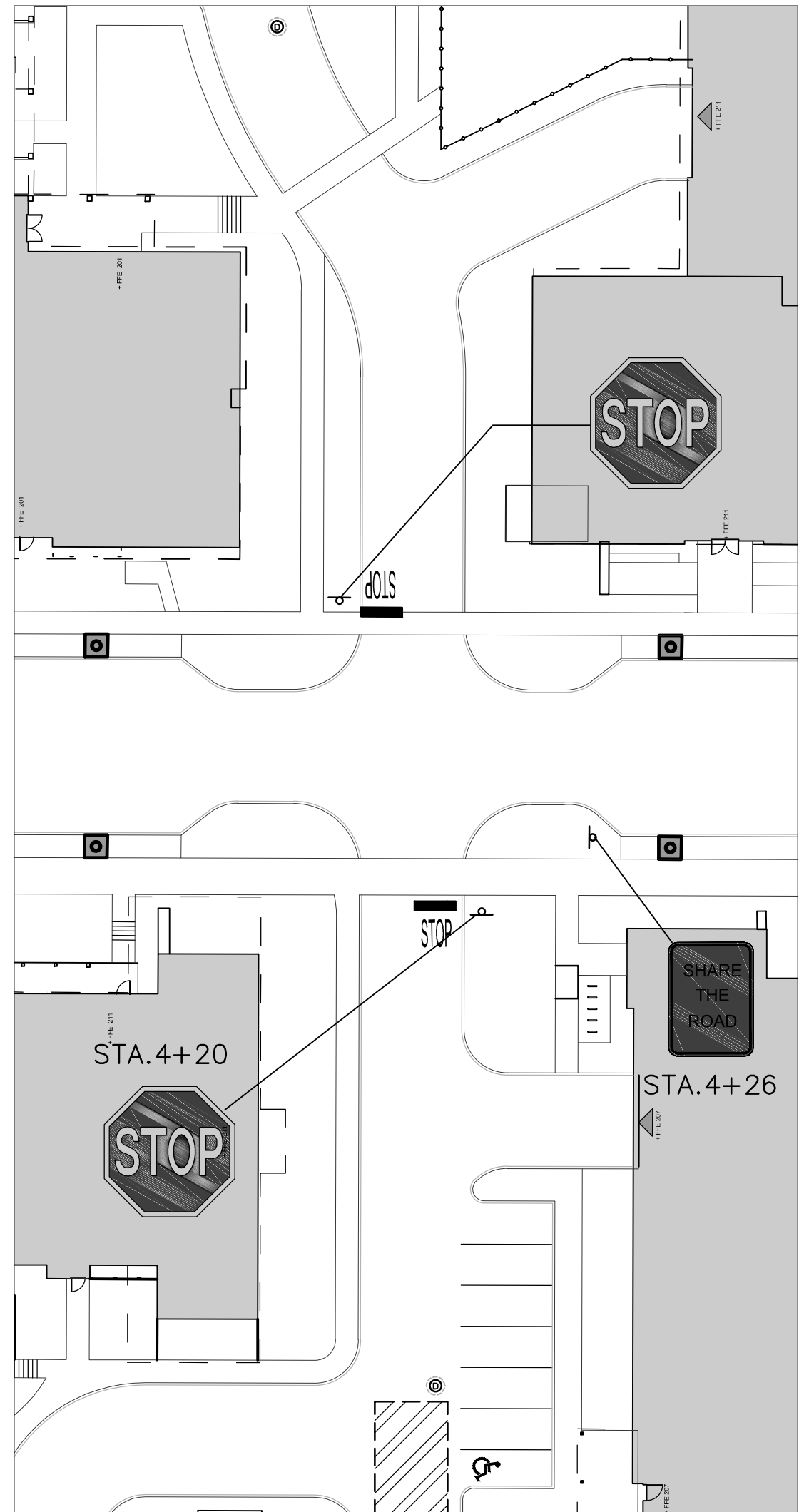
NORTH ROAD STA. 104+39  
SCALE: 1" = 30'



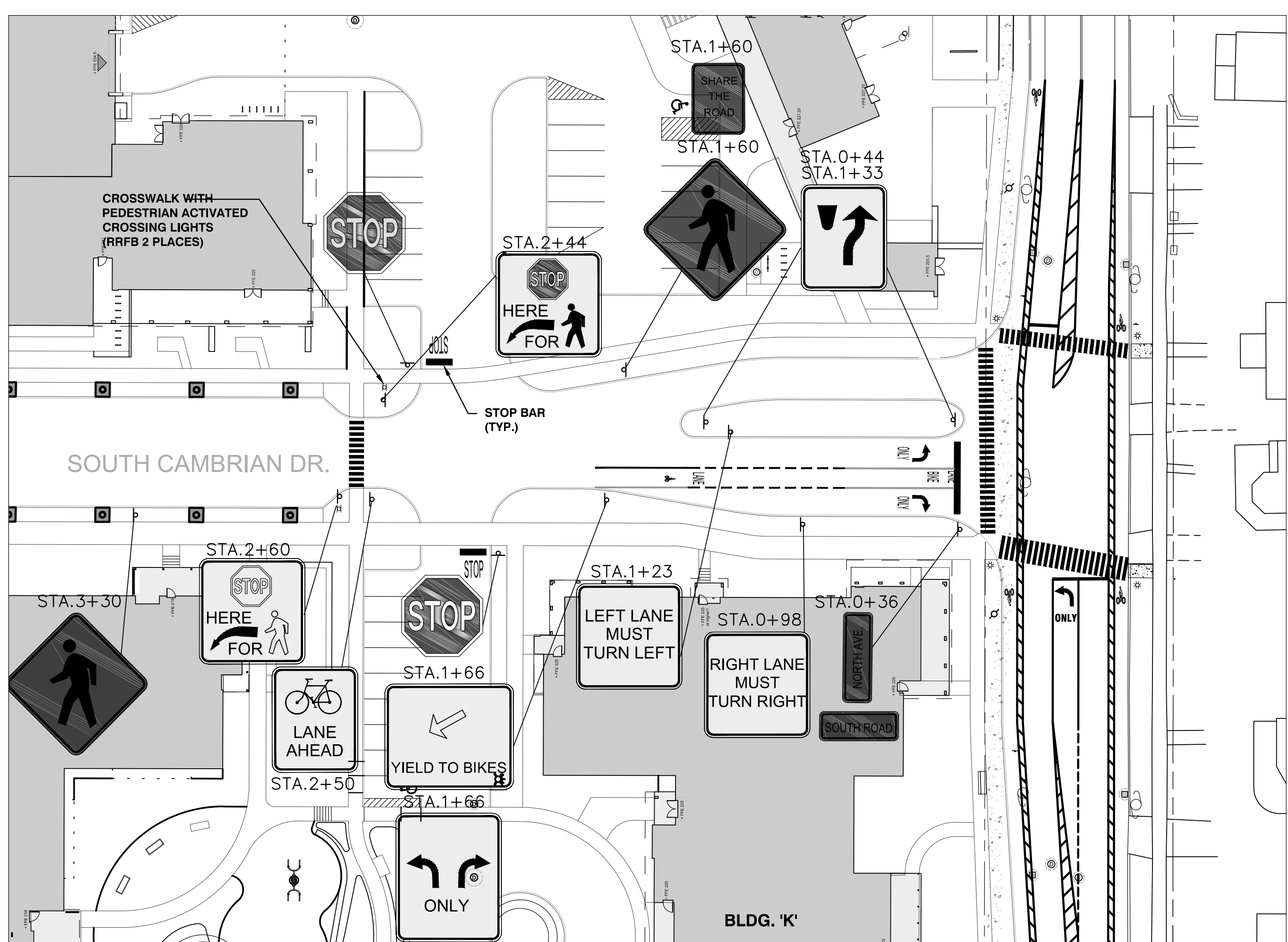
NORTH ROAD & NORTH AVE. INTERSECTION  
SCALE: 1" = 30'



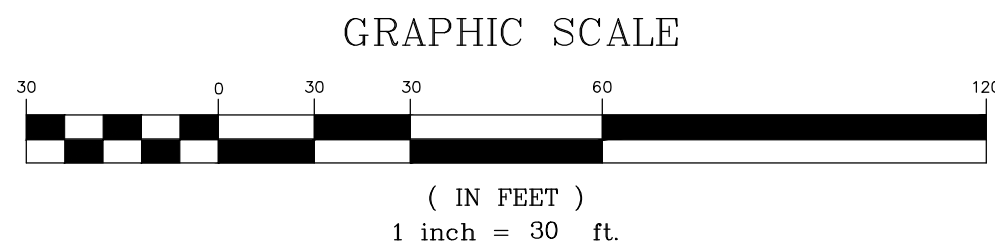
SOUTH ROAD & WEST ROAD INTERSECTION  
SCALE: 1" = 30'



SOUTH ROAD STA. 4+65  
SCALE: 1" = 30'



SOUTH ROAD & NORTH AVE. INTERSECTION  
SCALE: 1" = 30'



PROGRESS PLANS  
11/22/2016

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311 & 329 NORTH AVE.  
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LOCATION MAP

1" = 2000'

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SIGNAGE AND  
STRIPING PLAN

DATE

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SCALE

1" = 30'

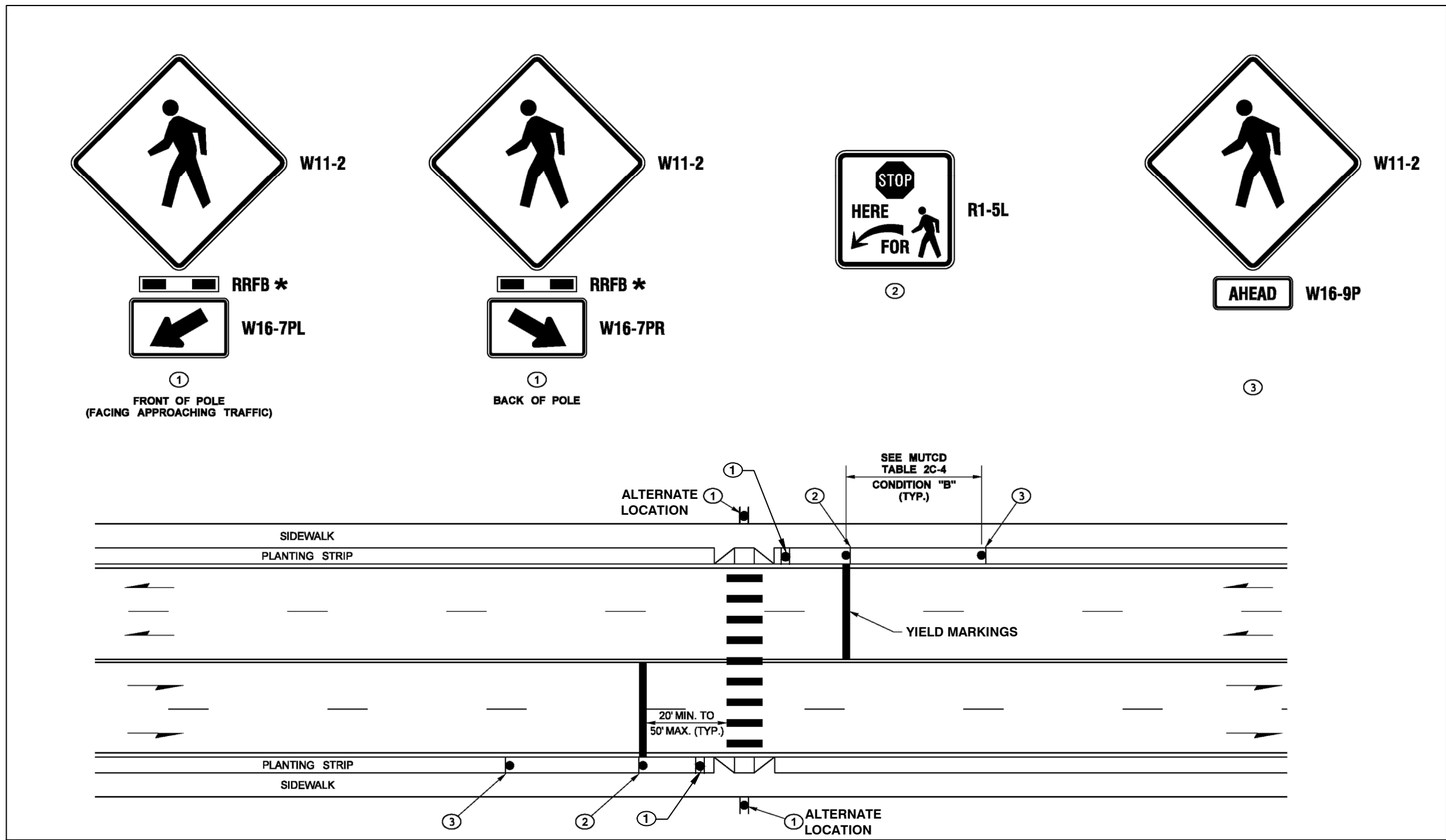
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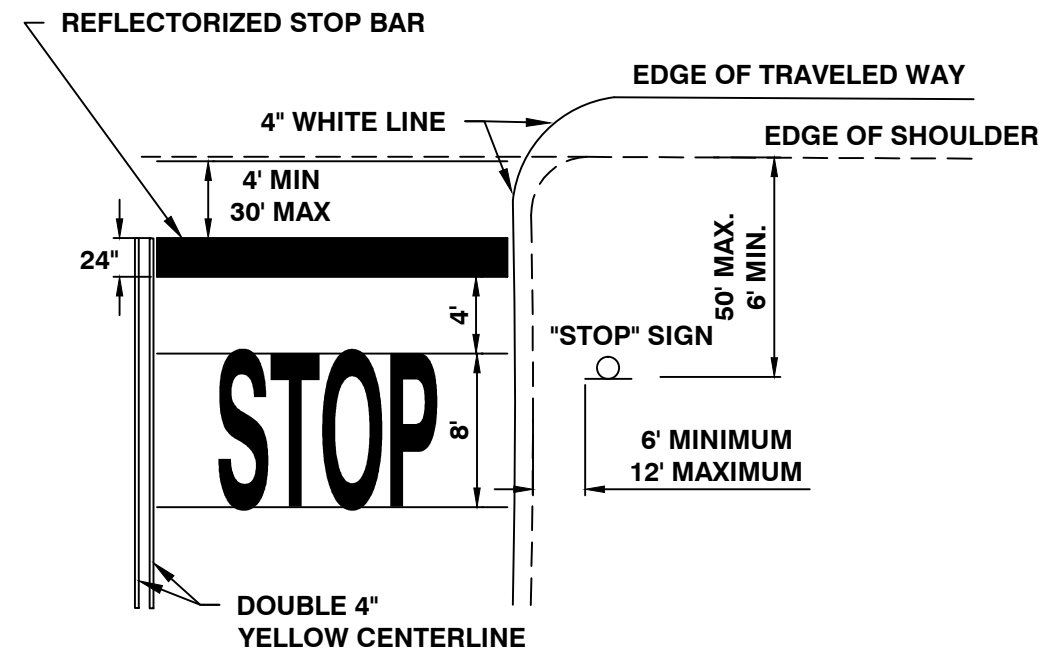
DRAWING NUMBER

C5.1





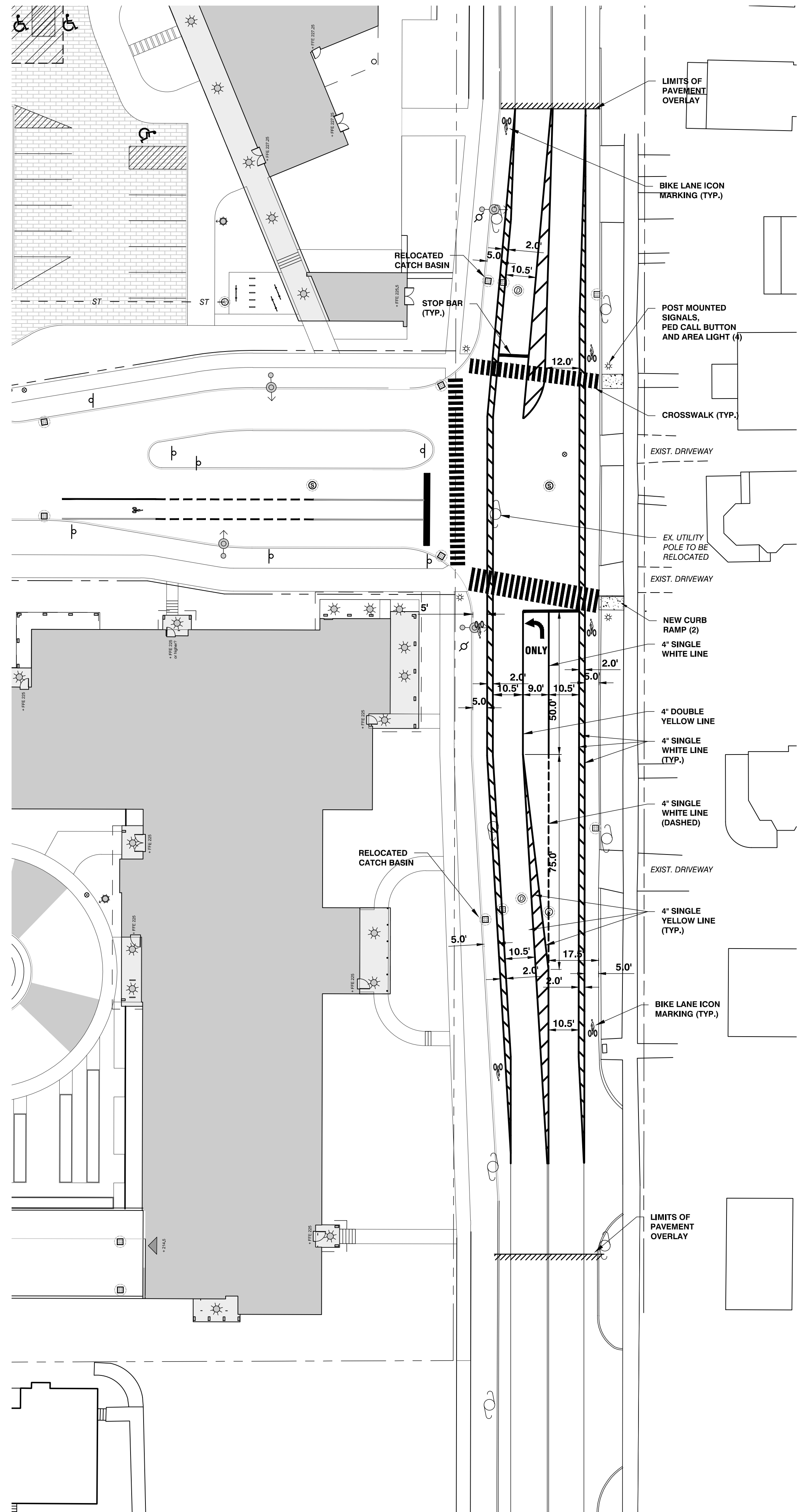
**PEDESTRIAN CROSSING DETAILS**  
N.T.S.



\* THE 'DESIRED STOPPING POINT' IS THE LOCATION BASED ON SITE CONDITIONS THAT BEST ALLOWS THE STOPPED VEHICLE TO VIEW THE APPROACHING TRAFFIC

**STOP BAR LAYOUT**

N.T.S.



**NORTH AVE AND SOUTH CAMBRIAN DRIVE INTERSECTION**

SCALE: 1" = 25'

PROGRESS PLANS  
11/22/2016

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311 & 329 NORTH AVE.  
BURLINGTON, VT



**LOCATION MAP**

1" = 2000'

| DATE | CHECKED | REVISION |
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**SIGNAGE AND STRIPING DETAIL PLAN**

DATE

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SCALE

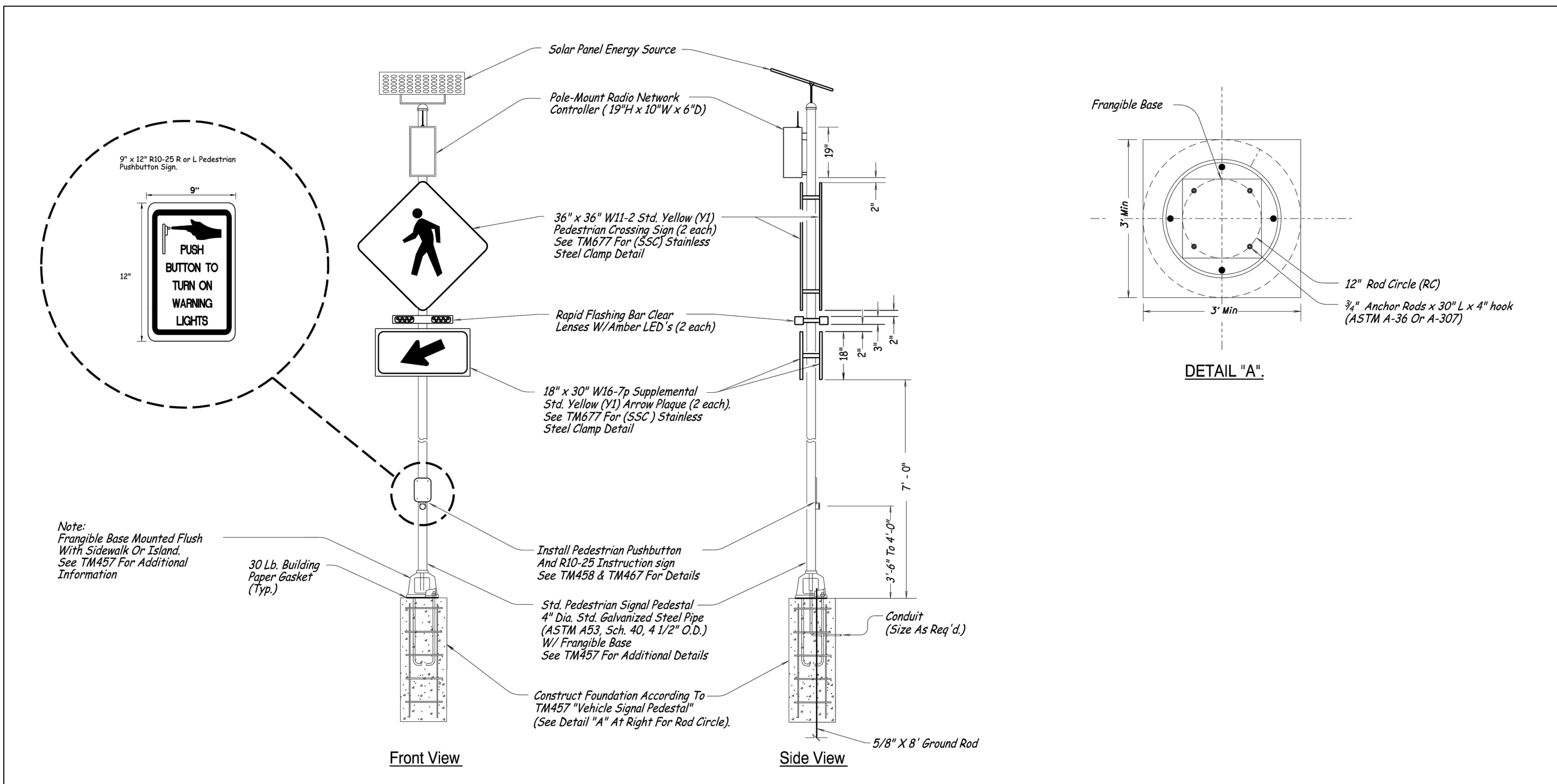
AS SHOWN

PROJ. NO.

14215

DRAWING NUMBER

**C5.2**



**RECTANGULAR RAPID FLASHING BEACONS**

N.T.S.

| Posted or 85th-Percentile Speed | Advance Placement Distance <sup>1</sup>                                      |                     |                                                                                |                     |                     |                     |                     |                     |                     |  |
|---------------------------------|------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|
|                                 | Condition A: Speed reduction and lane changing in heavy traffic <sup>2</sup> |                     | Condition B: Deceleration to the listed advisory speed (mph) for the condition |                     |                     |                     |                     |                     |                     |  |
|                                 | 0 <sup>3</sup>                                                               | 10 <sup>4</sup>     | 20 <sup>4</sup>                                                                | 30 <sup>4</sup>     | 40 <sup>4</sup>     | 50 <sup>4</sup>     | 60 <sup>4</sup>     | 70 <sup>4</sup>     |                     |  |
| 20 mph                          | 225 ft                                                                       | 100 ft <sup>5</sup> | N/A <sup>5</sup>                                                               | —                   | —                   | —                   | —                   | —                   | —                   |  |
| 25 mph                          | 325 ft                                                                       | 100 ft <sup>5</sup> | N/A <sup>5</sup>                                                               | —                   | —                   | —                   | —                   | —                   | —                   |  |
| 30 mph                          | 460 ft                                                                       | 100 ft <sup>5</sup> | N/A <sup>5</sup>                                                               | —                   | —                   | —                   | —                   | —                   | —                   |  |
| 35 mph                          | 565 ft                                                                       | 100 ft <sup>5</sup> | N/A <sup>5</sup>                                                               | N/A <sup>5</sup>    | —                   | —                   | —                   | —                   | —                   |  |
| 40 mph                          | 670 ft                                                                       | 125 ft              | 100 ft <sup>5</sup>                                                            | 100 ft <sup>5</sup> | N/A <sup>5</sup>    | —                   | —                   | —                   | —                   |  |
| 45 mph                          | 775 ft                                                                       | 175 ft              | 125 ft                                                                         | 100 ft <sup>5</sup> | 100 ft <sup>5</sup> | N/A <sup>5</sup>    | —                   | —                   | —                   |  |
| 50 mph                          | 885 ft                                                                       | 250 ft              | 200 ft                                                                         | 175 ft              | 125 ft              | 100 ft <sup>5</sup> | —                   | —                   | —                   |  |
| 55 mph                          | 990 ft                                                                       | 325 ft              | 275 ft                                                                         | 225 ft              | 200 ft              | 125 ft              | N/A <sup>5</sup>    | —                   | —                   |  |
| 60 mph                          | 1,100 ft                                                                     | 400 ft              | 350 ft                                                                         | 325 ft              | 275 ft              | 200 ft              | 100 ft <sup>5</sup> | —                   | —                   |  |
| 65 mph                          | 1,200 ft                                                                     | 475 ft              | 450 ft                                                                         | 400 ft              | 350 ft              | 275 ft              | 200 ft              | 100 ft <sup>5</sup> | —                   |  |
| 70 mph                          | 1,250 ft                                                                     | 550 ft              | 525 ft                                                                         | 500 ft              | 450 ft              | 375 ft              | 275 ft              | 150 ft              | —                   |  |
| 75 mph                          | 1,350 ft                                                                     | 650 ft              | 625 ft                                                                         | 600 ft              | 550 ft              | 475 ft              | 375 ft              | 250 ft              | 100 ft <sup>5</sup> |  |

<sup>1</sup>The distances are adjusted for a sign legibility distance of 160 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

<sup>2</sup>Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2005 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the sign legibility distance of 160 feet for the appropriate sign.

<sup>3</sup>Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2005 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second<sup>2</sup>, minus the sign legibility distance of 160 feet.

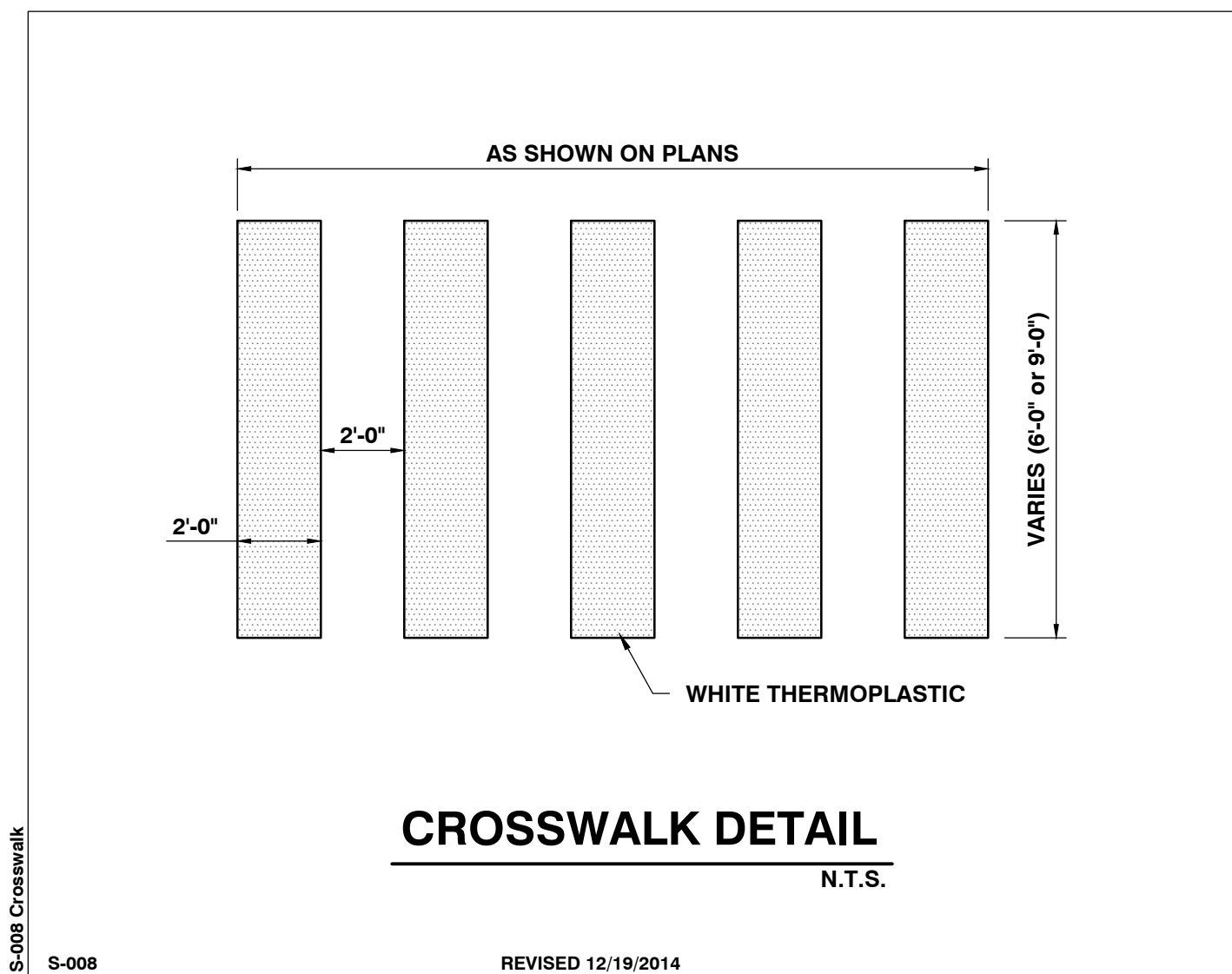
<sup>4</sup>Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second<sup>2</sup>, minus the sign legibility distance of 250 feet.

<sup>5</sup>No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.

<sup>6</sup>The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.

**TABLE 2C-4**

N.T.S.



**CROSSWALK DETAIL**

N.T.S.

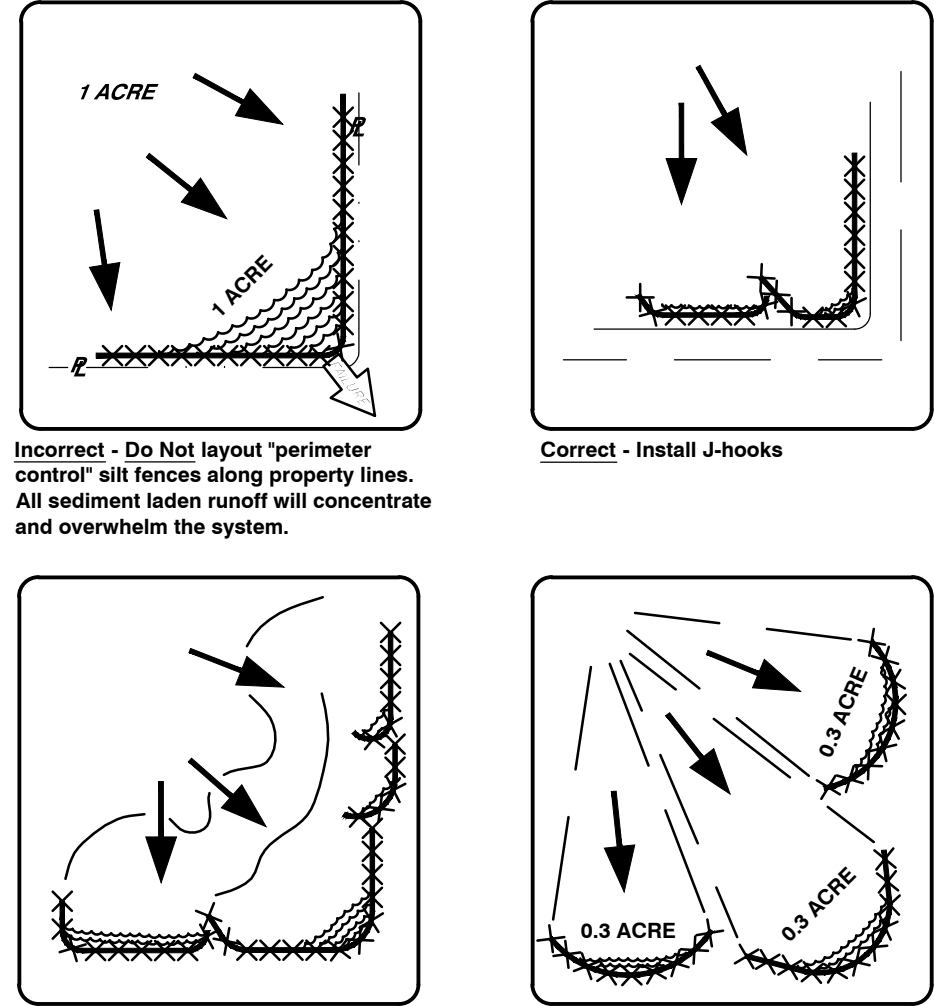






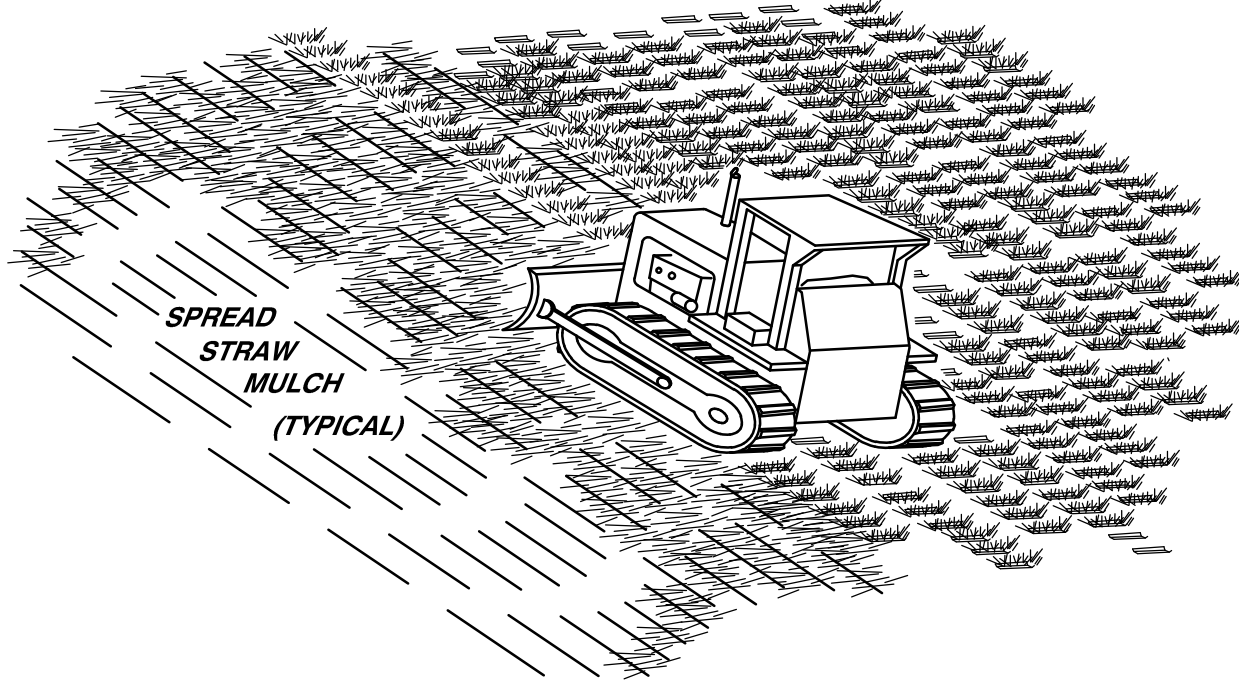
P:\AWC\AWC Projects\0114\0114 C-010 Silo C-010 Silo.dwg (12/20/2014) 12:15:00 PM

E-010 Silo Fence Perimeter Control



### SILT FENCE PLACEMENT FOR PERIMETER CONTROL

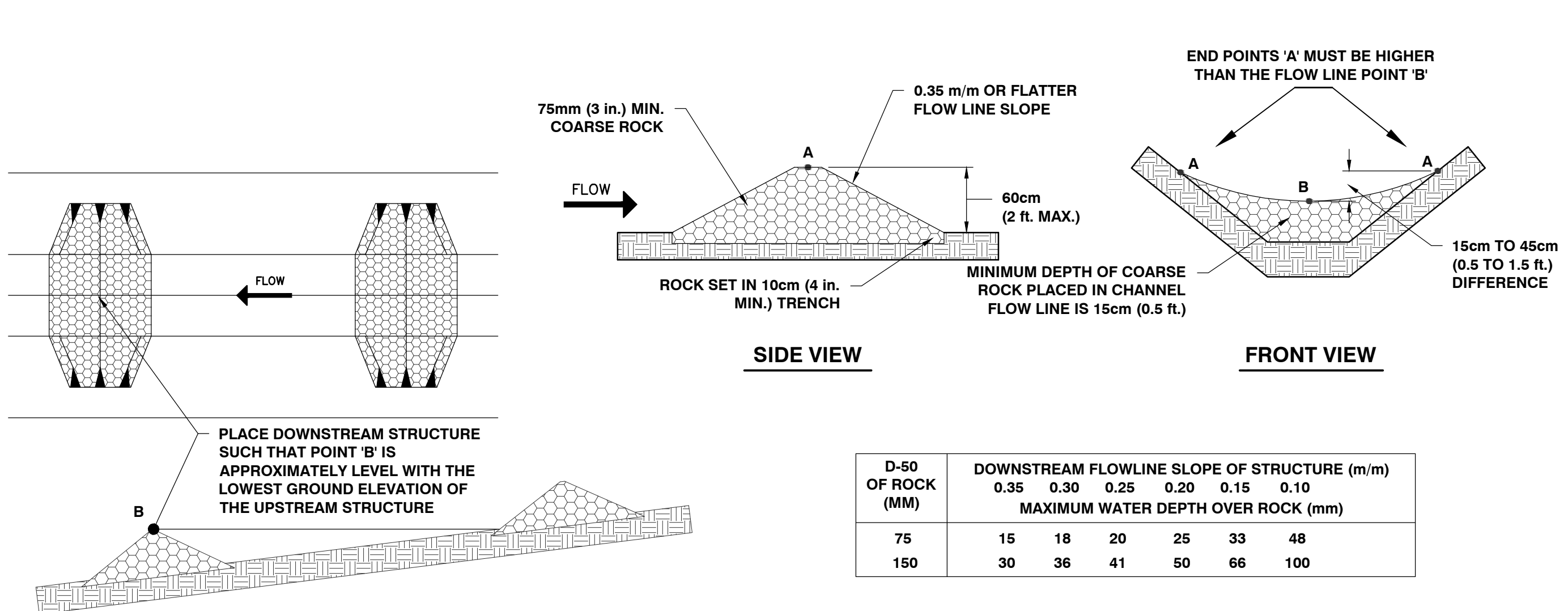
E-010 REVISED 12/19/2014 N.T.S.



- NOTES:
1. ROUGHEN SLOPE WITH BULLDOZER.
  2. BROADCAST SEED AND FERTILIZER.
  3. SPREAD STRAW MULCH 3" (2½ TONS PER ACRE)
  4. PUNCH STRAW MULCH INTO SLOPE BY RUNNING BULLDOZER UP AND DOWN SLOPE.

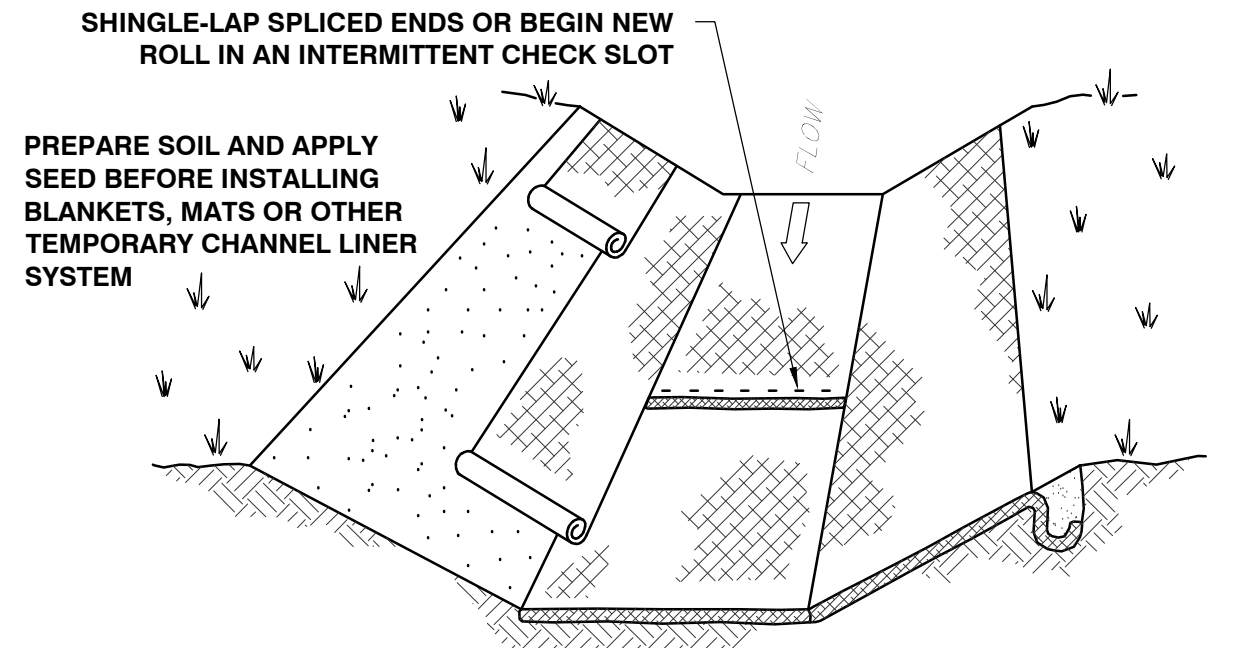
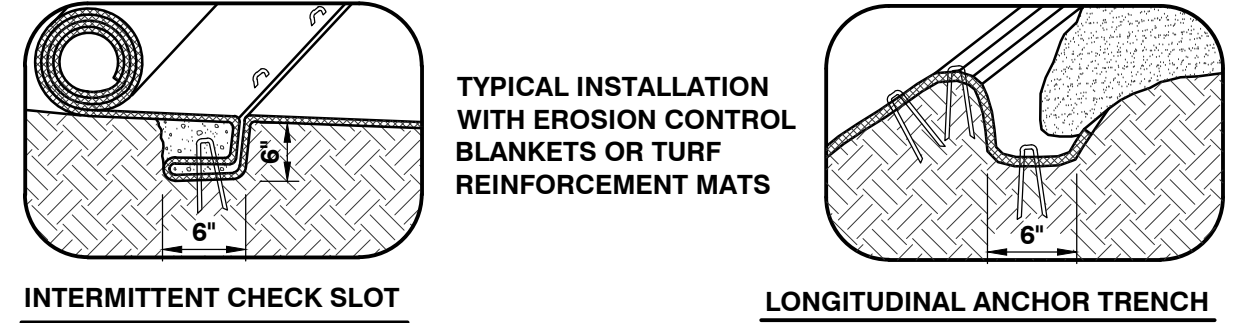
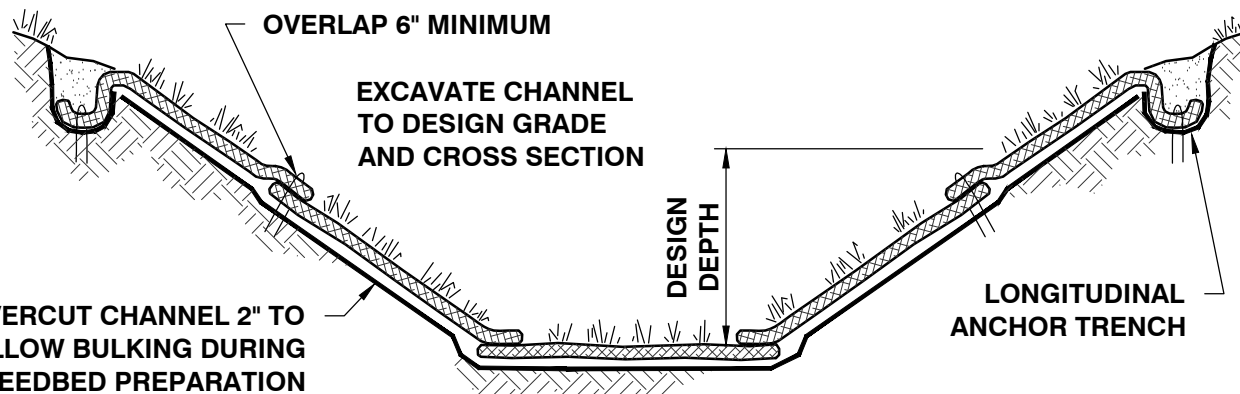
### STRAW ANCHORING

E-012 REVISED 12/19/2014



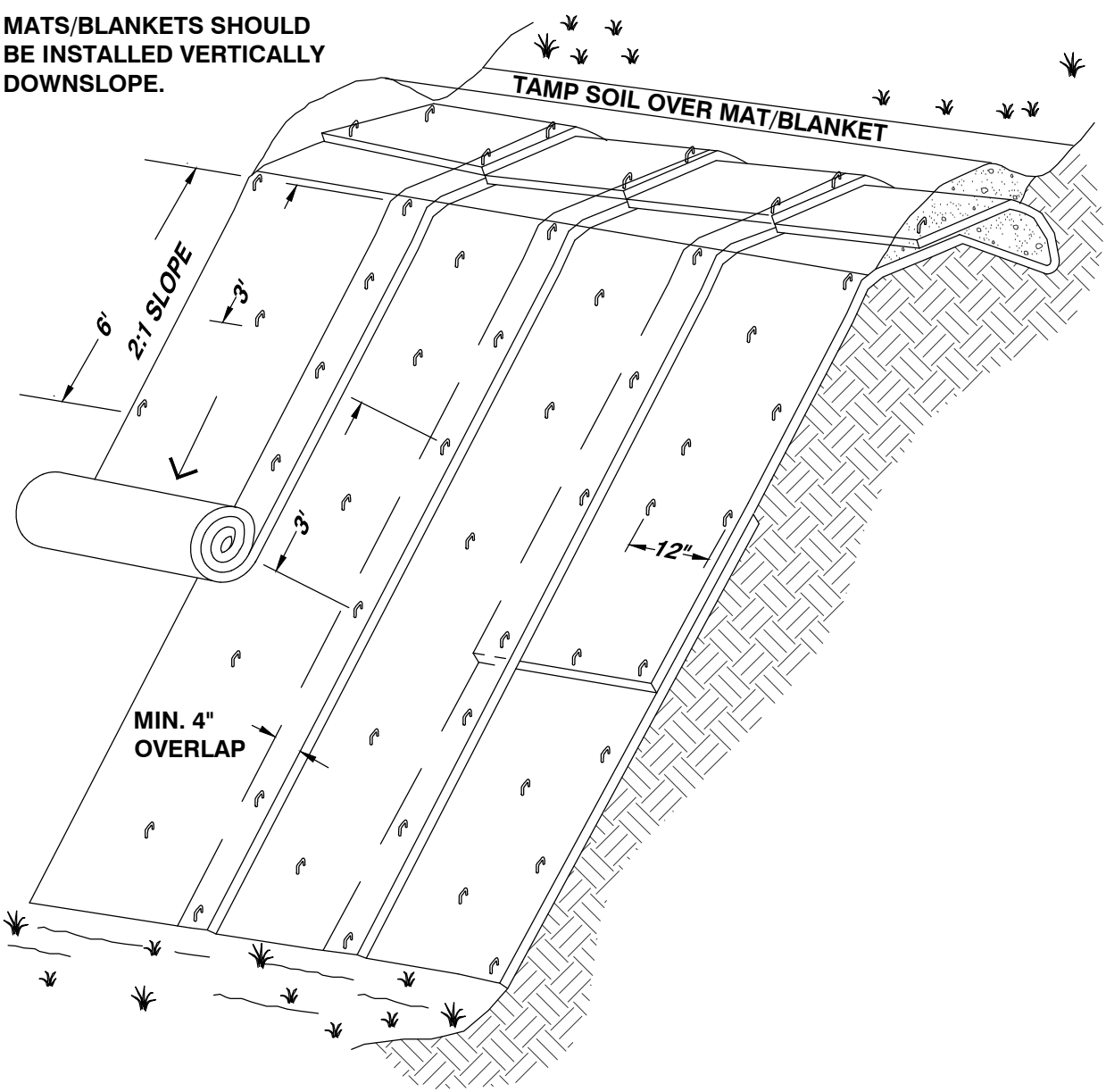
### STONE CHECK DAM STRUCTURE

E-006 REVISED 08/01/2014



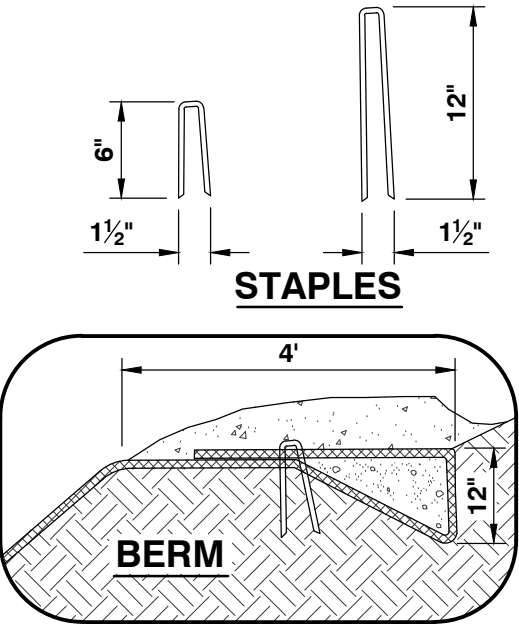
### GRASS-LINED CHANNEL TYPICAL INSTALLATION

E-011 REVISED 12/19/2014



### ISOMETRIC VIEW

### TYPICAL SLOPE SOIL STABILIZATION



- NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLOUDS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
  2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
  3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

### EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

E-009 REVISED 08/01/2014

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05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

DATE CHECKED REVISION

EPSC DETAILS & SPECIFICATIONS

DATE

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NONE

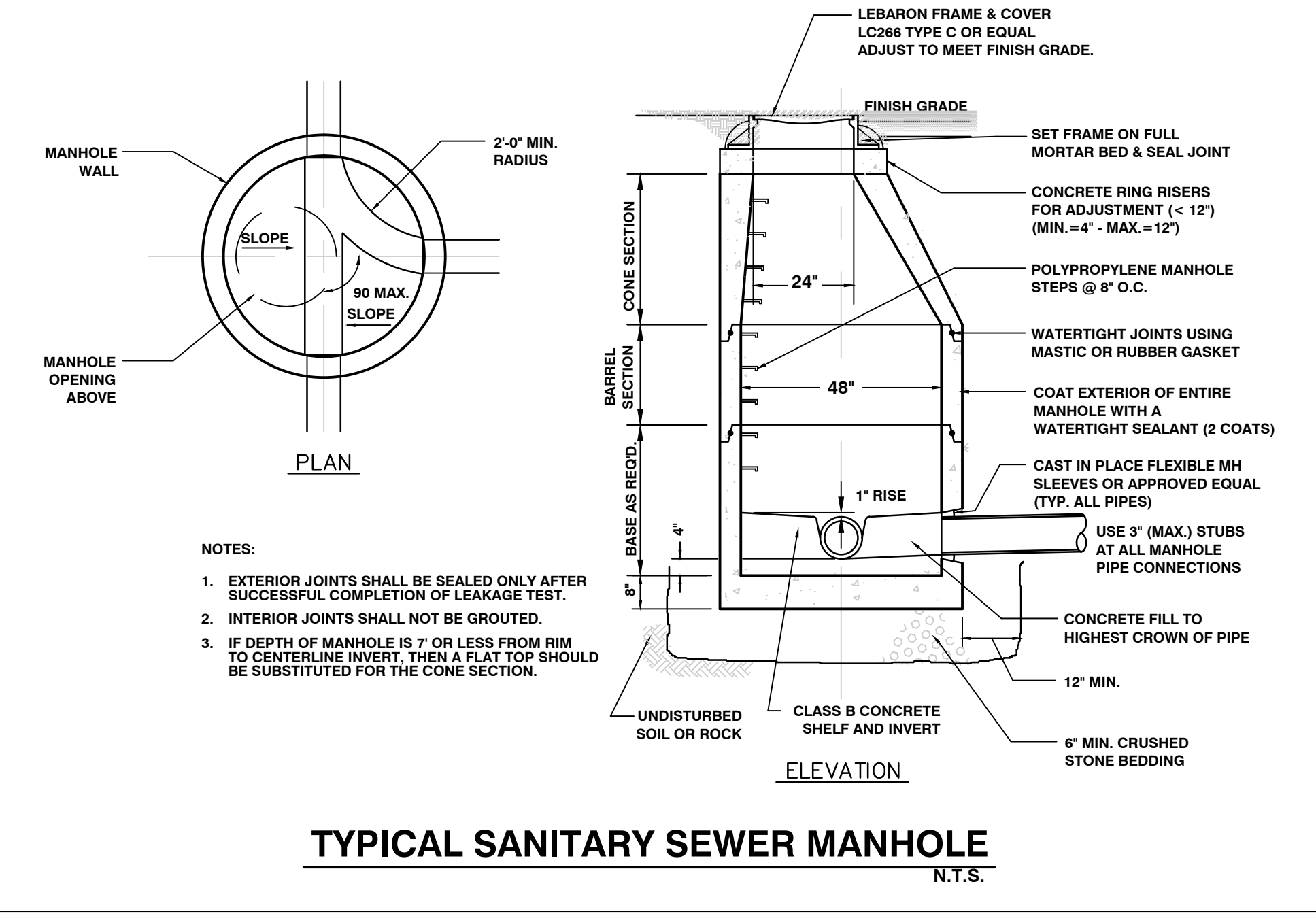
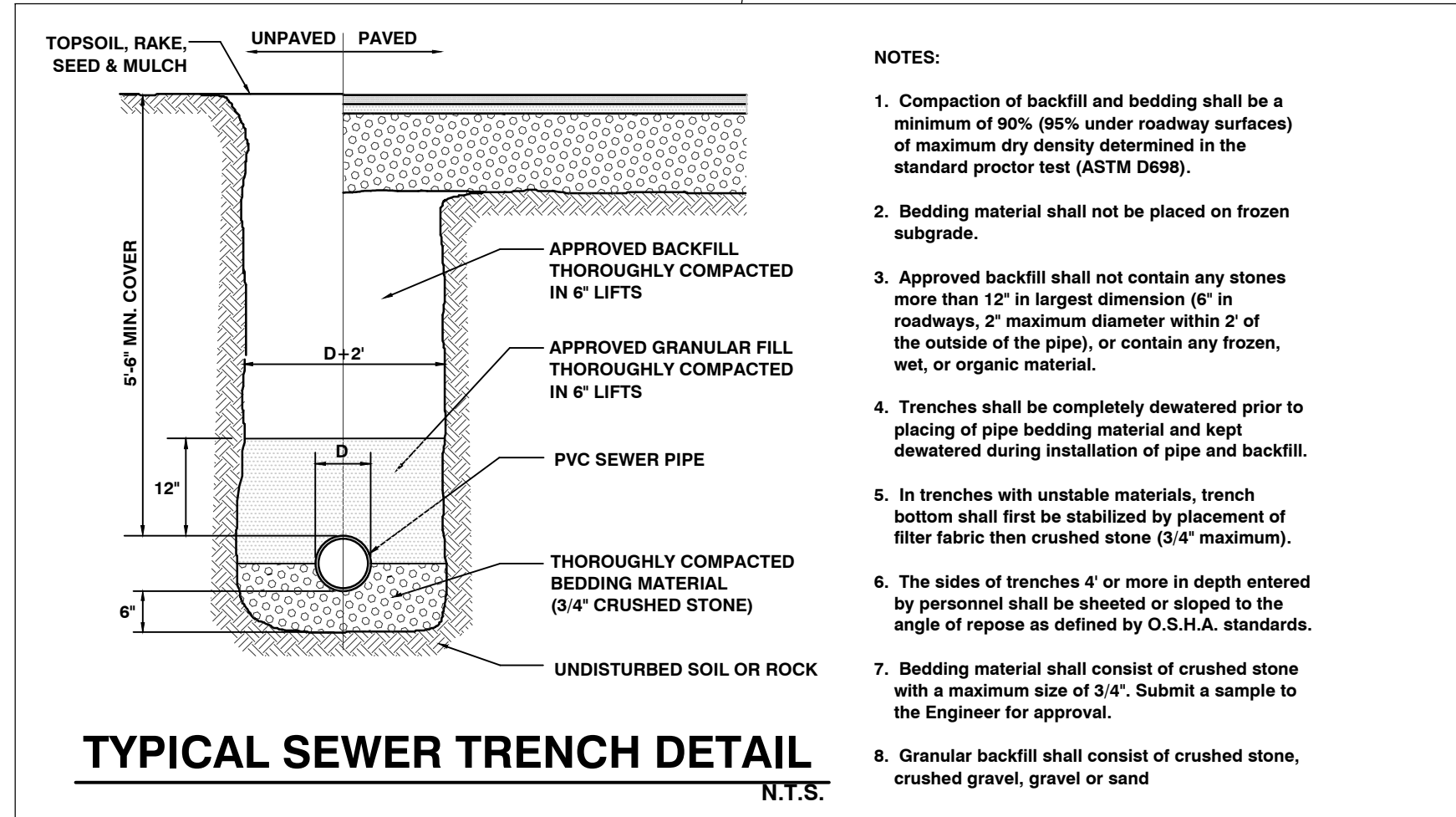
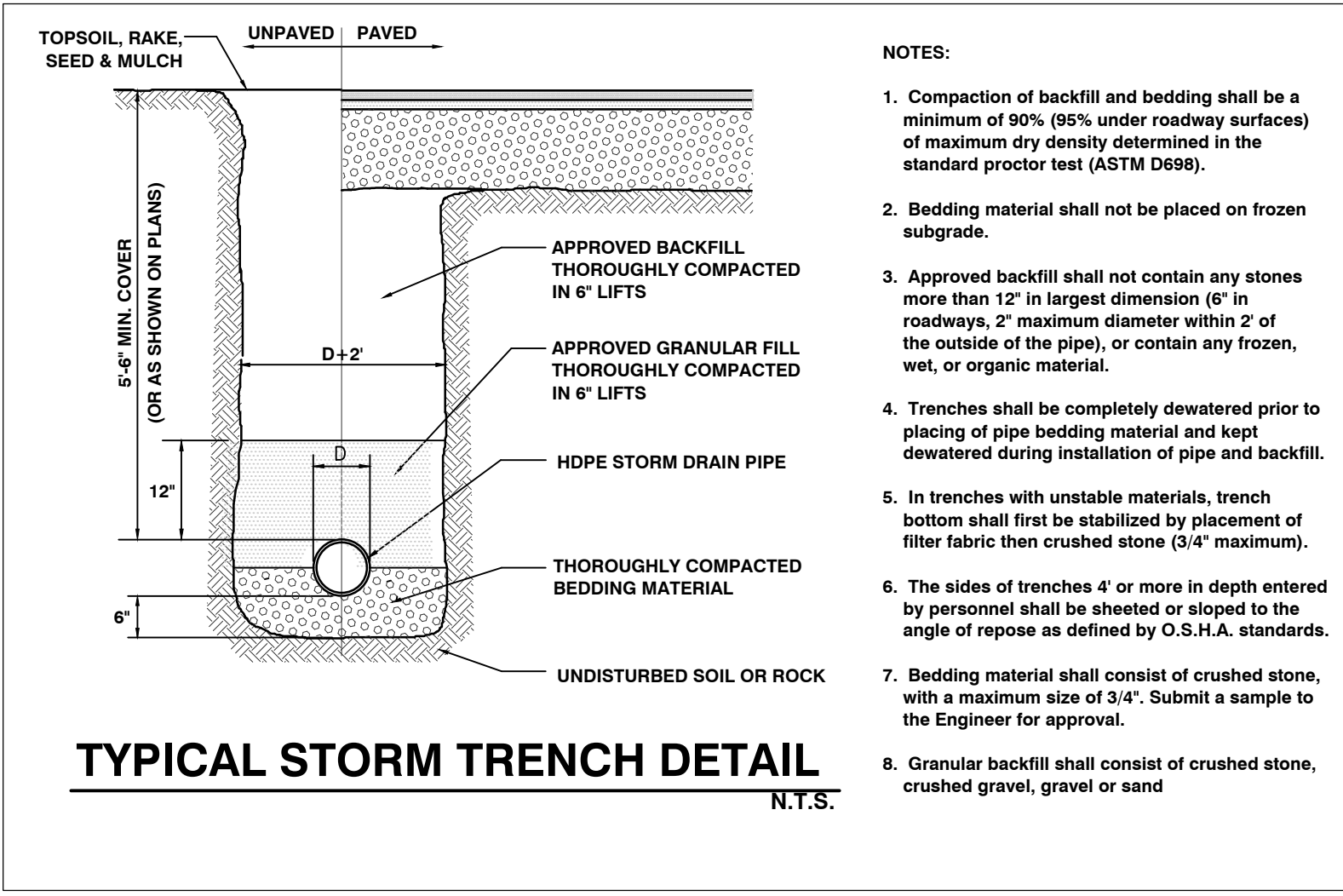
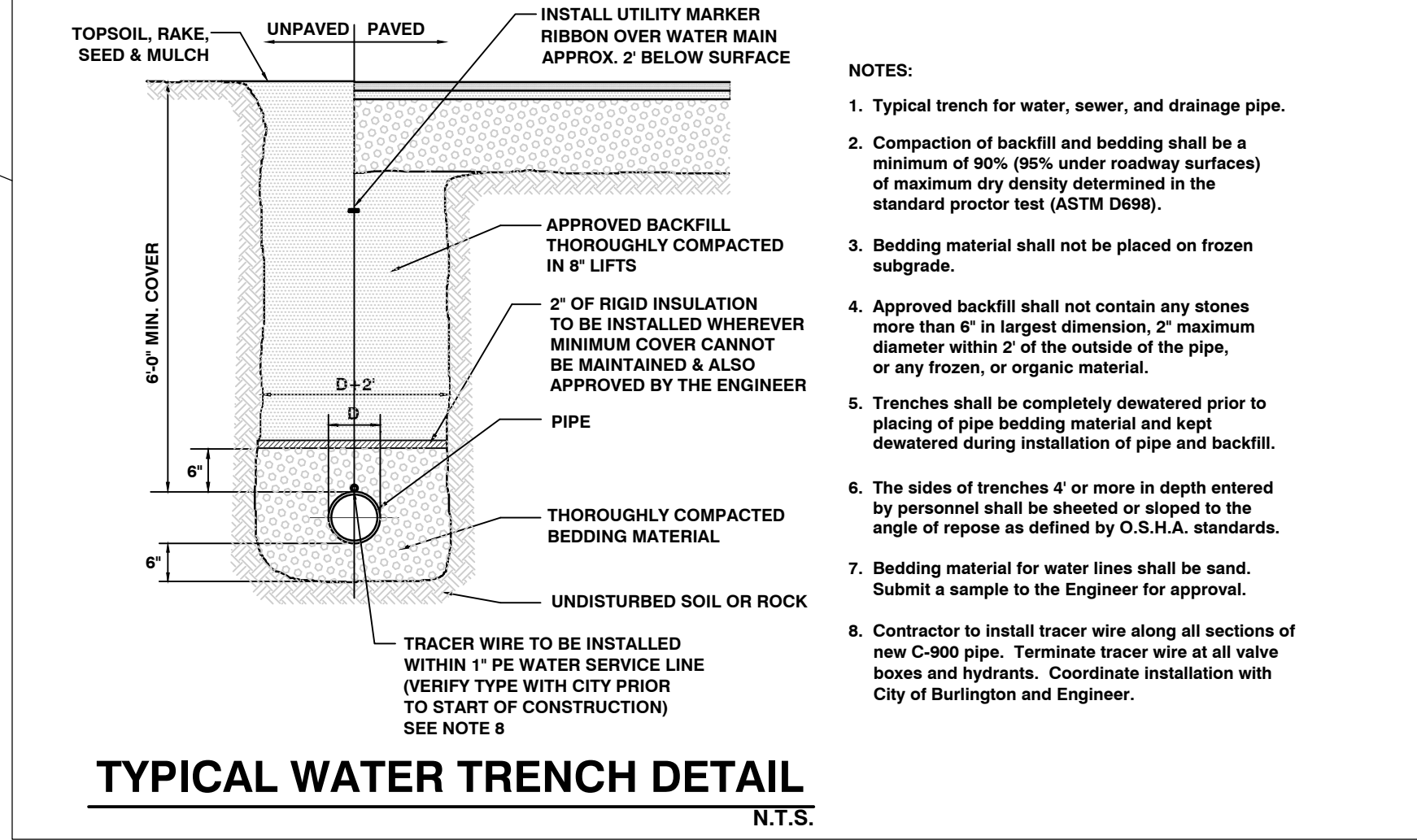
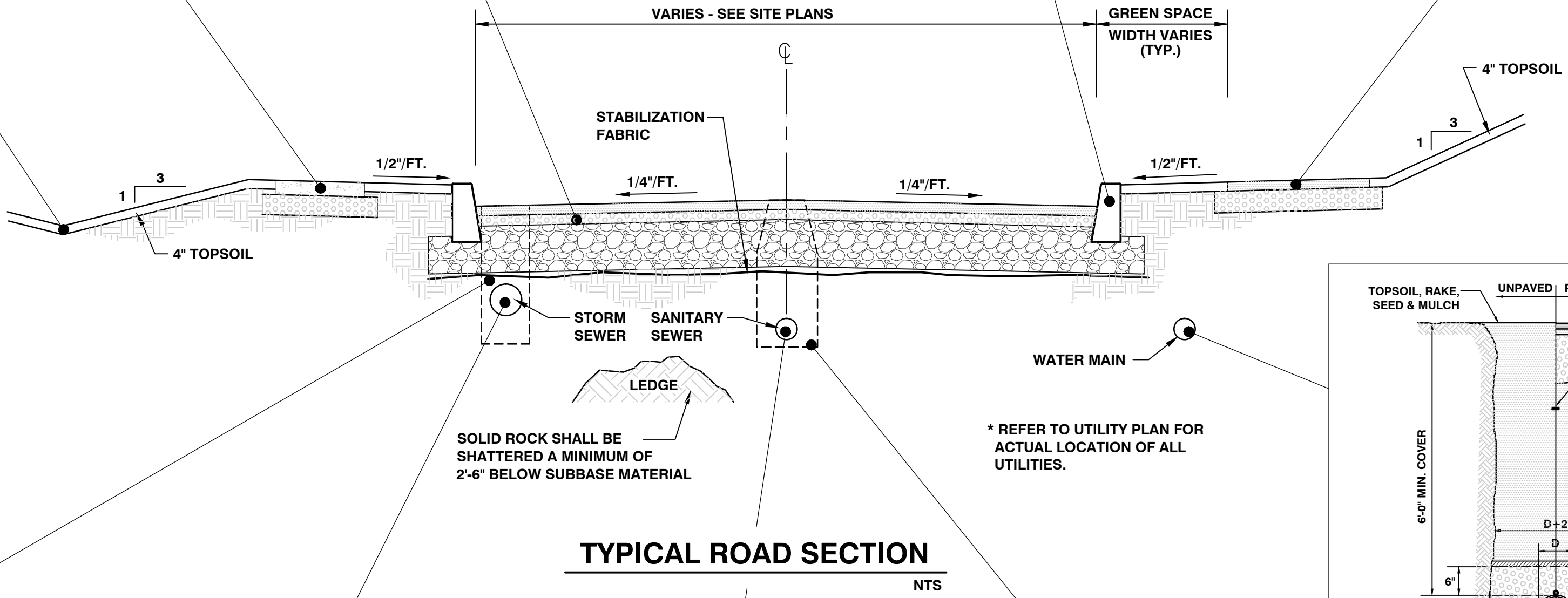
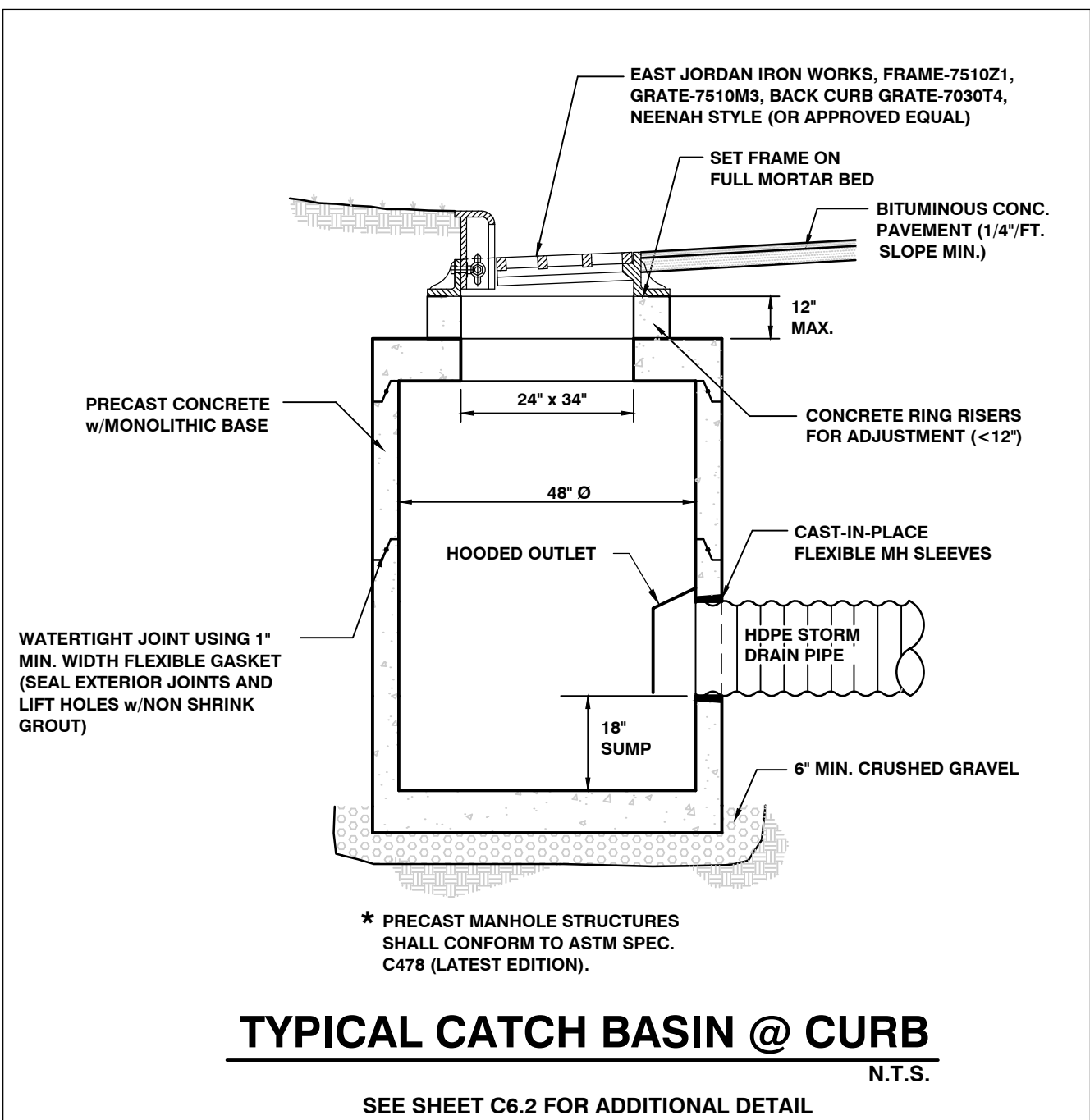
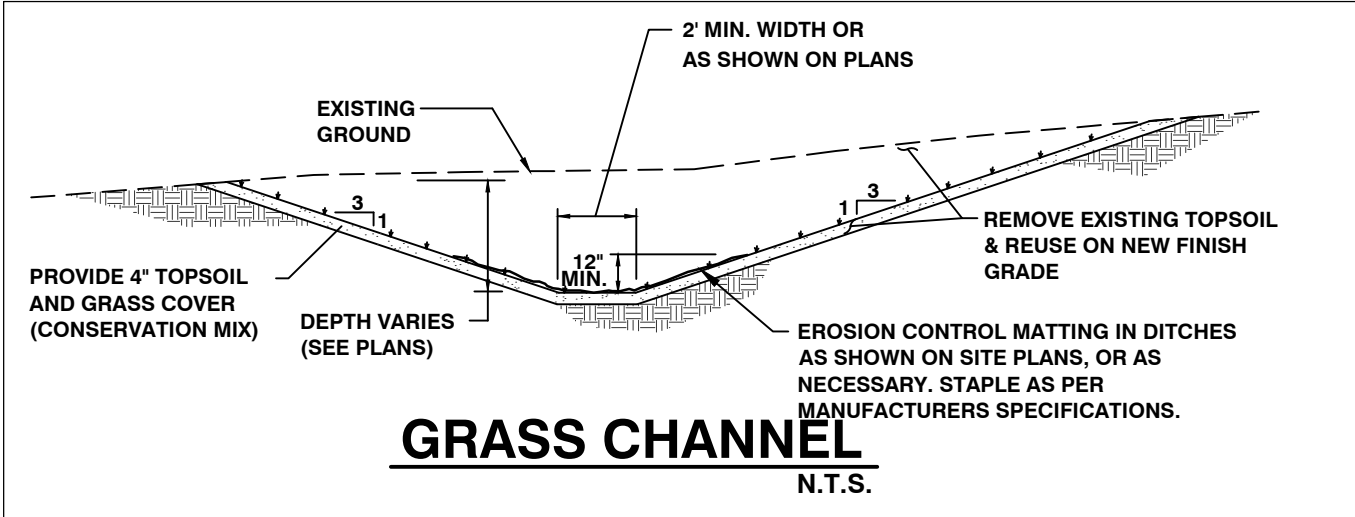
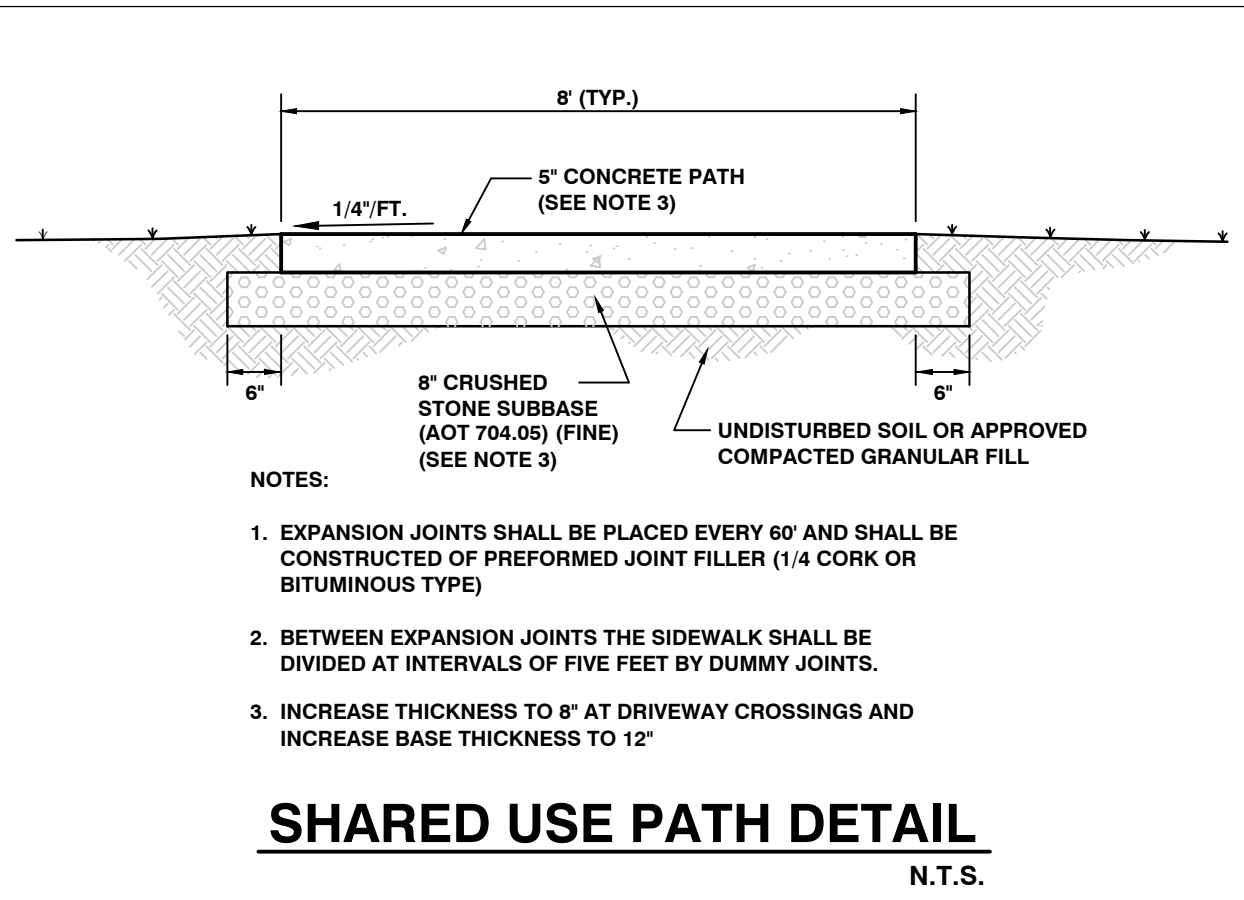
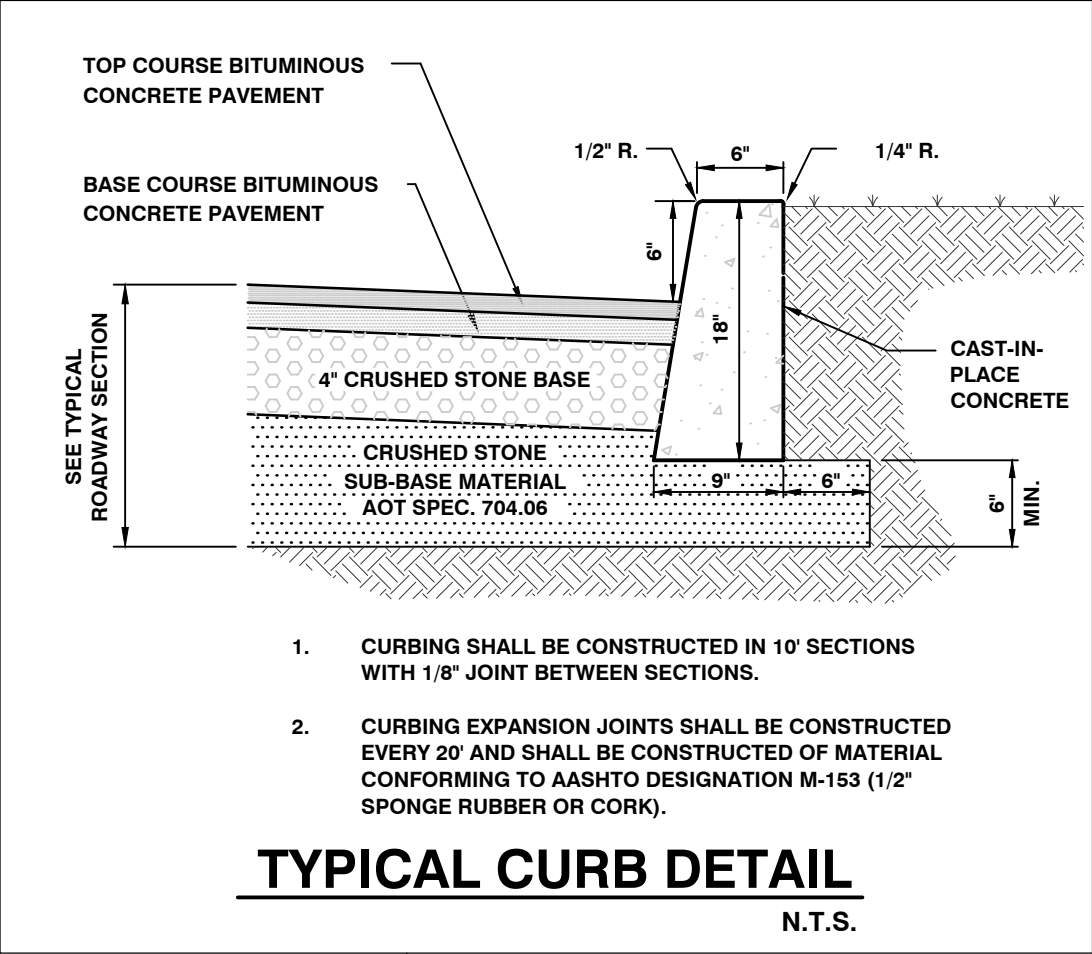
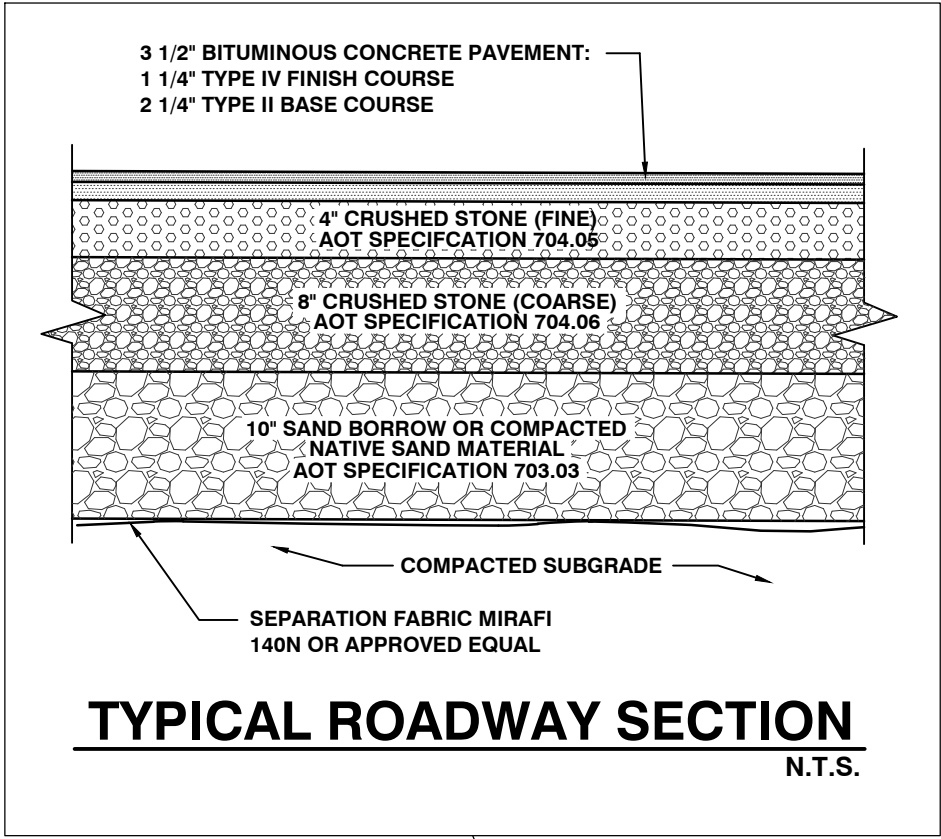
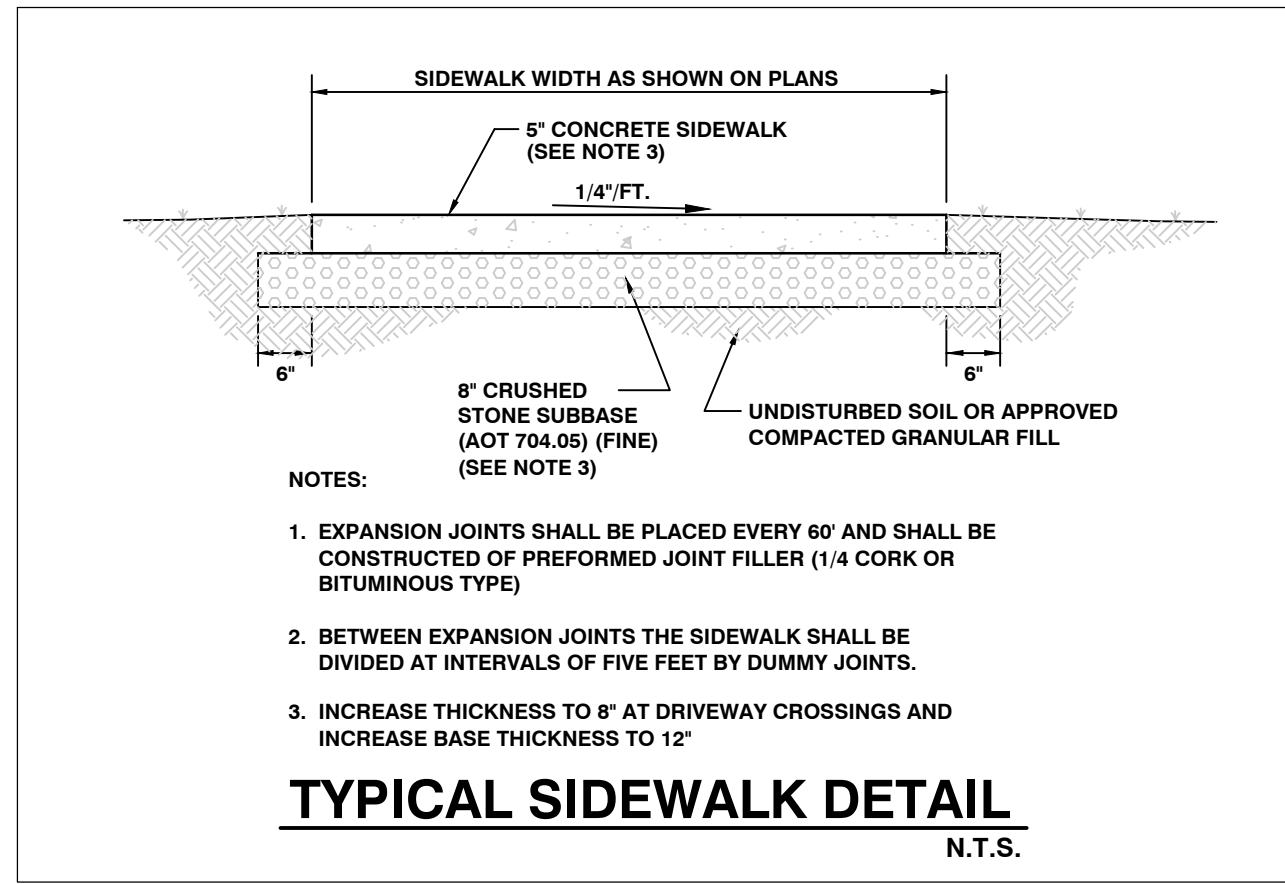
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PROJECT:  
  
CAMBRIAN RISE  
  
311 & 329 NORTH AVE.  
BURLINGTON, VT

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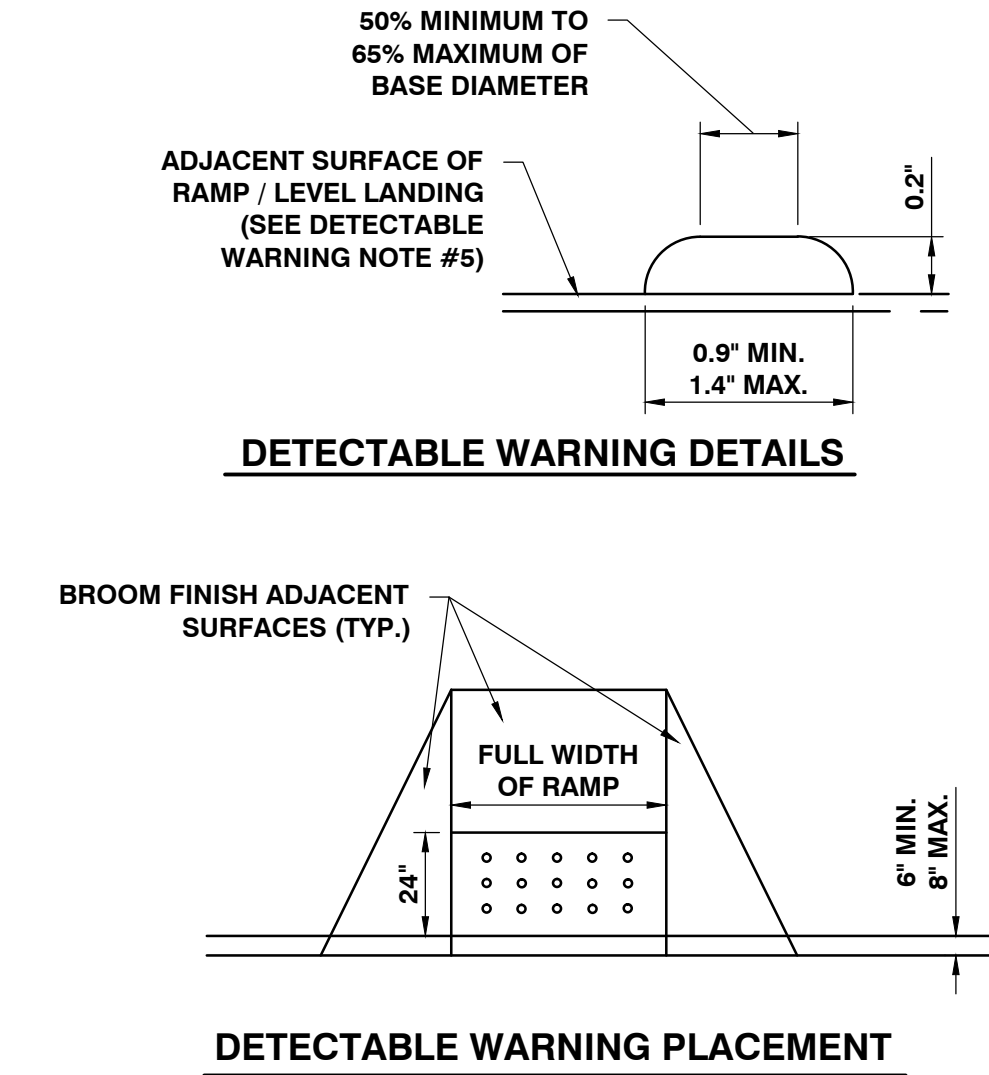
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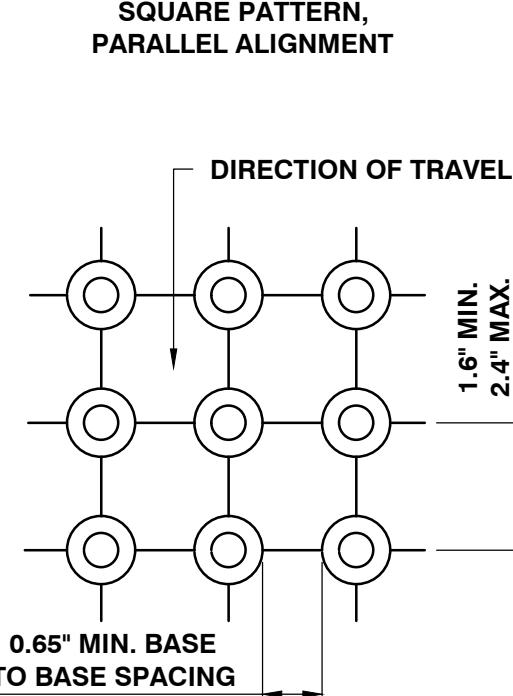
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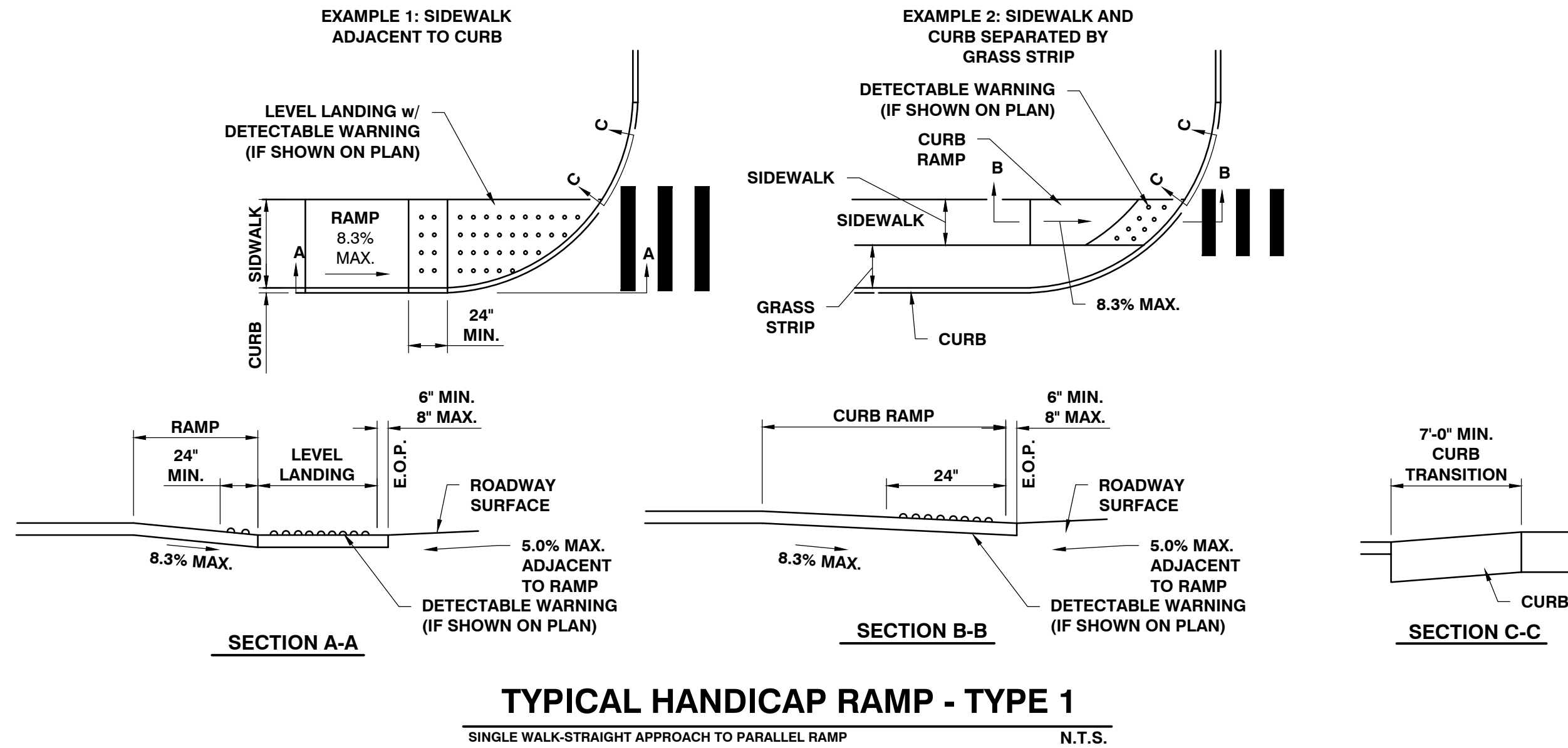
REVISED 08/01/2014

#### DETECTABLE WARNING NOTES

1. DETECTABLE WARNING SURFACES SHALL BE PAID FOR AS SPECIFIED IN THE CONTRACT.
2. CONCRETE ADJACENT TO ALL DETECTABLE WARNINGS SHALL HAVE A BROOM FINISH.
3. THE COLOR OF THE DETECTABLE WARNING SHALL PROVIDE A VISUAL CONTRAST TO THE SURROUNDING SURFACE AND SHALL BE AS SPECIFIED IN THE DOCUMENTS.
4. TRUNCATED DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF PEDESTRIAN TRAVEL.
5. FOR SURFACE APPLIED TRUNCATED DOME PRODUCTS, A MAXIMUM 0.25" VERTICAL CHANGE IN LEVEL IS ALLOWED. FOR CHANGES IN LEVEL BETWEEN 0.25" AND 0.50", A BEVEL WITH A MAXIMUM 1:2 SLOPE IS REQUIRED. CHANGES IN LEVEL GREATER THAN 0.50" MUST BE TREATED AS A RAMP - 8.3% MAXIMUM SLOPE.
6. SEE THE TOWN FOR A LIST OF ACCEPTABLE DETECTABLE WARNINGS MANUFACTURERS FOR ANY WARNINGS TO BE INSTALLED WITHIN THE PUBLIC RIGHT-OF-WAY.



M-002 HC Ramp 1



REVISED 08/01/2014

M-004 HC Ramp Notes

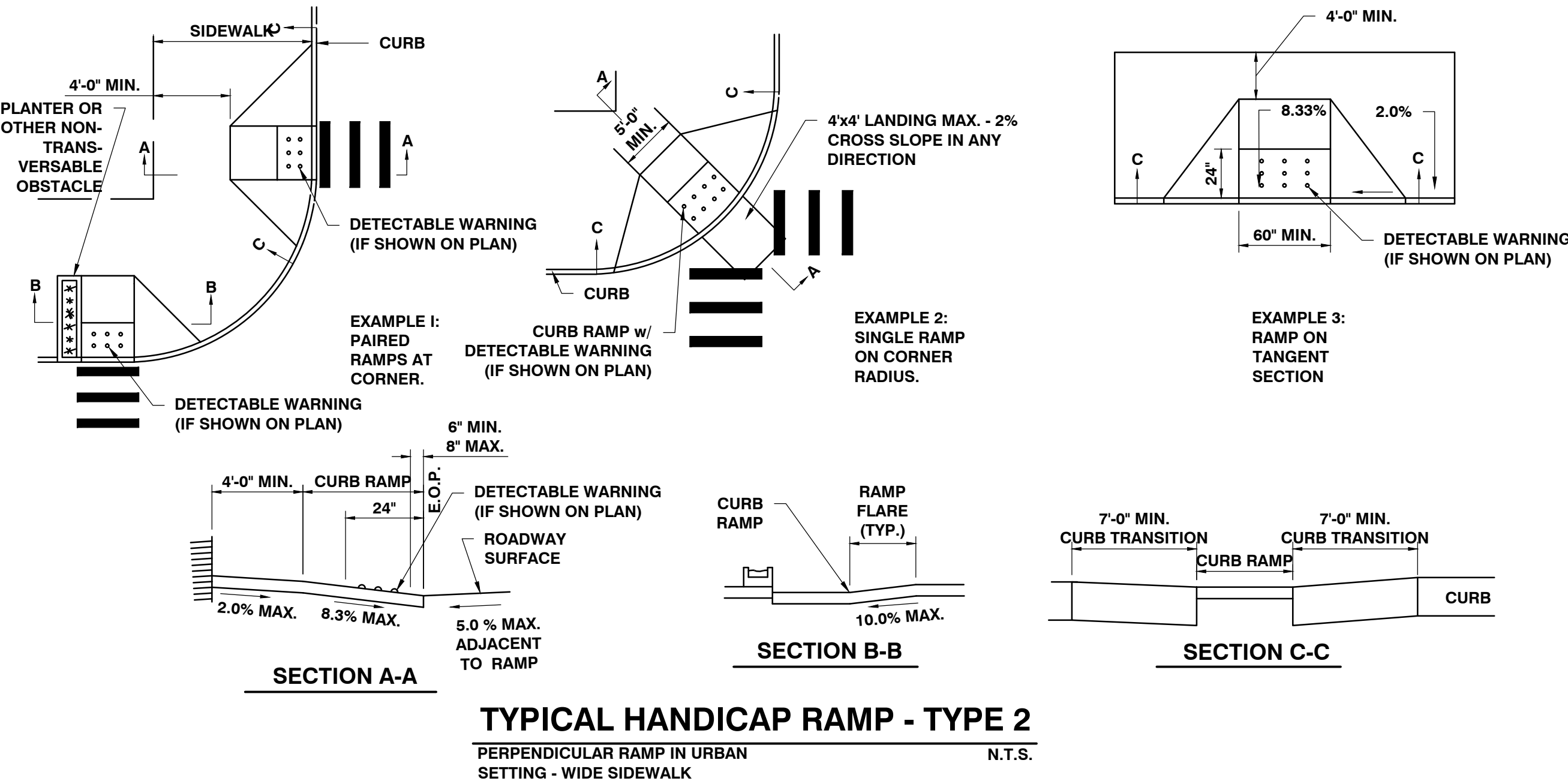
1. THE DIMENSIONS AND GRADES SHOWN ON THIS STANDARD WILL BE ADHERED TO IN THE DESIGN AND THE CONSTRUCTION OF SIDEWALK RAMPS. WHERE SIDEWALKS RUN ADJACENT TO ROADWAYS ON STEEP (5% OR GREATER) GRADES, RAMP GRADES WILL BE AS FLAT AS POSSIBLE. (ON LOW SIDE OF DRIVES AND INTERSECTING SIDE STREETS, RAMPS SHALL SLOPE TOWARDS DRIVE OR SIDE STREET @ 2%)
2. NOMINAL RAMP DIMENSIONS: RAMP WIDTH - 5'-0" MINIMUM RAMP SLOPE - 8.3% MAXIMUM FLARE SLOPE - 10% MAXIMUM RAMP CROSS SLOPE - 2.0% MAXIMUM
3. A LEVEL LANDING (NO GREATER THAN 2.0% SLOPE IN ANY DIRECTION) SHALL BE PROVIDED AT THE TOP OF SIDEWALK RAMPS TO ALLOW FOR STOPPING AND MANEUVERING OF WHEELCHAIRS.
4. LEVEL LANDINGS AT THE BOTTOM OF PERPENDICULAR RAMPS SHALL BE WHOLLY CONTAINED WITHIN MARKED CROSSWALKS.
5. DUMMY JOINTS SHALL BE PROVIDED AT TRANSITIONS (GRADE CHANGES) AT TOPS AND BOTTOMS OF RAMPS AND FLARES.
6. VERTICAL DROP-OFF EDGES TO RAMPS WILL NOT BE BUILT UNLESS THE RAMP ADJOINS THE ROADWAY.
7. NO VERTICAL "LIP" OR "CURB REVEAL" WILL BE PROVIDED WHERE THE RAMP ADJOINS THE ROADWAY.
8. AT MARKED CROSSWALKS, THE FULL WIDTH OF THE RAMP OR LANDING SHALL BE CONTAINED WITHIN THE PAVEMENT MARKINGS.
9. WHERE POSSIBLE, RAMP FLARES SHOULD BE LOCATED OUTSIDE THE DIRECT LINE OF TRAVEL MOST LIKELY TO BE FOLLOWED BY THE VISUALLY IMPAIRED.
10. SIGNS, POLES, PLANTERS, MAILBOXES, ETC. SHALL NOT BE LOCATED WHERE THEY WILL INTERFERE WITH THE USE OF SIDEWALK RAMPS.
11. WHERE POSSIBLE, SIDEWALK RAMPS SHOULD NOT BE LOCATED WHERE USERS MUST CROSS DROP INLET GRATES, MANHOLE COVERS OR OTHER ACCESS LIDS. IF THIS CANNOT BE AVOIDED THEN GRATE DESIGN AND PLACEMENT SHALL CONFORM TO ADA REQUIREMENTS.
12. CURB DRAINAGE SHOULD BE CONSTRUCTED SO AS TO PRECLUDE THE FLOW OF WATER PAST THE SIDEWALK RAMP.
13. WHEREVER FEASIBLE, TWO SIDEWALK RAMPS ARE RECOMMENDED IN PREFERENCE TO A SINGLE RAMP.
14. JOINTS WILL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT SIDEWALK SPECIFICATIONS, HOWEVER EXPANSION JOINTS WITHIN THE SIDEWALK RAMP AREA WILL BE AVOIDED WHEREVER POSSIBLE.
15. SIDEWALKS THAT ARE LESS THAN 5' WIDE REQUIRE 5' WIDE BY 5' LONG PASSING AREAS (NO GREATER THAN 2.0% CROSS SLOPE) AT INTERVALS NOT TO EXCEED 200 FEET.
16. E.O.P. = EDGE OF PAVEMENT
17. THE PUBLIC SIDEWALK CURB RAMP STANDARDS DEPICTED HERE MAY NOT BE APPROPRIATE FOR ALL LOCATIONS. FIELD CONDITIONS AT INDIVIDUAL LOCATIONS MAY REQUIRE SPECIFIC DESIGNS. DESIGNS MUST BE CONSISTENT WITH THE PROVISIONS OF THIS SHEET TO THE MAXIMUM EXTENT FEASIBLE ON ALTERATION PROJECTS AND WHEN STRUCTURALLY PRACTICABLE ON NEW CONSTRUCTION PROJECTS AS REQUIRED BY THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.
18. ALL AREAS OF SIDEWALK RAMPS SHALL HAVE EXPOSED AGGREGATE.

### HANDICAP RAMP NOTES

N.T.S.

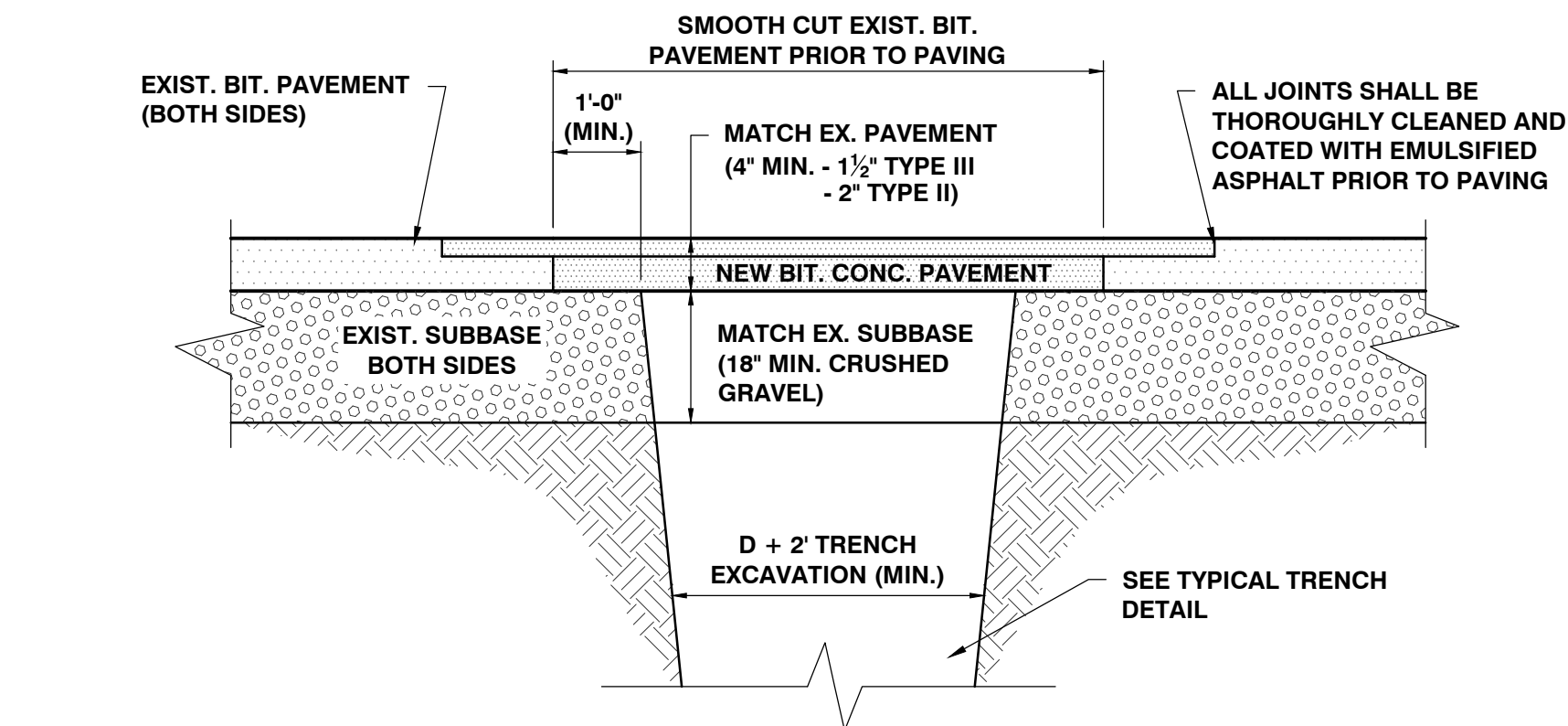
REVISED 08/01/2014

M-003 HC Ramp 2



REVISED 11/21/2016

S-005 Replace Ex. Pav



#### NOTES:

1. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE-WAY TRAFFIC AT ALL TIMES DURING WORK WITHIN THE R.O.W.
2. MAINTENANCE AND PROTECTION OF TRAFFIC DURING WORK WITHIN THE HIGHWAY R.O.W. SHALL BE PROVIDED IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL NOT WORK WITHIN THE R.O.W. WITHOUT APPROPRIATE CONSTRUCTION SIGNING IN PLACE.
3. ALL BACKFILL SHALL BE MADE IN SIX INCH (6") LIFTS AND COMPACTED TO NOT LESS THAN 95% MAXIMUM DRY DENSITY ACCORDING TO ASTM D698.
4. REPLACE EXISTING ROAD STRIPING AS NECESSARY.

### REPLACEMENT OF EXISTING PAVEMENT

N.T.S.

REVISED 09/29/2014

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PROJECT:

**CAMBRIAN RISE**

311 & 329 NORTH AVE.  
BURLINGTON, VT

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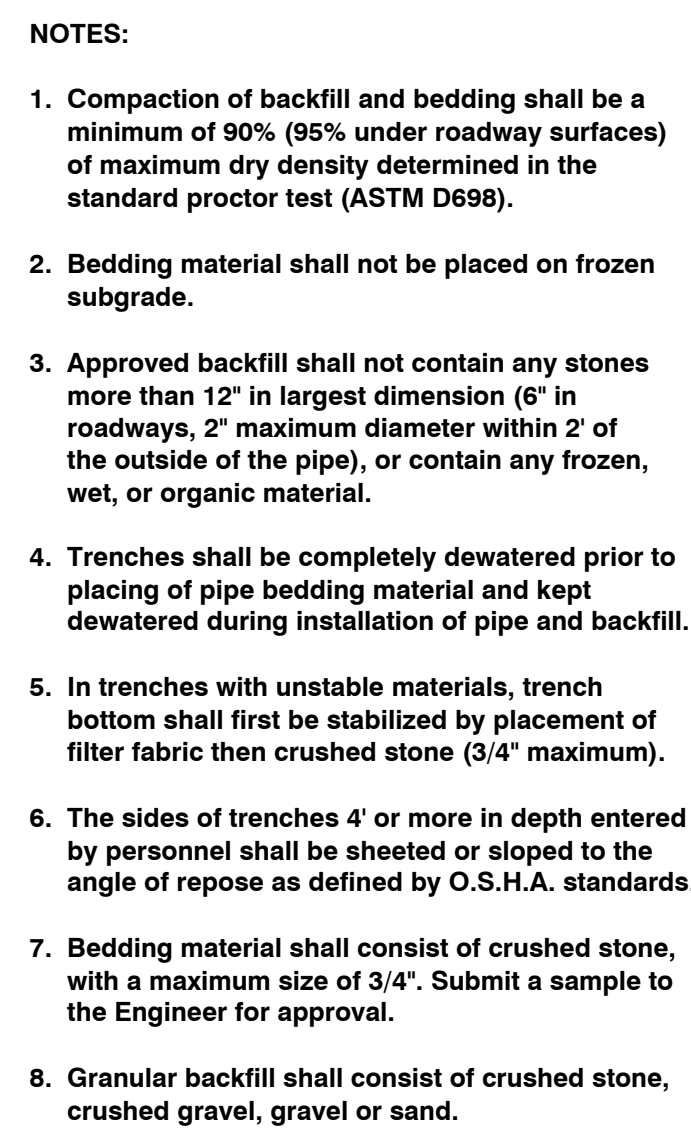
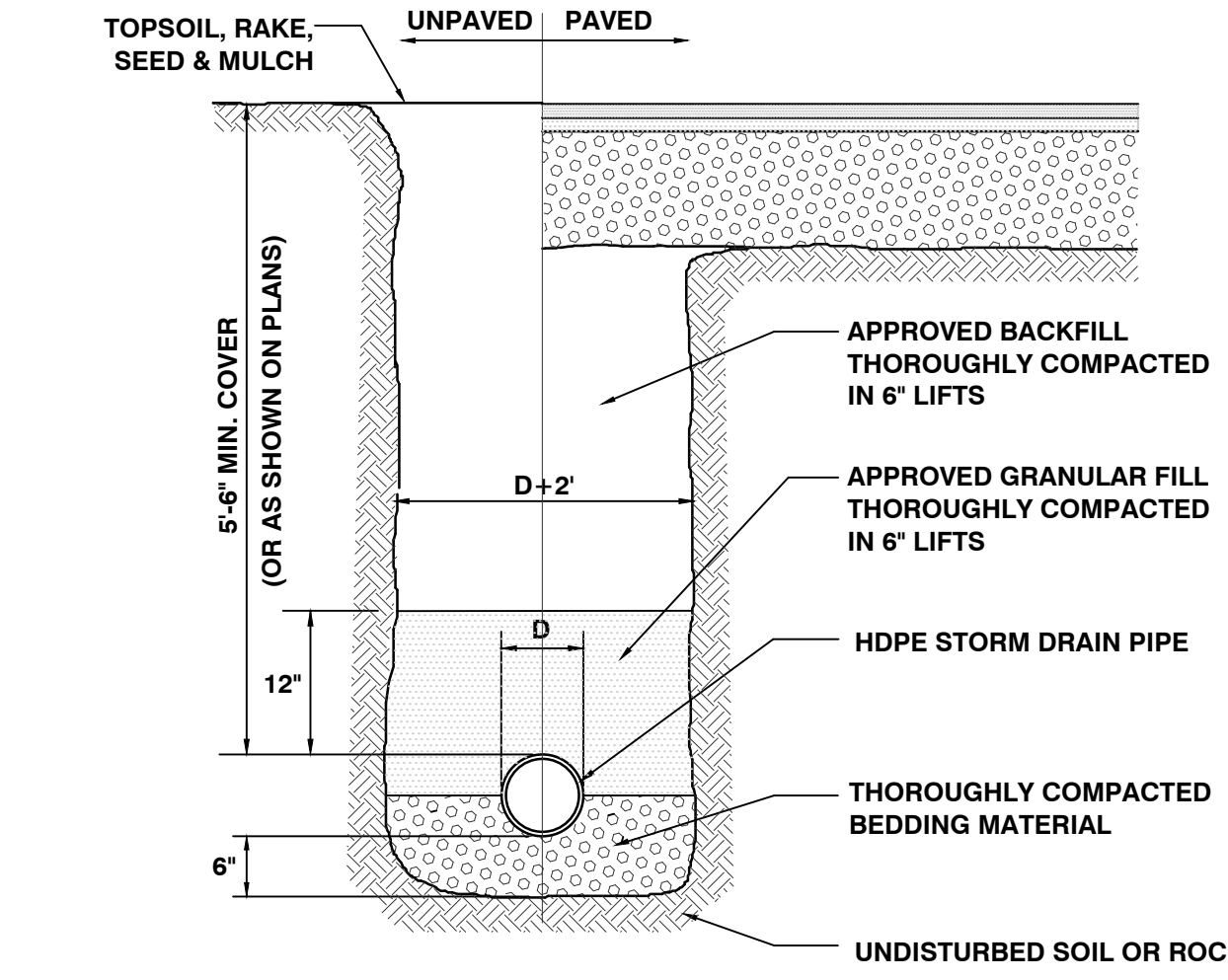
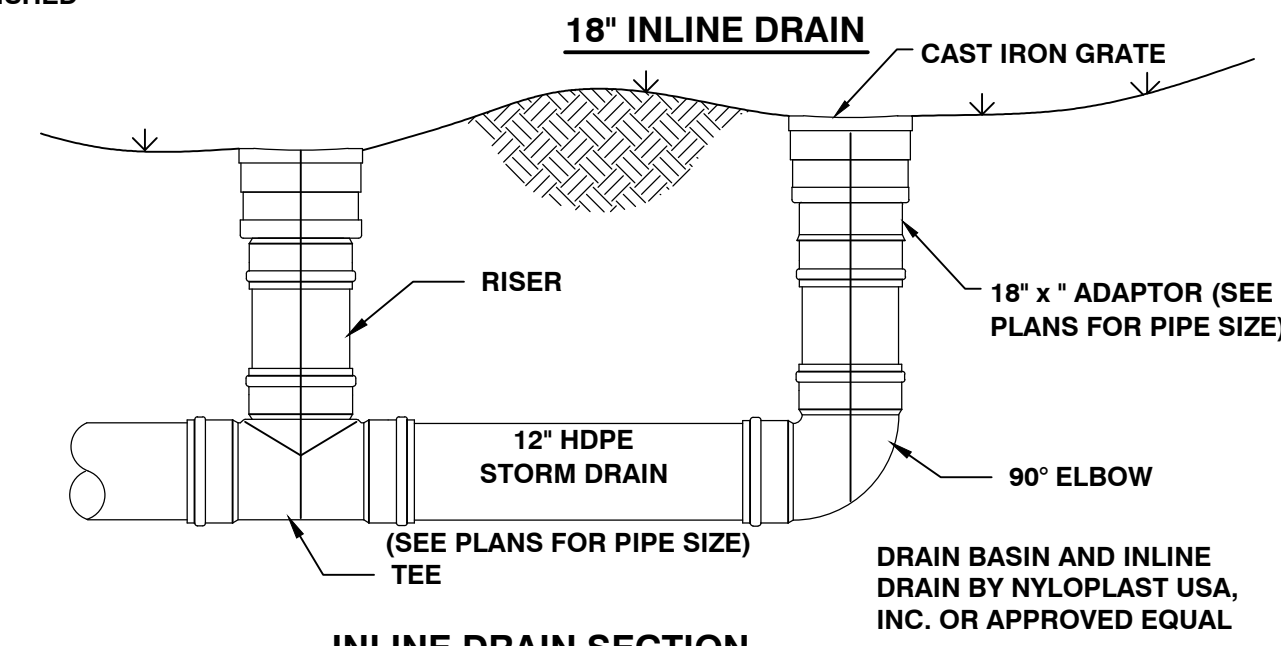
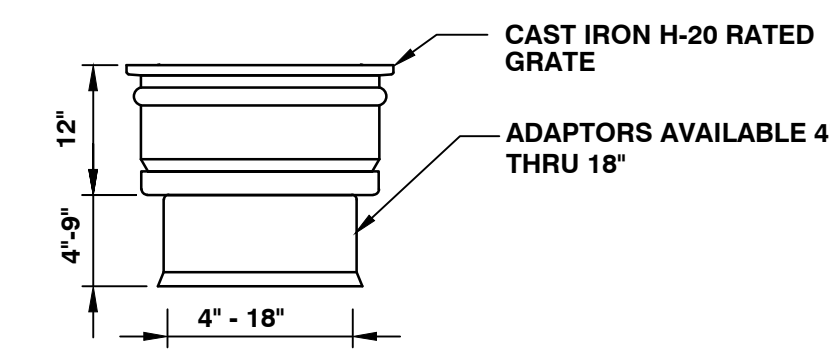
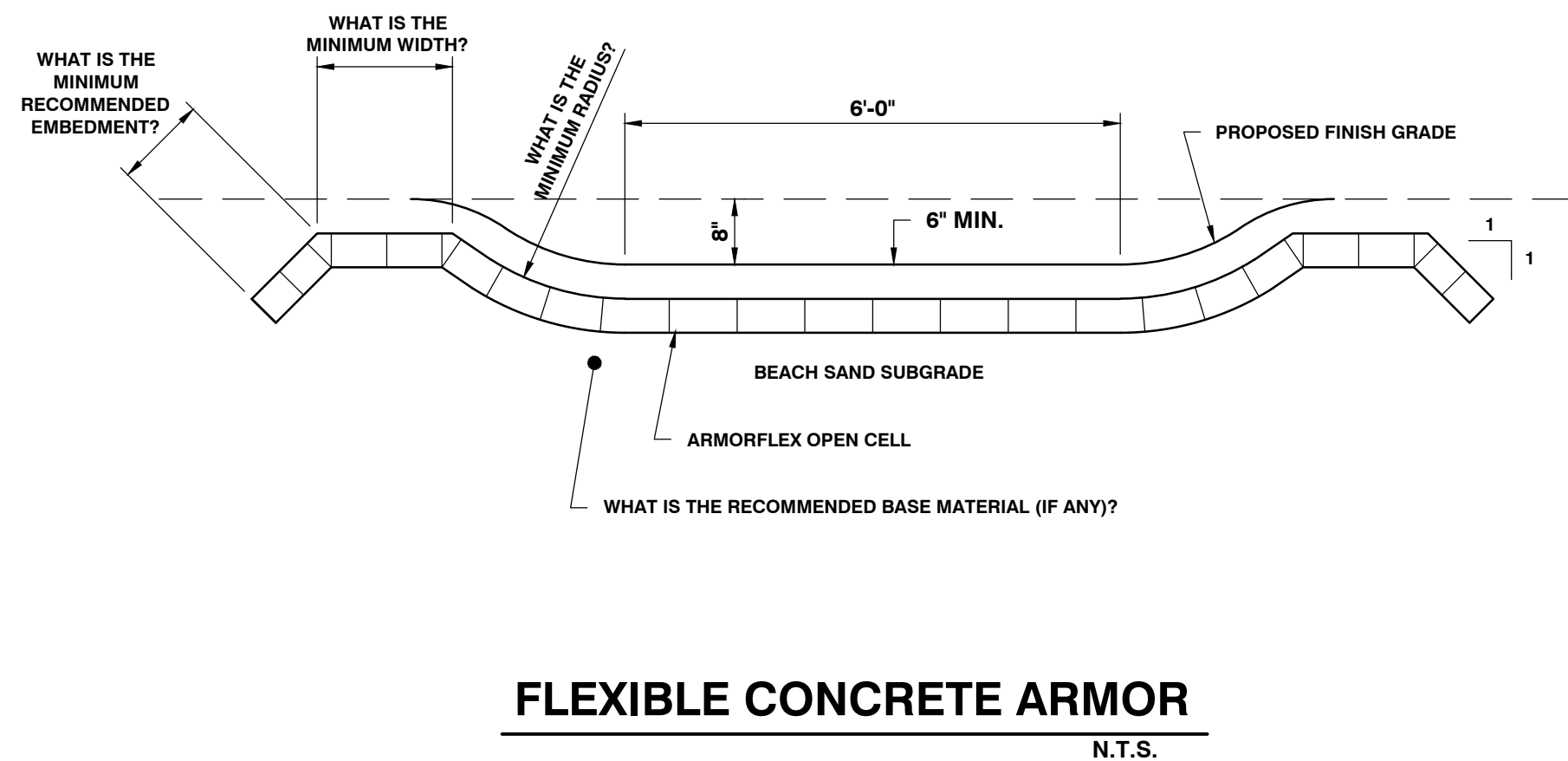
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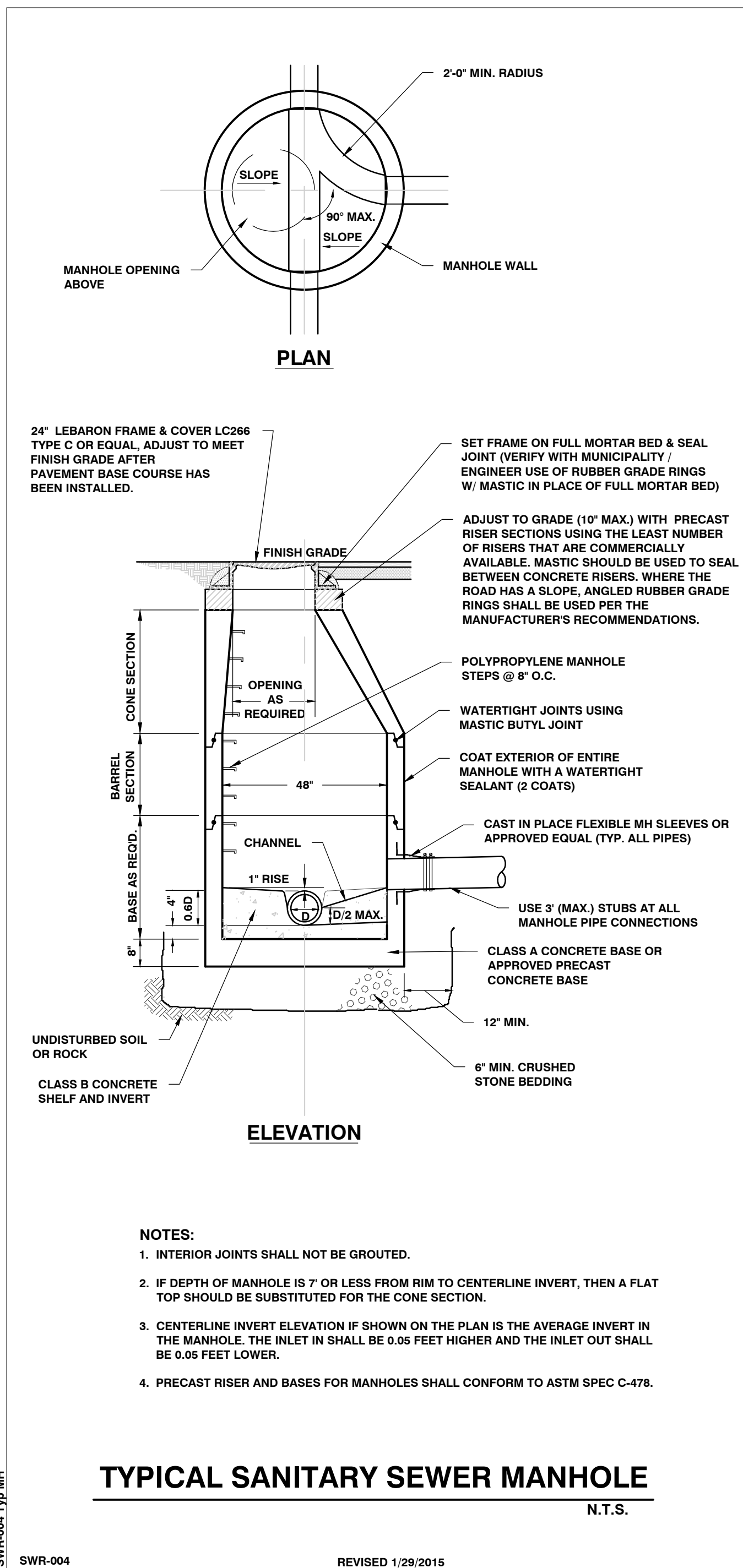
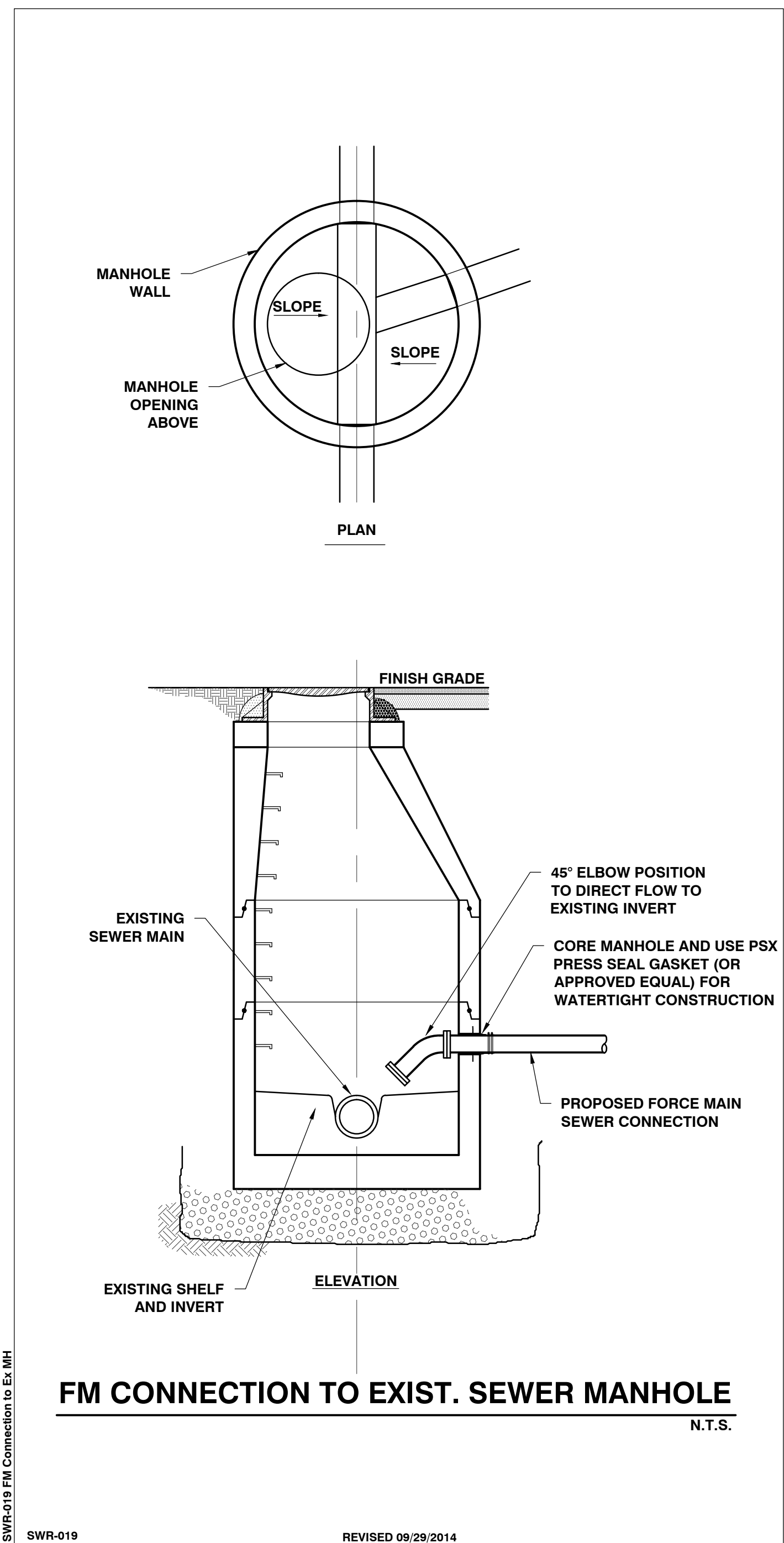
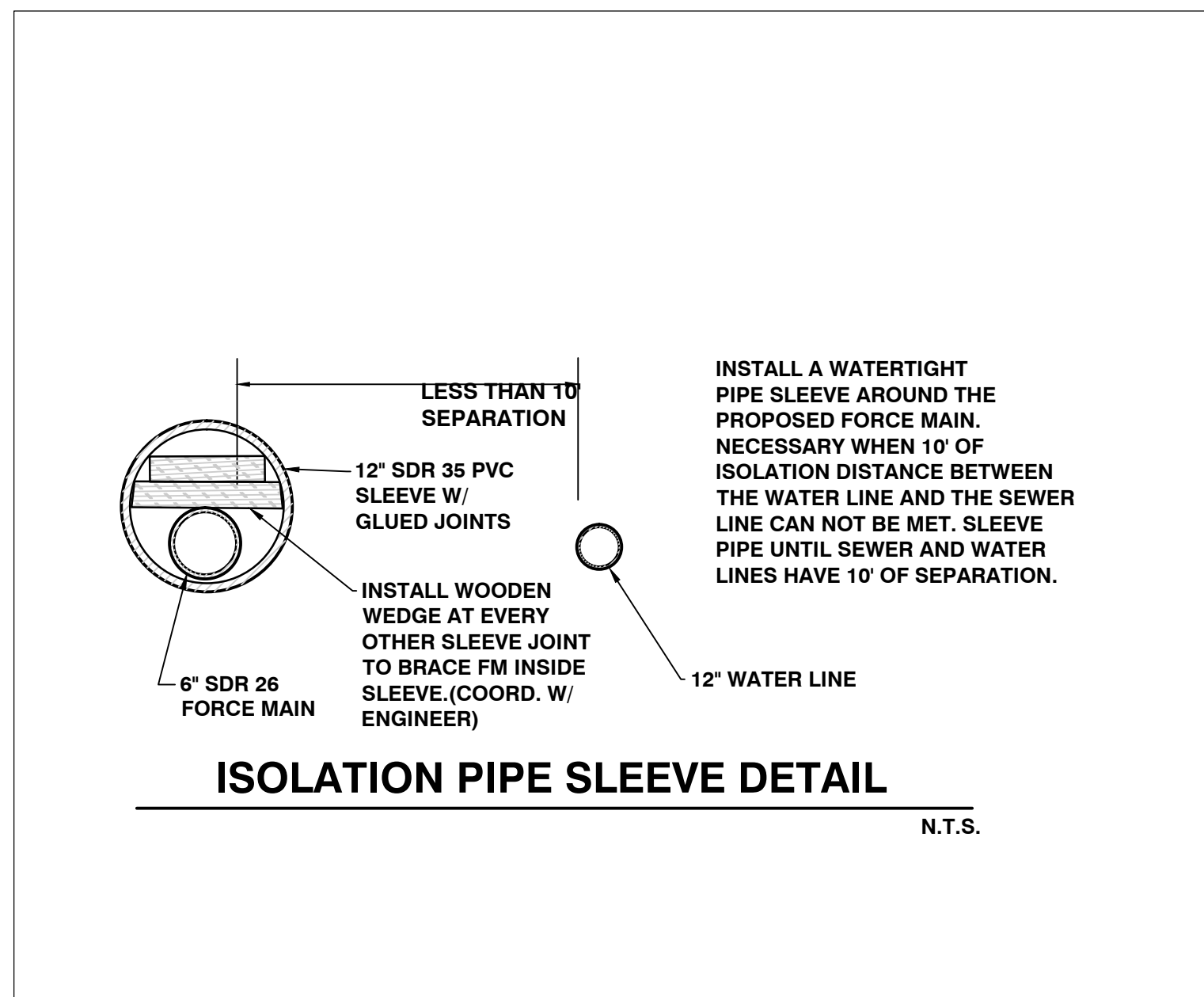
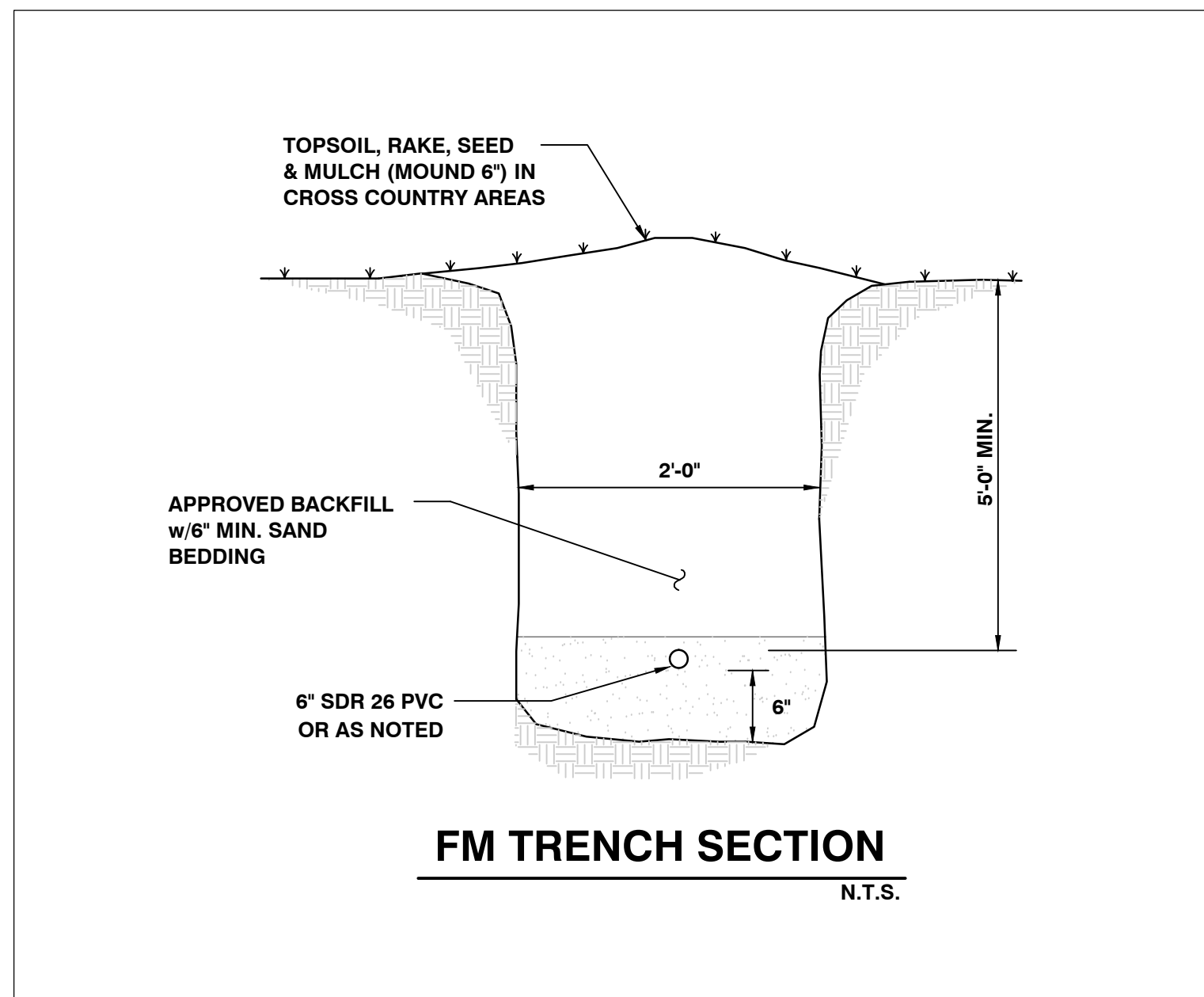
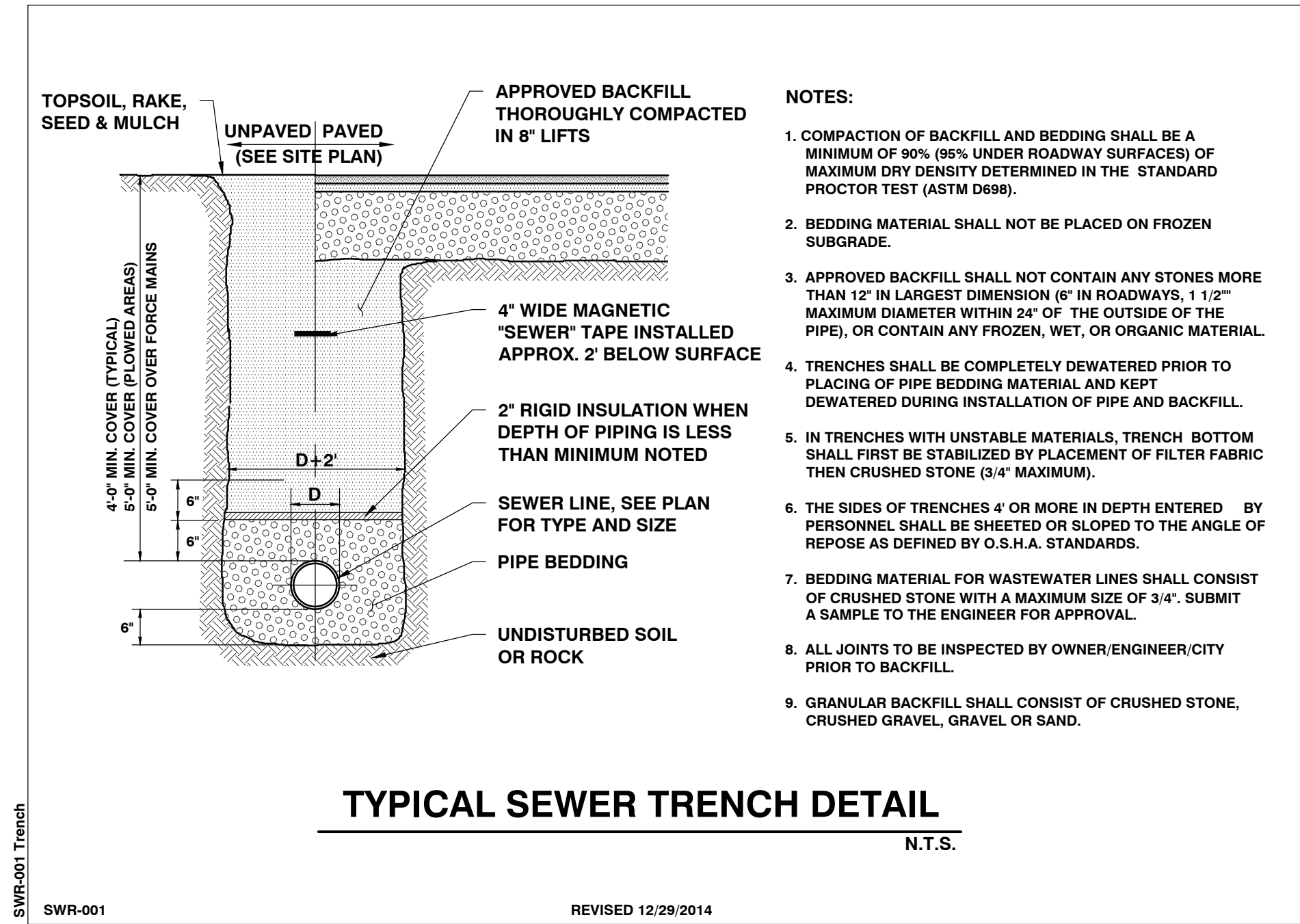
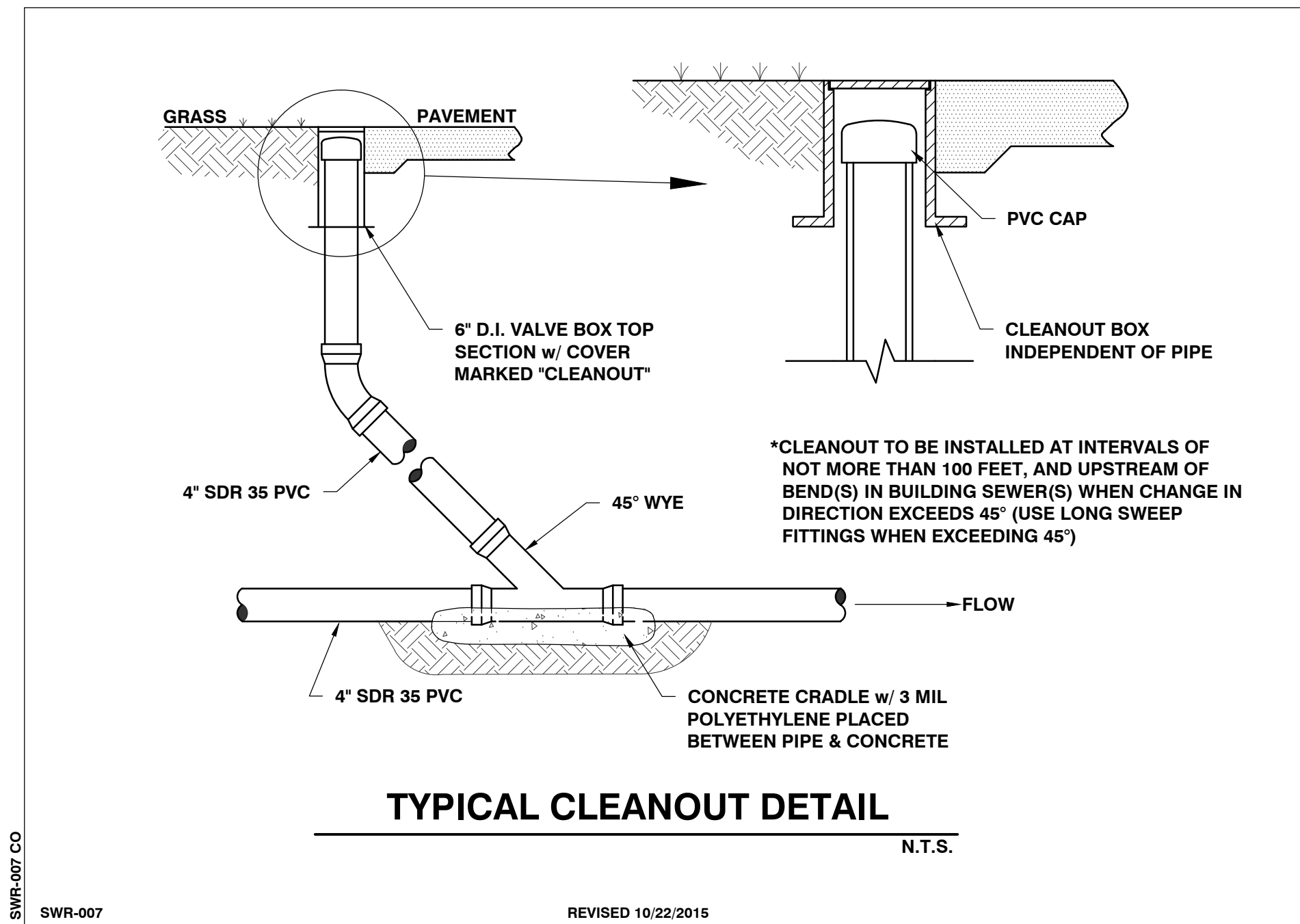
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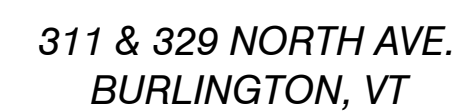




- | <div> <div>Cambrian Rise</div> <div>Pump Station Basis of Design</div> <div>311-329 North Avenue</div> <div>12-Oct-16</div> </div> |        |         |          |
|------------------------------------------------------------------------------------------------------------------------------------|--------|---------|----------|
| Total Design Flow                                                                                                                  | 59,770 | GPD     |          |
| Average Daily Flow                                                                                                                 | 62.3   | GPM     |          |
| Peaking Factor                                                                                                                     | 4.00   |         |          |
| Peak Flow                                                                                                                          | 249.0  | GPM     |          |
| Required Storage                                                                                                                   | 14,943 | gallons |          |
| Provided Storage                                                                                                                   | 23,132 | gallons |          |
| Force Main Dia.                                                                                                                    | 6.00   | Inches  |          |
| Min. Cleansing Velocity                                                                                                            | 2.00   | FPS     |          |
| Min. Pumping Rate                                                                                                                  | 176.2  | GPM     |          |
| Chosen Pumping rate                                                                                                                | 375    | GPM     | Good     |
| Length of FM to Discharge                                                                                                          | 820    | feet    |          |
| Friction Losses to Discharge                                                                                                       | 7.7    | feet    |          |
| High Point of Force Main                                                                                                           | 214.00 | feet    |          |
| Low Elevation in PS                                                                                                                | 152.00 | feet    |          |
| Elevation Change                                                                                                                   | 62.00  | feet    |          |
| Minor headlosses                                                                                                                   | 4.80   | feet    |          |
| Residual                                                                                                                           | 0      | feet    |          |
| TDH                                                                                                                                | 74.52  | feet    |          |
| Pump Cycle Storage                                                                                                                 | 1,000  | Gallons |          |
| Run Cycle                                                                                                                          | 3.98   | Minutes |          |
| Wet Well Detention Time                                                                                                            | 16.06  | Minutes |          |
| System Curve                                                                                                                       | GPM    | TDH     |          |
| 25 Increment                                                                                                                       | 250.0  | 70.40   |          |
|                                                                                                                                    | 275.0  | 71.10   |          |
|                                                                                                                                    | 300.0  | 71.90   |          |
|                                                                                                                                    | 325.0  | 72.70   |          |
|                                                                                                                                    | 350.0  | 73.60   |          |
|                                                                                                                                    | 375.0  | 74.50   |          |
|                                                                                                                                    | 400.0  | 75.50   |          |
| Pump Selection                                                                                                                     | 375    | GPM =   | 0.84 CFS |
| Hydraulic H3HX7P, 1750 RPM, 10" Impeller, 3h, 15 Hp                                                                                |        |         |          |



- NOTES:**
- 1. CONTROL PANEL SHALL ALSO INCLUDE CONTROLS FOR THE ELECTRONICALLY ACTIVATED VALVES AND CONTAIN THE NEMA 4 JUNCTION BOX**
  - 2. THE AIR VENTILATION BLOWER UNIT SHALL BE LOCATED ADJACENT TO THE CONTROL PANEL.**



## C6.4



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------|-----------------|----------|----------|-------|----------|---------|--------|---------|-------|
| PUMP STATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | SITE ENGINEER:                                                                                                                                                                                                                                                                                                                                                                          |  |            |                 |          |          |       |          |         |        |         |       |
| PART 1 - GENERAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | <div></div> <div>CIVIL ENGINEERING ASSOCIATES, INC.<br/>10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403<br/>802-864-2323 FAX: 802-864-2271 web: www.ces-vt.com</div>                                                                                                                              |  |            |                 |          |          |       |          |         |        |         |       |
| 1.01 SUMMARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| A. Section includes:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | <div>DRAWN<br/><b>ACL/SAL</b></div> <div>CHECKED<br/><b>DSM</b></div> <div>APPROVED<br/><b>DSM</b></div>                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| 1. Demolition, excavation and backfilling required for the complete construction of a replacement recessed wet well sanitary sewer pump station. This shall include all pumping units and appurtenances, pipes, valves and structures necessary to complete the system as indicated on the drawings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 1.02 GENERAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | CLIENT:                                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| A. The design of all pumping stations must be reviewed and approved by the City Wastewater Department prior to construction. 3-phase power shall be used for all pump stations, wherever feasible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | <div><b>BC COMMUNITY HOUSING, LLC</b></div> <div>P.O. BOX 1335<br/>BURLINGTON VERMONT 05402</div>                                                                                                                                                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| B. Multiple pumps or ejector units shall be provided with each raw wastewater pumping station. For duplex stations, each pumping unit shall be identical, and with sufficient capacity to handle the design peak hour effluent flow with one pump off-line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| C. Wastewater pumping station structures and electrical and mechanical equipment shall be protected from physical damage as the result of a flood of 100 year recurrence interval. All pumping stations shall be designed to be fully operational and accessible during a flood of 25 year recurrence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | <div>DRAWN<br/><b>ACL/SAL</b></div> <div>CHECKED<br/><b>DSM</b></div> <div>APPROVED<br/><b>DSM</b></div>                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| D. All pumping station sites shall be fully accessible by maintenance vehicles during all weather conditions. Gravel access roads and associated easements must be conveyed with the pumping station.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 1.03 SUBMITTALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | PART 2 - PRODUCTS                                                                                                                                                                                                                                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| A. Shop drawings shall be submitted to the Engineer for approval prior to any equipment being delivered to the site. Shop drawings shall include all structural, mechanical and electrical components with detailed dimensions and specifications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | 2.01 SOIL MATERIALS                                                                                                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| B. Five (5) complete operation and maintenance manuals shall be provided prior to final acceptance of the pump station by the Engineer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | A. Compacted Fill/Granular Borrow: Free of shale, clay, friable material, debris, and organic matter, graded in accordance with ANSI/ASTM C136 within the following limits:                                                                                                                                                                                                             |  |            |                 |          |          |       |          |         |        |         |       |
| 1.04 QUALITY ASSURANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | <table><tr><td>Sieve Size</td><td>Percent Passing</td></tr><tr><td>3/4 Inch</td><td>75 - 100</td></tr><tr><td>No. 4</td><td>20 - 100</td></tr><tr><td>No. 100</td><td>0 - 20</td></tr><tr><td>No. 200</td><td>0 - 6</td></tr></table>                                                                                                                                                   |  | Sieve Size | Percent Passing | 3/4 Inch | 75 - 100 | No. 4 | 20 - 100 | No. 100 | 0 - 20 | No. 200 | 0 - 6 |
| Sieve Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Percent Passing |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 3/4 Inch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 75 - 100        |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| No. 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20 - 100        |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| No. 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0 - 20          |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| No. 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0 - 6           |                                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| A. All materials and construction of same shall be as shown on the contract drawings and shall meet the requirements of the City Sewer Department.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | PART 3 - EXECUTION                                                                                                                                                                                                                                                                                                                                                                      |  |            |                 |          |          |       |          |         |        |         |       |
| B. The recessed wet well mounted pump station shall be supplied complete by an experienced pump station manufacturer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | 3.01 SURFACE CONDITIONS                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| C. All applicable regulations of the Occupational Health and Safety Administration should be followed when assembling, installing, or servicing this pump station. In particular, this pump station is a confined space, under no circumstances should it be entered without the required safety equipment and precautions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| D. Electrical Equipment: Electrical systems and components (e.g. motors, lights, cables, conduits, switch boxes, control circuits, etc.) shall comply with the National Electrical Code, latest edition. In addition, equipment located in the wet well shall be suitable for use under corrosive conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | 3.02 PREPARATION                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| 1.05 REFERENCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | A. Identify required lines, levels, contours, and datum.                                                                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| A. The Standard Specifications shall refer to the Vermont Agency of Transportation Standard Specifications for Construction (2006 Edition).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | 3.03 PROCEDURES                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 1.06 WARRANTY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | A. Existing Utilities:                                                                                                                                                                                                                                                                                                                                                                  |  |            |                 |          |          |       |          |         |        |         |       |
| A. The pump station manufacturer will take full responsibility for startup and operator training. The pump station manufacturer will warranty the station as a unit against defects in material and workmanship for one year from the date of startup.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | 1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavations. If damaged, repair or replace at no additional cost to the Owner.                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| PART 2 - PRODUCTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | 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.                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| 2.01 GENERAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | 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.                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| A. The Contractor shall provide all fittings, couplings and appurtenances to provide a complete and operable system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | 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.                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| 2.02 WET WELLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | 5. Do not proceed with permanent relocation of utilities until instructions are received from the Engineer.                                                                                                                                                                                                                                                                             |  |            |                 |          |          |       |          |         |        |         |       |
| A. A reinforced concrete foundation shall be provided for the wet well and pump chamber, designed by a structural engineer licensed in the State of Vermont.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | B. Protection of persons and property:                                                                                                                                                                                                                                                                                                                                                  |  |            |                 |          |          |       |          |         |        |         |       |
| B. The foundation and structure shall be designed to prevent flotation of the dry well and wet well under worst case conditions. Flotation computations shall be submitted as part of the design for review by the City.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | 1. Barricade open holes and depressions occurring as part of the work, and post warning lights or signs.                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| C. The effective volume of the wet well shall be established such that the filling time shall not exceed 30 minutes under design average flow conditions (unless equalization is incorporated in the design). When the anticipated initial flow tributary to the pumping station is less than the design average flow, provisions shall be made such that a 30 minute fill time is not exceeded for initial flows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | 2. 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.                                                                                                                                                                                   |  |            |                 |          |          |       |          |         |        |         |       |
| D. Suitable and safe means of access for persons wearing self-contained breathing apparatus shall be provided to both the dry well and to the wet well.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | 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 excavations after utilities have been placed.      |  |            |                 |          |          |       |          |         |        |         |       |
| E. Pre-cast concrete wet wells shall be of steel reinforced design with a documented compressive strength of 4000 psi at 28 days. Butyl rubber gaskets shall be specified at all joints.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | 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. |  |            |                 |          |          |       |          |         |        |         |       |
| F. All pipe penetrations shall be pre-cast openings with flexible rubber boots or compression fittings to create watertight connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | 3.04 EXCAVATION                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| G. The top of the wet well shall be designed with a minimum 30" x 30" wet well access hatch of 1/4" diamond plate aluminum suitable for concrete embedment. The hatch shall include a lockable latching device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | A. Care shall be exercised by the Contractor to avoid disrupting the operation of existing facilities to remain in place.                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| H. The pre-cast concrete wet well shall be externally coated with an asphaltic sealant and tested for water tightness using an approved vacuum or water testing procedure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | B. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel.                                                                                                                                                                                                                                                                                   |  |            |                 |          |          |       |          |         |        |         |       |
| I. A ventilating blower shall provide air circulation to the floor of the pump chamber. The exhaust outlet shall be screened to prevent the entrance of foreign matter and insects and shall have a suitable cover to prevent the entrance of rain and snow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | C. Excavation shall not interfere with normal 45° bearing splay of foundations.                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| J. Fresh air to the pump chamber shall be drawn from the surface. The air inlet shall be screened to prevent the entrance of foreign matter and insects and shall have a suitable cover to prevent the entrance of rain and snow. The blower shall be sized to exchange the air in the station once every two minutes. The ventilating blower and station lights shall be turned on automatically when the entrance tube cover is raised and shall have a manual cold weather switch located on the inside of the entrance cover. A dual range thermostatically controlled electric heater shall be provided within the pump station to keep the temperature within the pump chamber above freezing.                                                                                                                                                                                                                                                                                                                  |                 | D. All excavations shall be in accordance with the latest OSHA requirements.                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
| K. A mercury float switch shall not be used. Wet well high and low alarms should be based on the bubbler pressure transmitter signal. Float switches shall each have two normally open and two normally closed contacts. Float switches will be wired to the local alarm system that will automatically activate the alarm at the main pumping station via a radio.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | E. 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.                                                                             |  |            |                 |          |          |       |          |         |        |         |       |
| 2.03 SEWAGE PUMPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | F. Where excavations occur in existing lawns, remove turf or plantings in sections and keep damp. Replace upon completion of the backfilling.                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| A. The sewage pumps shall be designed such that, with any one pump out of service, the remaining unit(s) will have capacity to handle the design peak hourly flow. The pumps shall be new vertical submersible dry-pit, non-clog type specifically designed for raw sewage applications. The pumps shall be 4", 6" or 8" non-clog solids handling pumps designed specifically for handling sanitary sewage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | 3.05 BACKFILLING                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| B. Each pump shall be of heavy cast iron construction. The shaft shall be of solid stainless steel construction sealed against leakage by a double mechanical seal. Impellers shall be of the enclosed type made of close-grained cast iron. All impellers less than full diameter shall be trimmed, to prevent the buildup of foreign particles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| C. The pump shall be designed such that the rotating element can be easily removed from the volute, without disconnecting the seal system, electrical wiring or removal of the motor from the back head and seal. The pump shall be supported via a floor-mounted cast iron base with four legs to provide rigidity and balance. The motor shall be fitted with heavy lifting eyes or lugs, each capable of supporting the entire weight of the pump and motor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | B. 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.                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| 2.04 INTERIOR PIPING AND VALVES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | C. Take special care that backfilling operations do not damage the pump station or pump station coatings.                                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| A. Pump suction and discharge piping shall be drilled and tapped for 125 pound American Standard flanges. All flanged ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151) latest version. All suction and discharge pipes shall be equipped with the appropriate gauges for reading mg/Hg and psi and shall be scaled to read within 1 unit or less.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | D. 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 Standard Proctor ASTM D698.                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| B. Pump suction lines protruding through the equipment chamber wall shall be sealed with multiple link seals or welded to create a gas-tight seal. Suction and discharge valves shall be new non-lubricated eccentric type plug valves with resilient facings and 1/4 turn operating valve. All valves shall be supplied with ANSI 125 pound flange end connections. New check valves shall be placed on the discharge lines between the pumps and the plug valves. Check valves shall be non-slamming, bronze mounted swing type valves with bolted covers and outside levers. Check valves shall have ANSI 125 pound flanged ends.                                                                                                                                                                                                                                                                                                                                                                                  |                 | 1. Around all structures, under roadway paving, shoulder and embankments - 95%.                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 2.05 EMERGENCY STORAGE AND PUMPING REQUIREMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 2. All other areas - 90%.                                                                                                                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| A. All wastewater pumping stations shall include provision for emergency power to prevent flooding in the event of a power outage. Manual transfer switches shall be required for all stations. A cord and cap connection shall be installed to connect the generator to the transfer switch. The cord end shall be of the style and size required for connection to the Wastewater Department's portable generator. On a case-by-case basis, emergency storage tanks may be considered by the City Wastewater Treatment Department. The designer should insure that a minimum emergency storage volume of 25% of the design average daily flow (or 4 hours storage based on a 16 hour operating day) is provided for each pumping station.                                                                                                                                                                                                                                                                           |                 | 1.01 SUMMARY                                                                                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
| B. Emergency storage tanks shall have at least one manhole access to grade with aluminum or copolymer plastic ladder rungs at 8" on center. The manhole access shall have a cast iron frame and cover (LeBaron LC266 type C or equal) or a 30" x 30" hinged, diamond plate hatch (Bilco or equal).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | A. Section includes:                                                                                                                                                                                                                                                                                                                                                                    |  |            |                 |          |          |       |          |         |        |         |       |
| C. The emergency storage system shall be free-draining toward the wet well with the fill/drain pipe invert elevation above the high water alarm level. The emergency storage tanks shall not be used as part of the normal pump dose volume.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | 1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities and the pump station.                                                                                                                                                                                                                                                      |  |            |                 |          |          |       |          |         |        |         |       |
| D. An emergency pumping connection shall be made to allow maintenance personnel to pump into the force main with a portable pump in the event of an emergency. The force main connection shall include a four (4), or six (6) inch quick connect hose fitting and associated valves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | 1.02 QUALITY ASSURANCE                                                                                                                                                                                                                                                                                                                                                                  |  |            |                 |          |          |       |          |         |        |         |       |
| 2.06 ELECTRICAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 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.                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| A. When permitted PVC piping shall be used in all areas that meet the requirements of the National Electric Code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| B. Electrical systems and components (i.e. motors, lights, conduits, switch boxes, control circuits, etc.) shall not be installed in raw sewage wet wells. Electrical systems and components in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present, shall comply with the National Electric Code requirements for Class I Group D, Division 1 locations and shall be corrosion resistant. Each flexible cable shall be provided with a watertight seal and separate strain relief. A fused disconnect switch located above ground shall be provided for the main power feed for all pumping stations. When such equipment is exposed to weather, it shall meet the requirements of weatherproof equipment NEMA 4. A 110 volt power receptacle to facilitate maintenance shall be provided inside the control panel for lift stations that have control panels outdoors. Ground fault interruption protection shall be provided for all outdoor outlets. |                 | 1.03 REFERENCES                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| C. All wiring shall meet the requirements of the National Electric Code and shall be color-coded as indicated on the wiring diagram. All wiring outside the panel shall be in conduit, except for the 115 volt accessory items that are provided with insulated service cord. Conduit shall be provided from the control panel across the ceiling, and up the entrance tube to receive the feeder lines, and shall terminate in a threaded conduit connection through the wall of the entrance tube. All receptacles shall be of the ground fault type. Accessory items such as the and air compressors shall be plugged into polarized grounded convenience outlets located close to their installed position so that such items can be readily removed and serviced if necessary.                                                                                                                                                                                                                                   |                 | A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
| D. The package pump station shall be completely pre-wired at the factory, except for the power feeder lines. All wires shall meet the requirements of the National Electrical Code and shall be color-coded as indicated on the wiring diagram. All wiring outside the panel shall be in conduit, except for the 115 volt accessory items that are provided with insulated service cord. Conduit shall be provided from the control panel across the ceiling, and up the entrance tube to receive the feeder lines, and shall terminate in a threaded conduit connection through the wall of the entrance tube. All receptacles shall be of the ground fault type.                                                                                                                                                                                                                                                                                                                                                    |                 | B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures using 5.5 pound rammer and 12 inch drop.                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| E. All material and equipment necessary for a complete and workable electrical system shall be furnished and installed including: conduit and fittings, wire and cable, service panel, grounding, alarm system, connections to pump station, power company connection fees, telephone service fees. The above grade panel and signal communicator shall be provided by the pump station manufacturer and shall be PVC , fiberglass, aluminum, or stainless steel construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | 1.04 SUBMITTALS                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| F. All materials and equipment shall meet the standards of the National Electrical Manufacturers' Association and Underwriters Laboratories, Inc., and shall bear their label whenever standards have been established and label service is available. Installation of electric systems and controls shall be in conformance with the latest edition of the National Electric Code, local ordinances and regulations prescribed by the local Power Company.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | A. Testing laboratory reports indicating that material for backfill meets requirements of this Section.                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| G. Completed electric work performed shall comply with the latest edition of the National Electric Code Underwriters Laboratories regulations and all Municipal, State and other public or private authorities having jurisdiction. The developer is responsible for acquiring all necessary permits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | B. Field density test reports of backfill in place.                                                                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| H. All equipment and workmanship shall be guaranteed to be free from mechanical and electrical defects for a period of one year from the day of final acceptance. Any replacement of parts or adjustments, including labor made necessary by such defects and adjustments, shall be rectified without cost to the City.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | PART 2 - PRODUCTS                                                                                                                                                                                                                                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| Required Testing:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | 2.01 SOIL MATERIALS                                                                                                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| 1. All mechanical, control and alarm functions shall be tested in the presence of the City representative to demonstrate that all equipment is fully operational.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | A. Sieve Size                                                                                                                                                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| 2. Any grounds, opens, shorts or other defects shall be rectified at no cost to the City before acceptance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | Percent Passing                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 2.07 CONTROLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | No. 4                                                                                                                                                                                                                                                                                                                                                                                   |  |            |                 |          |          |       |          |         |        |         |       |
| A. Pumping sequence shall be arranged in an alternating lead/lag configuration. When liquid level reaches the predetermined lead pump on elevation, the designated lead pump shall start automatically. This pump shall continue to operate until such time as the liquid level falls below the designated pump off elevation. If flow into the wet well exceeds the capacity of the lead pump, and liquid level rises to the lag pump on elevation, then the designated lag pump shall be automatically activated. Both the lag pump and the lead pump shall continue to operate until liquid level falls to the pump off elevation.                                                                                                                                                                                                                                                                                                                                                                                 |                 | No. 100                                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| B. A high level alarm condition shall occur if liquid level rises above the predetermined alarm level (typically established at an elevation 6" above the lag pump on elevation). The alarm condition shall remain in affect until manually reset from the control panel. The main equipment control system shall be mounted internally within the pump station in a NEMA 4 panel, complete with suitable latching devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | No. 200                                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| C. All circuit breakers, pump control switches shall be mounted so that they are operable without opening the cabinet. The low voltage, automatic pump control section shall be separate from the high voltage circuit breaker motor section and shall be provided with a hinged access door and latch. The control switches shall be mounted on the face of the automatic pump control section door. A grounding-type convenience duplex outlet shall be provided for 115 volt AC operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | PART 3 - EXECUTION                                                                                                                                                                                                                                                                                                                                                                      |  |            |                 |          |          |       |          |         |        |         |       |
| 2.08 RADIO TELEMETRY SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | 3.01 EXCAVATIONS                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| A. Each pump station shall be equipped with a radio telemetry unit (RTU) that is capable of being integrated with the Wastewater Department's current system. Each RTU shall be wired to the pump station's control panel and shall input:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | A. Excavations shall be made to a point at least 6 inches below the existing structures to accommodate the new pump station. All excavations are to be kept dry throughout construction until the structures have been inspected by the Engineer and approval given to commence backfilling operations.                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| - Sewage pump status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | 3.02 BACKFILL                                                                                                                                                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| - Sewage pump fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | A. Backfill shall consist of materials meeting the granular borrow requirements of the Backfill Section.                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| - Power failure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 3.03 FIELD TEST                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| - Wet well level (continuous)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | A. Upon completion of installation, the Contractor shall conduct a field test in the presence of the Engineer to demonstrate that the pumping units and all appurtenances are properly installed and deliver the specified flow/head requirements. All necessary equipment and labor to perform the test shall be furnished by the Contractor.                                          |  |            |                 |          |          |       |          |         |        |         |       |
| - Wet well high level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | EXCAVATION AND BACKFILLING                                                                                                                                                                                                                                                                                                                                                              |  |            |                 |          |          |       |          |         |        |         |       |
| - Wet well low level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | PART 1 - GENERAL                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| - Station flood alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | 1.01 SUMMARY                                                                                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
| - Pump 1 and 2 run times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | A. Section includes:                                                                                                                                                                                                                                                                                                                                                                    |  |            |                 |          |          |       |          |         |        |         |       |
| 2.10 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | 1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities and the pump station.                                                                                                                                                                                                                                                      |  |            |                 |          |          |       |          |         |        |         |       |
| A. All City owned pump stations shall be integrated into the Wastewater Department's SCADA system. The control panel must be able to receive and output a 4-20mA signal. A voltage signal will not be accepted. All costs associated with the integration shall be at the expense of the developer or owner. The City shall not be liable for any costs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | 1.02 QUALITY ASSURANCE                                                                                                                                                                                                                                                                                                                                                                  |  |            |                 |          |          |       |          |         |        |         |       |
| 2.11 SPARE PARTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | 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.                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| A. A complete replacement pump shaft seal assembly shall be furnished with each lift station. The spare seal shall be securely fastened to the control panel and shall include complete installation instructions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| B. Two (2) spare volute gaskets shall be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | 1.03 REFERENCES                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| C. A spare filter cone for the seal filter shall be provided in the same container as the pump shaft seal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
| D. Provide 100% spare lamps and fuses for control panel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures using 5.5 pound rammer and 12 inch drop.                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| E. Provide all lubricants required for initial operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | 1.04 SUBMITTALS                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| F. Provide one (1) spare input and output card, processor, and power supply for the Programmable logic controller (PLC) system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | A. Testing laboratory reports indicating that material for backfill meets requirements of this Section.                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| G. Provide one (1) spare level transducer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | B. Field density test reports of backfill in place.                                                                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| 2.12 O & M MANUALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | PART 2 - PRODUCTS                                                                                                                                                                                                                                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| A. Installation of all mechanical equipment shall be done in accordance with written instructions provided by the manufacturer. Installation instructions shall be delivered with the station.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | 2.01 SOIL MATERIALS                                                                                                                                                                                                                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| B. The manufacturer shall provide five (5) copies of a complete and detailed operating and maintenance manual. This manual shall provide all design criteria, general operating procedures, maintenance and servicing procedures for all major components, and as-built drawings of the contributory gravity sewer system, the pumping station and force main. All instructions and parts lists shall be prepared for the specific equipment furnished and shall not refer to similar equipment. Operating manuals must be submitted to the City prior to final acceptance of the station.                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | A. Sieve Size                                                                                                                                                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
| PART 3 - EXECUTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | Percent Passing                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| 3.01 EXCAVATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | No. 4                                                                                                                                                                                                                                                                                                                                                                                   |  |            |                 |          |          |       |          |         |        |         |       |
| A. Excavations shall be made to a point at least 6 inches below the existing structures to accommodate the new pump station. All excavations are to be kept dry throughout construction until the structures have been inspected by the Engineer and approval given to commence backfilling operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | No. 100                                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| 3.02 BACKFILL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | No. 200                                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| A. Backfill shall consist of materials meeting the granular borrow requirements of the Backfill Section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | PART 3 - EXECUTION                                                                                                                                                                                                                                                                                                                                                                      |  |            |                 |          |          |       |          |         |        |         |       |
| 3.03 FIELD TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 3.01 SURFACE CONDITIONS                                                                                                                                                                                                                                                                                                                                                                 |  |            |                 |          |          |       |          |         |        |         |       |
| A. Upon completion of installation, the Contractor shall conduct a field test in the presence of the Engineer to demonstrate that the pumping units and all appurtenances are properly installed and deliver the specified flow/head requirements. All necessary equipment and labor to perform the test shall be furnished by the Contractor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.                                                                                                                                                       |  |            |                 |          |          |       |          |         |        |         |       |
| EXCAVATION AND BACKFILLING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | 3.02 PREPARATION                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
| PART 1 - GENERAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | A. Identify required lines, levels, contours, and datum.                                                                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
| 1.01 SUMMARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | 3.03 PROCEDURES                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
| A. Section includes:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | A. Existing Utilities:                                                                                                                                                                                                                                                                                                                                                                  |  |            |                 |          |          |       |          |         |        |         |       |
| 1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities and the pump station.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | 1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavations. If damaged, repair or replace at no additional cost to the Owner.                                                                                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| 1.02 QUALITY ASSURANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | 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.                                                                                                     |  |            |                 |          |          |       |          |         |        |         |       |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | 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.                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
| B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | 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 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 or signs.                                                                                                                                                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 2. 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 excavations after utilities have 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. |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 3.04 EXCAVATION                                                                                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | A. Care shall be exercised by the Contractor to avoid disrupting the operation of existing facilities to remain in place.                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | B. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel.                                                                                                                                                                                                                                                                                   |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | C. Excavation shall not interfere with normal 45° bearing splay of foundations.                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | D. All excavations shall be in accordance with the latest OSHA requirements.                                                                                                                                                                                                                                                                                                            |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | E. 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.                                                                             |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | F. Where excavations occur in existing lawns, remove turf or plantings in sections and keep damp. Replace upon completion of the backfilling.                                                                                                                                                                                                                                           |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 3.05 BACKFILLING                                                                                                                                                                                                                                                                                                                                                                        |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | B. 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.                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | C. Take special care that backfilling operations do not damage the pump station or pump station coatings.                                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | D. 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 Standard Proctor ASTM D698.                                                                                                                                                |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 1. Around all structures, under roadway paving, shoulder and embankments - 95%.                                                                                                                                                                                                                                                                                                         |  |            |                 |          |          |       |          |         |        |         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | 2. All other areas - 90%.                                                                                                                                                                                                                                                                                                                                                               |  |            |                 |          |          |       |          |         |        |         |       |

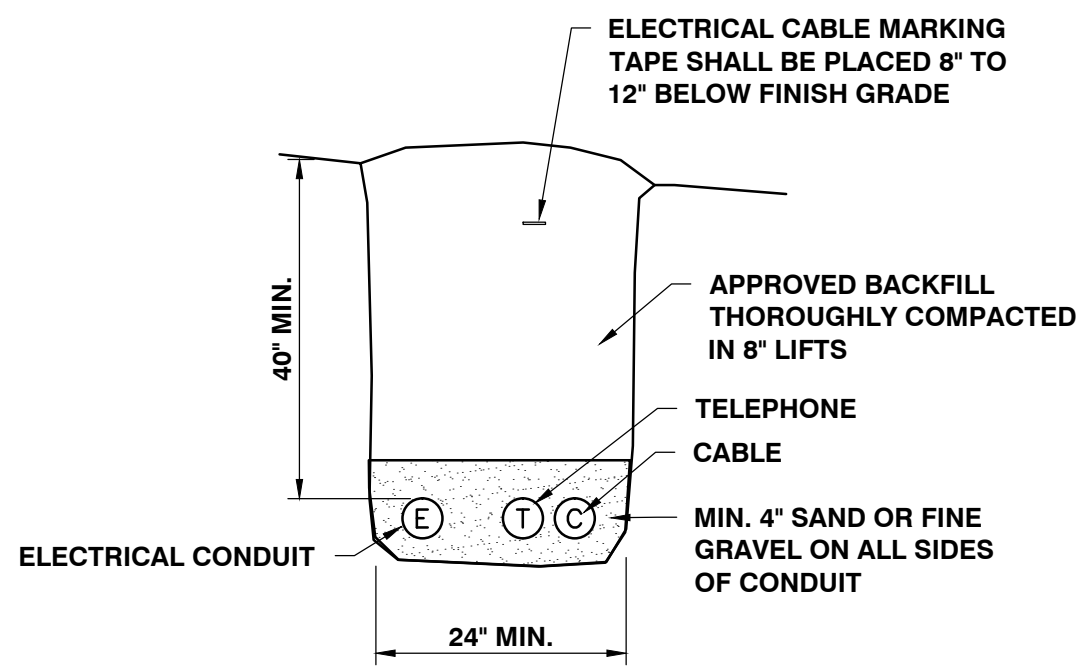
|       |  |  |                |  |  |
|-------|--|--|----------------|--|--|
| DATE  |  |  | DRAWING NUMBER |  |  |
| --    |  |  | C6.5           |  |  |
| SCALE |  |  | PROJ. NO.      |  |  |
| NONE  |  |  | 14215          |  |  |







M-007 Elec. Trench Primary



CONDUIT SHALL BE ENCASED IN A 4" ENVELOPE OF CONCRETE UNDER THE FOLLOWING CONDITIONS:

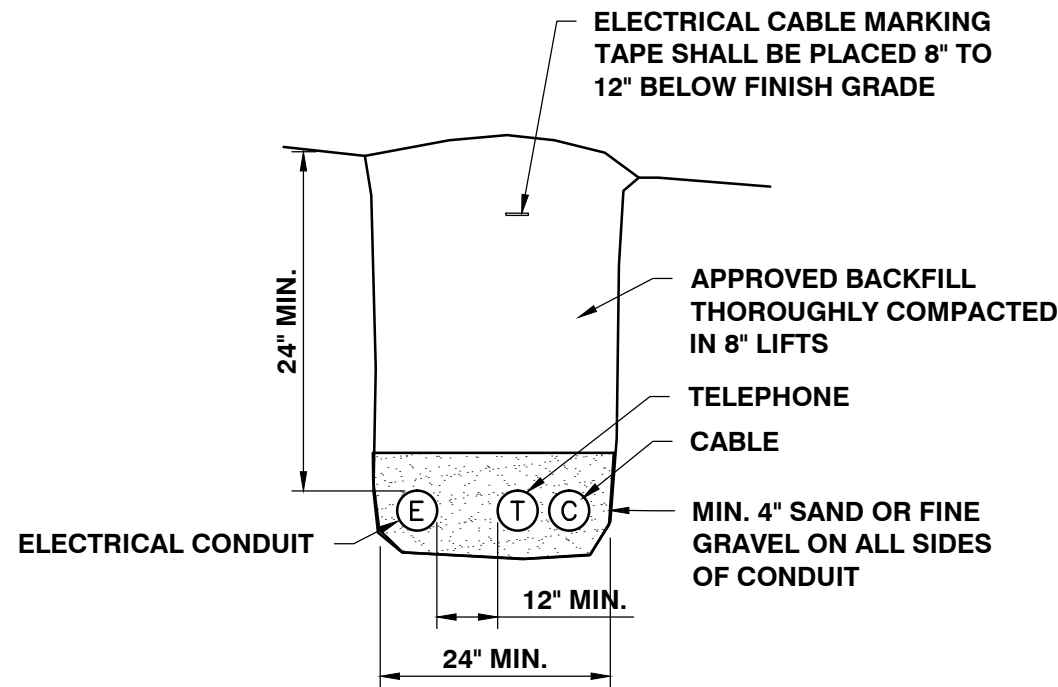
- FOR INSTALLATION UNDER THE TRAVEL PORTION OF THE ROAD.
- WITHIN 10' OF WATER, SEWER, GAS AND DRAIN CROSSING.

**ELECTRICAL TRENCH - PRIMARY**  
N.T.S.

M-007

REVISED 08/01/2014

M-008 Elec. Trench Secondary

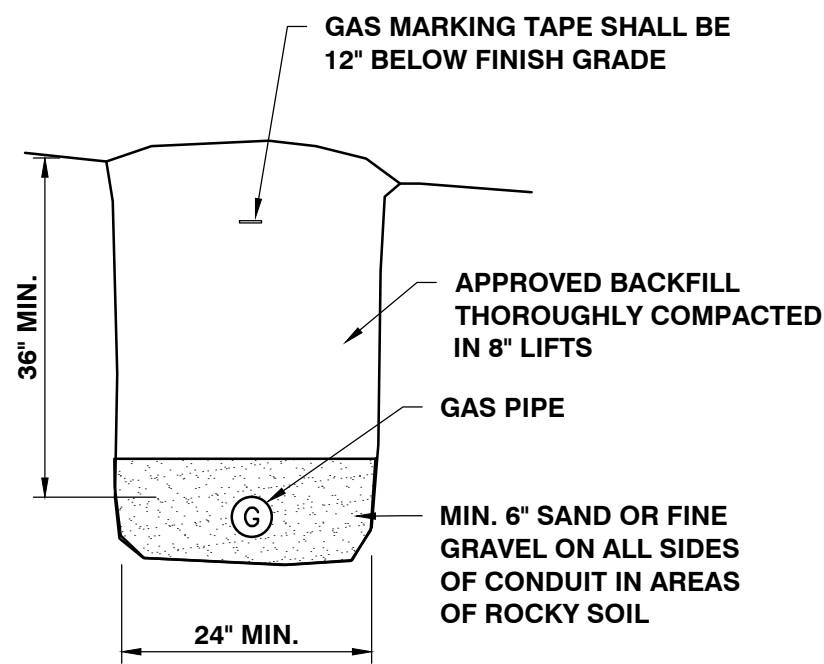


**ELECTRICAL TRENCH - SECONDARY**  
N.T.S.

M-008

REVISED 08/01/2014

M-006 Gas Trench

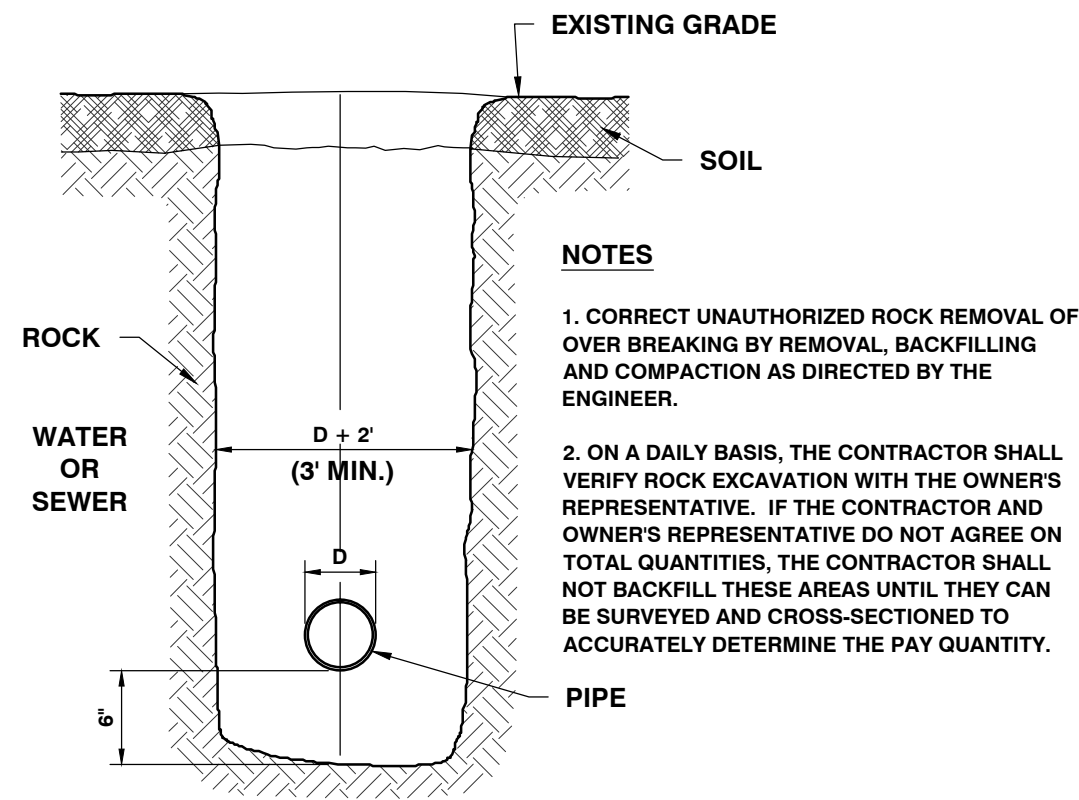


**GAS LINE TRENCH DETAIL**  
N.T.S.

M-006

REVISED 08/01/2014

M-001 Excav Pay



**TRENCH ROCK EXCAVATION PAY LIMITS**  
N.T.S.

M-001

REVISED 06/12/2015

SITE ENGINEER:



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

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DSM

APPROVED

DSM

CLIENT:

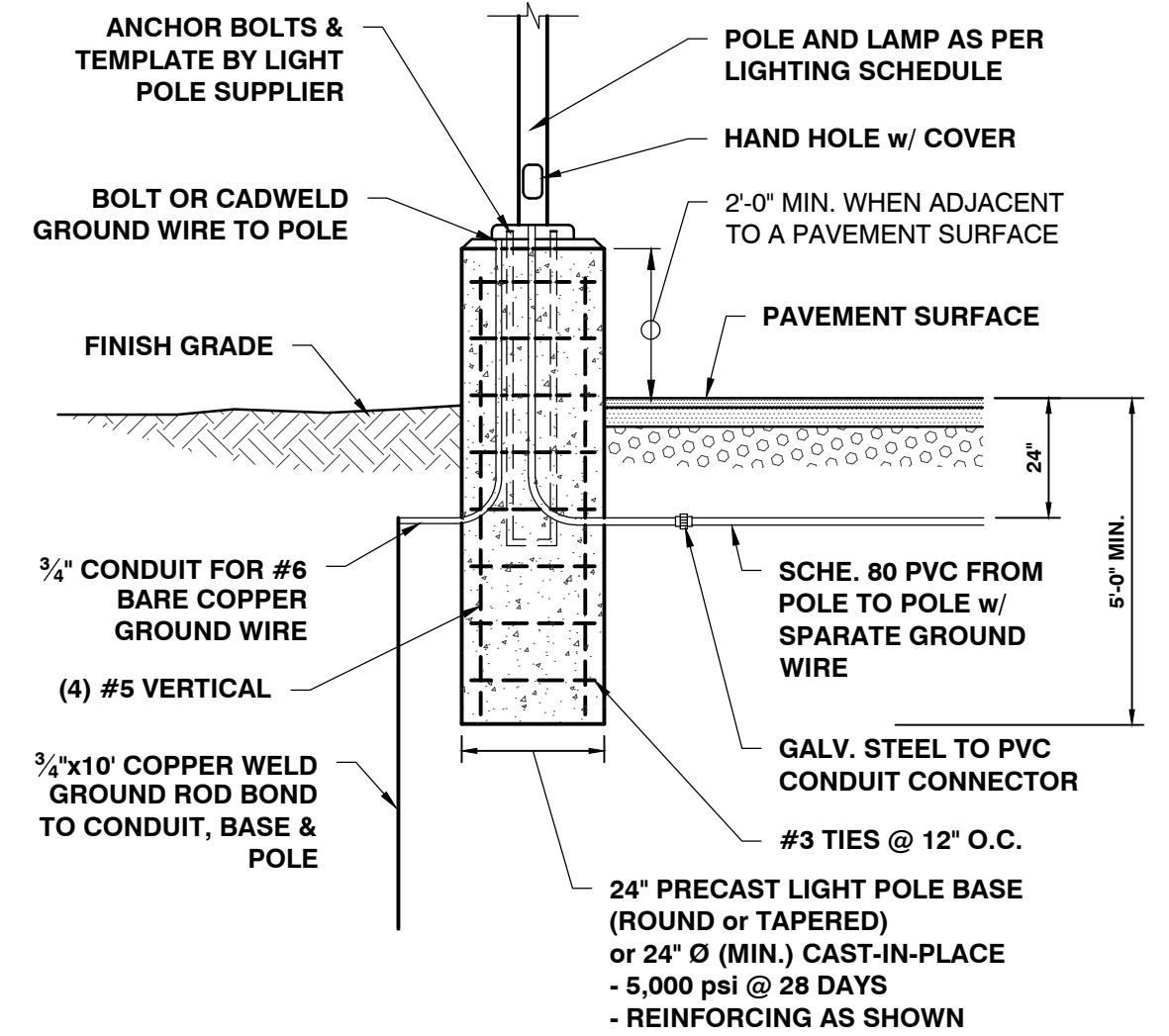
**BC COMMUNITY  
HOUSING, LLC**

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

**CAMBRIAN RISE**

311 & 329 NORTH AVE.  
BURLINGTON, VT

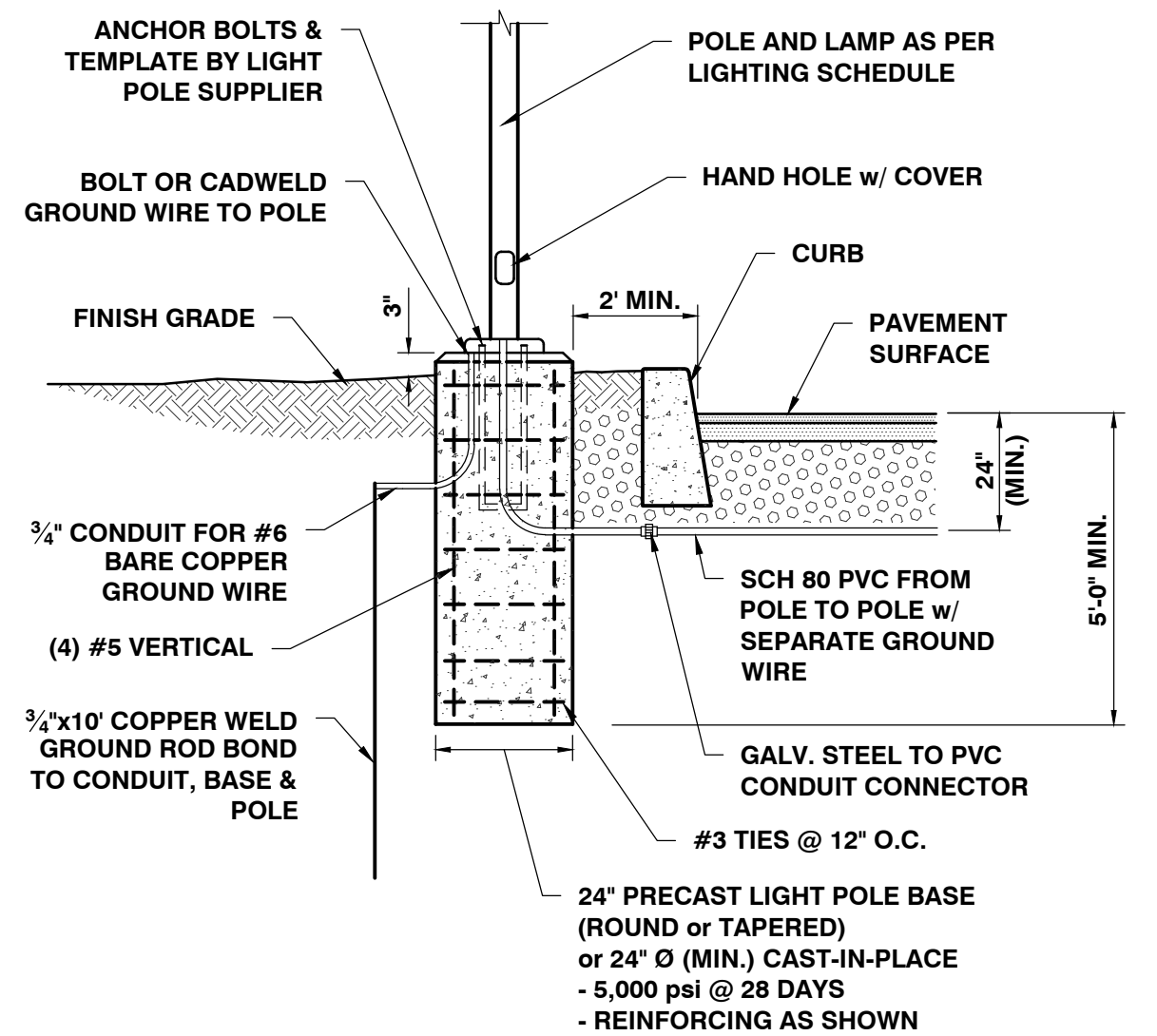


**POLE LIGHT BASE DETAIL**  
(ADJACENT TO PAVEMENT) N.T.S.

L-003 Light Pole Base - raised

L-003

REVISED 12/19/2014

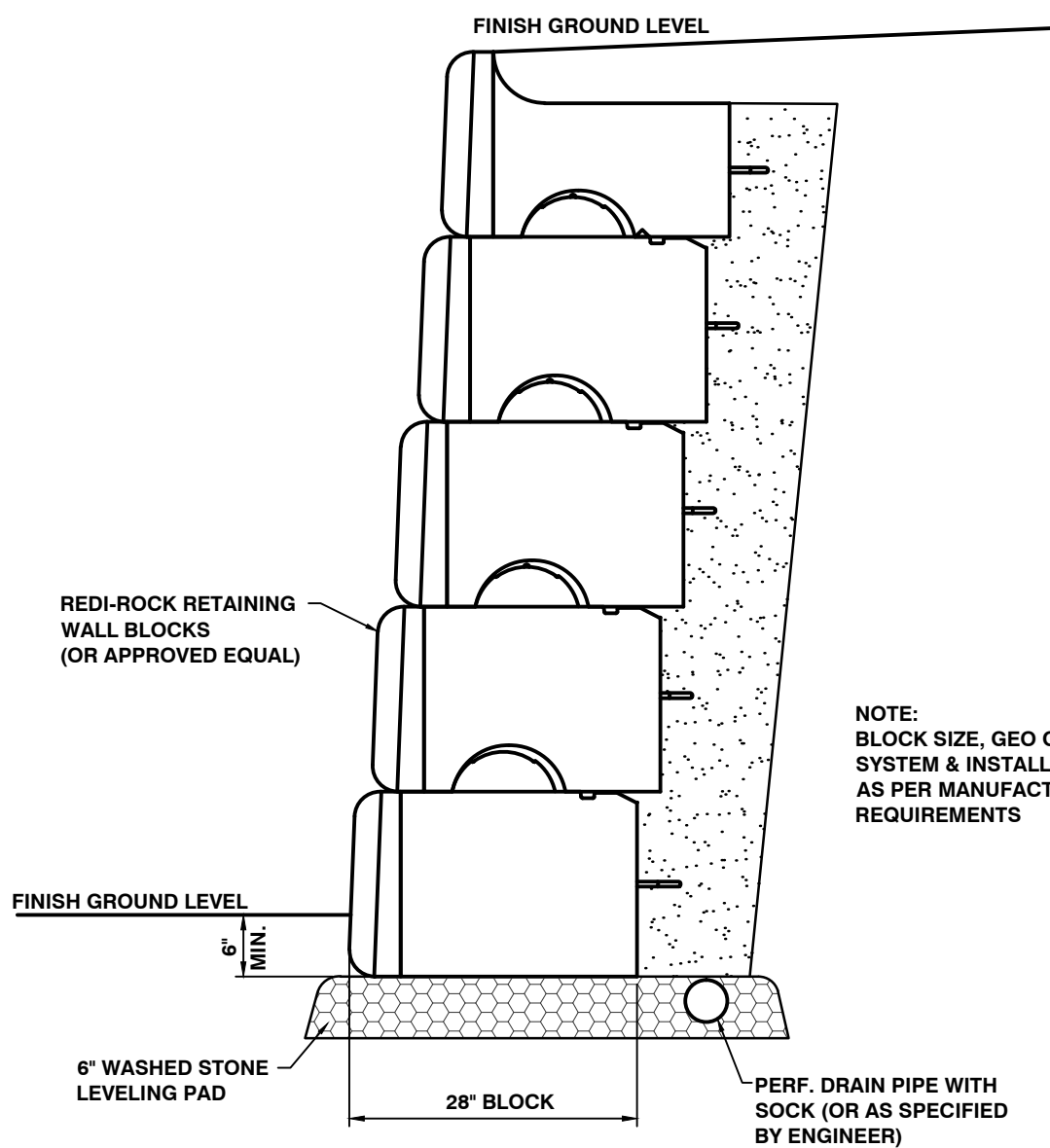


**POLE LIGHT BASE DETAIL**  
N.T.S.

L-003 Pole Light Base

L-003

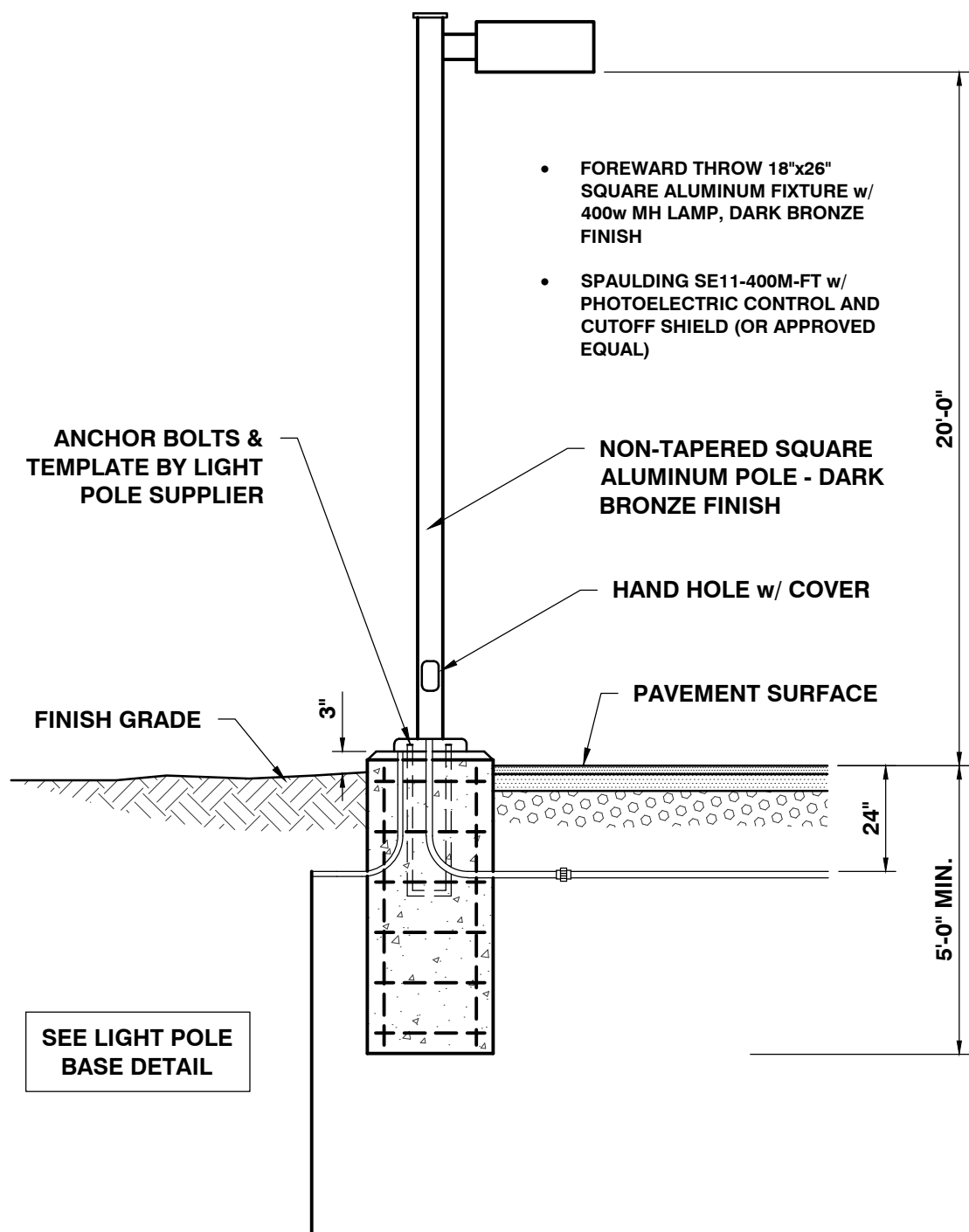
REVISED 12/19/2014



**RETAINING WALL DETAIL**  
N.T.S.

L-002 Retaining Wall

L-002



**POLE LIGHT DETAIL**  
N.T.S.

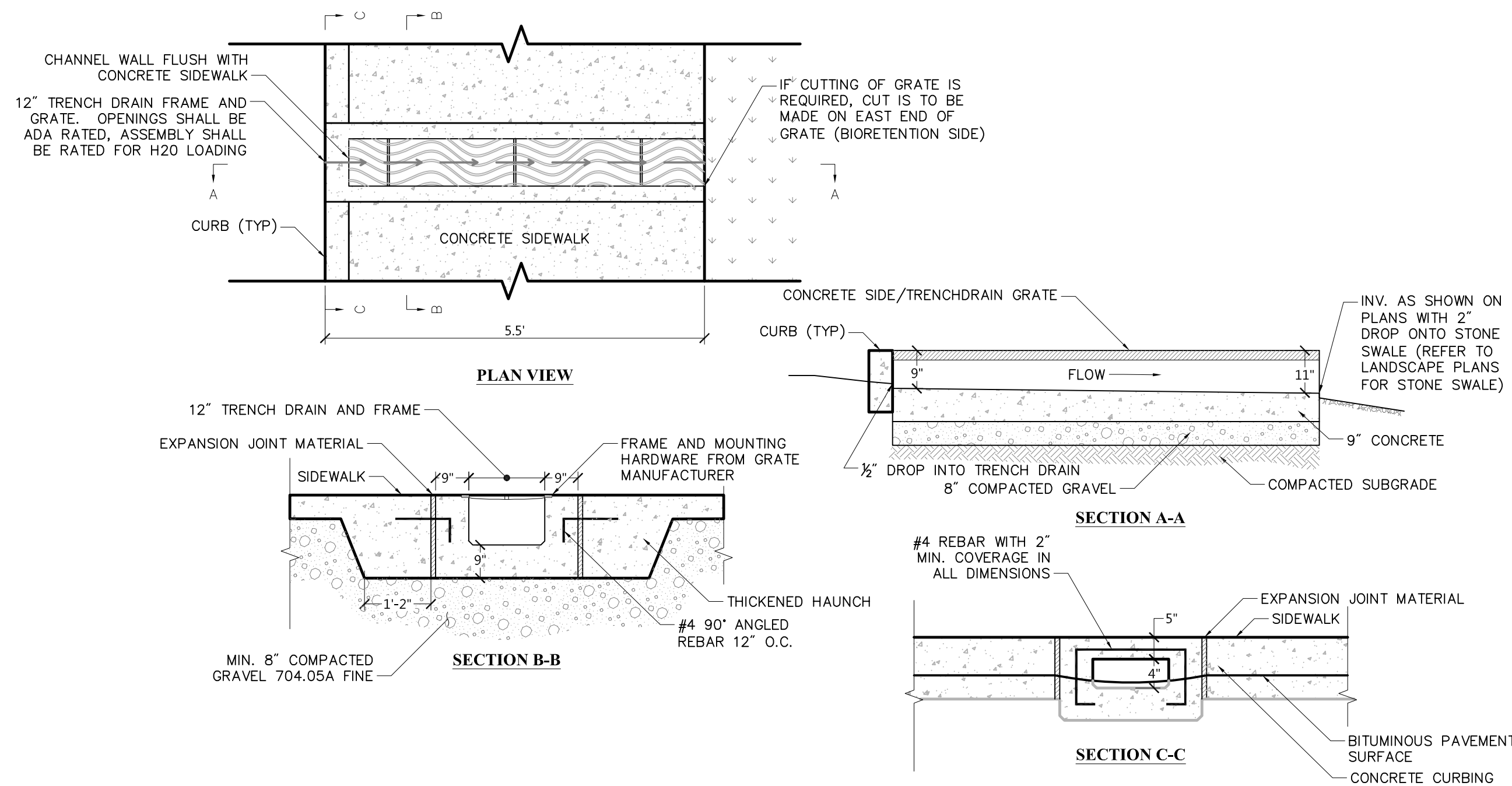
L-002 Pole Light

L-002

REVISED 12/19/2014

P:\MISC\14215\14215.dwg 12/20/2014 12:48 PM





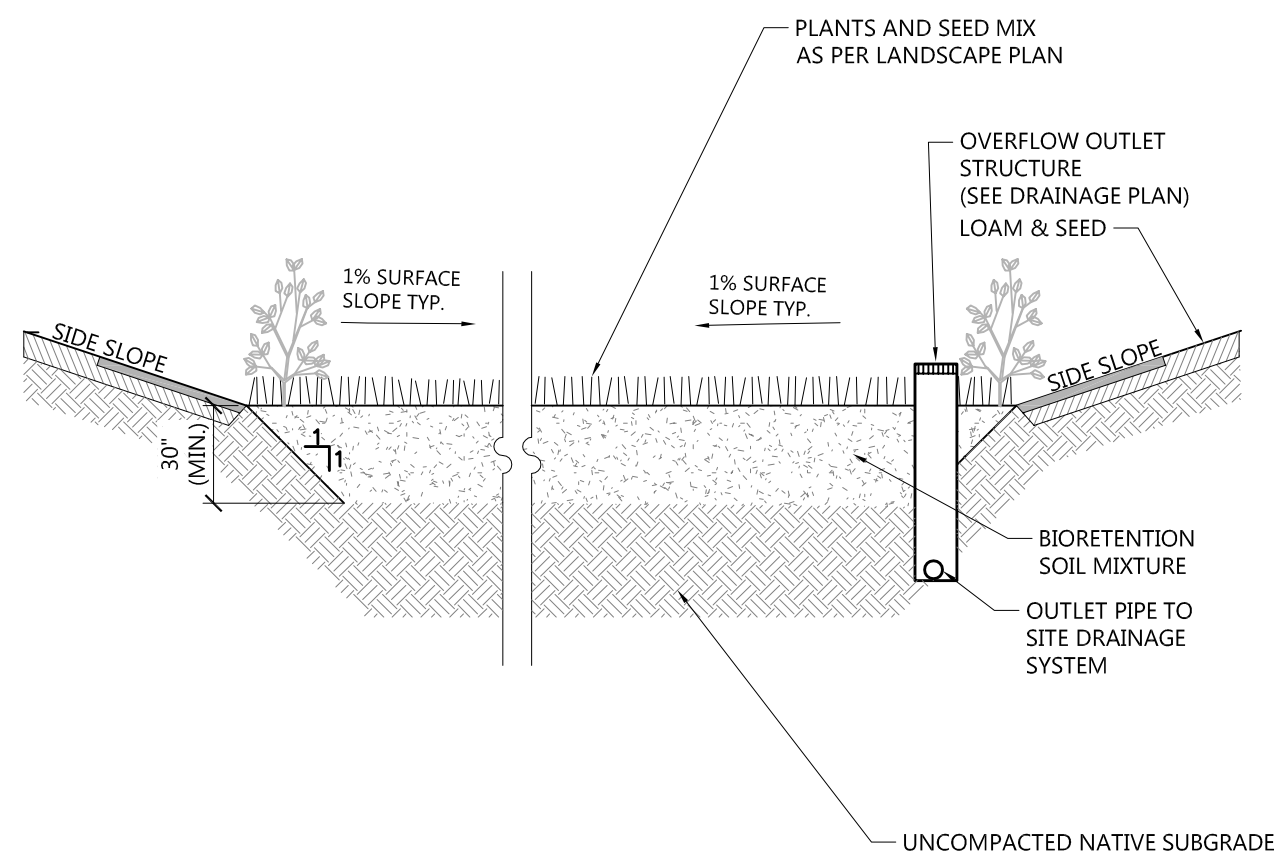
### Trench Drain (Bioretention Inlet at Green Streets)

N.T.S.

Source: VHB

10/16

LD\_



## NOTES

1. SIDE SLOPES SHALL BE 3:1 MAX. 2% MIN.

## Bioretention Basin

N.T.S.

Source: VHB

REV

1/16

LD\_353



40 IDX Dr  
Building 100 Suite 200  
South Burlington, VT 05403  
802.497.6100

# Cambrian Rise Project

North Avenue  
Burlington, Vermont

[illegible]

Not Approved for Construction

# Stormwater Details

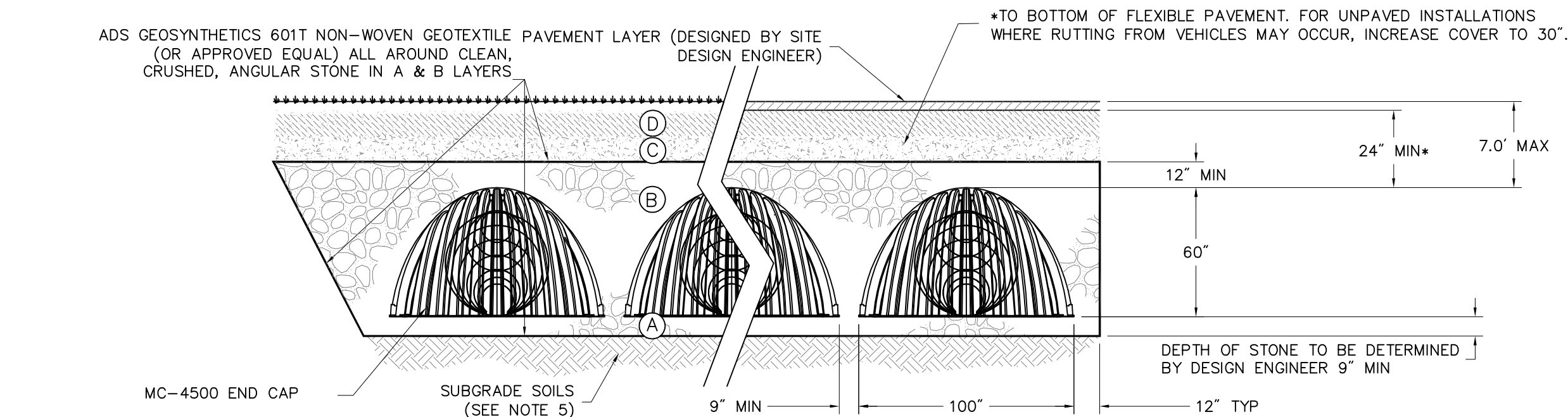
Drawing Number

## C6.8

Sheet 1 of 1

Project Number  
**57848.00**





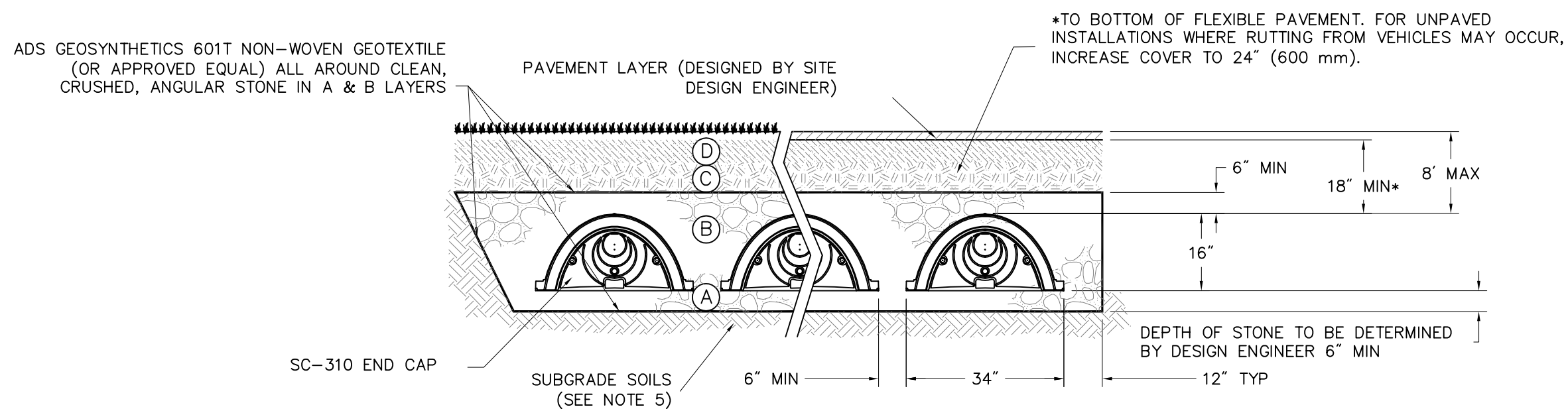
### MC - 4500 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



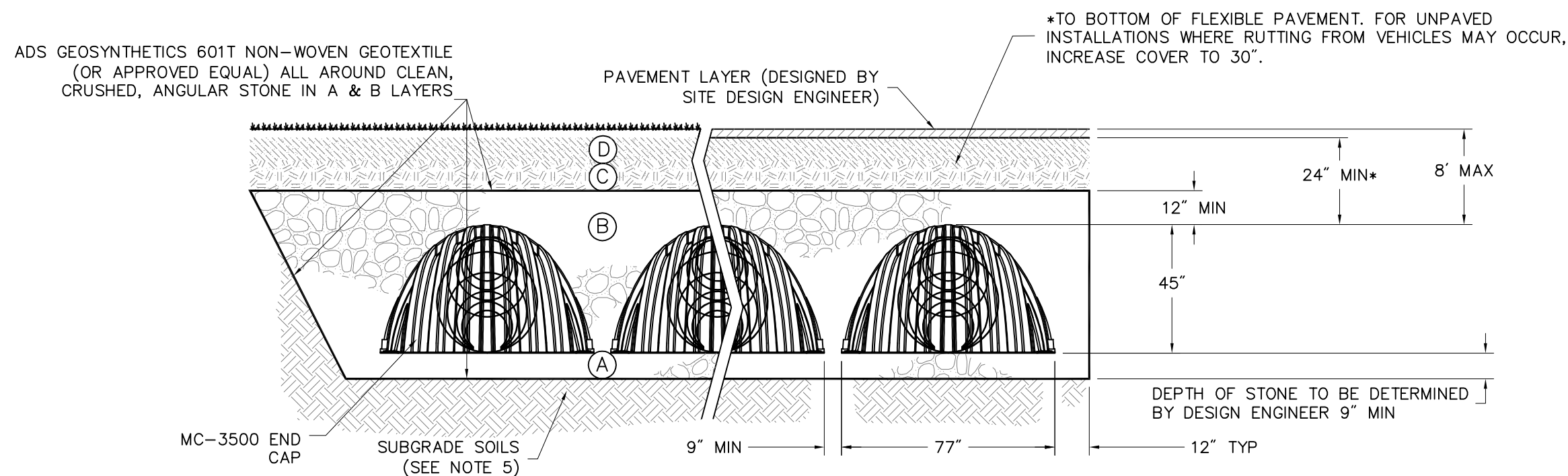
## SC - 310 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



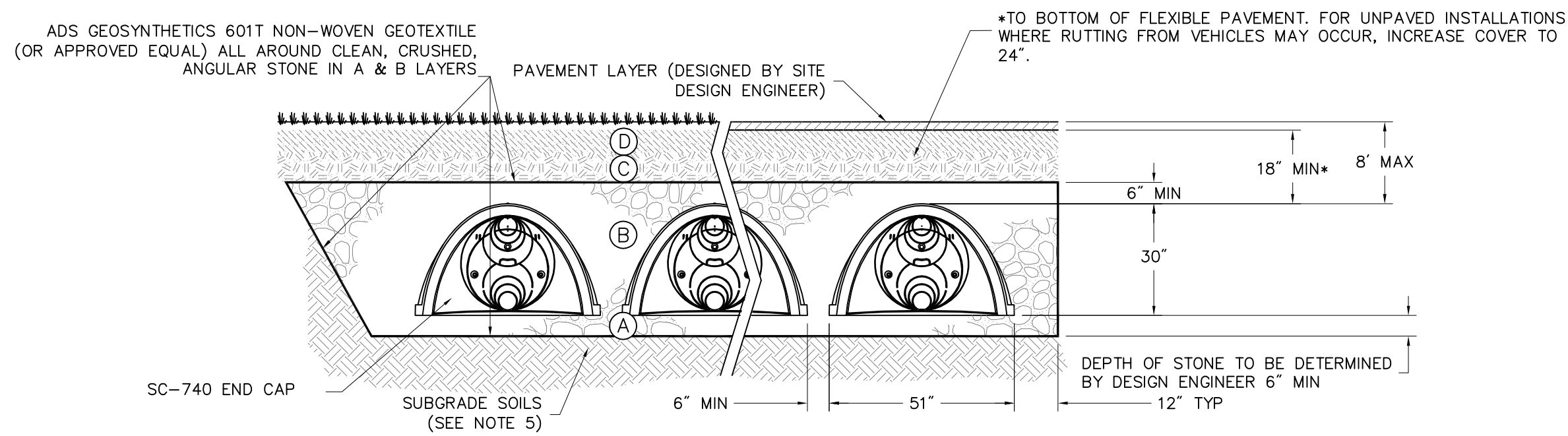
### MC - 3500 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD\_



### SC - 740 Chambers -Typical Section

N.T.S.

Source: VHB

11/16

LD.



N.T.S

Source: VHE

11/10

LD

# Cambrian Rise Project

North Avenue  
Burlington, Vermont

| No. | Revision | Date | Appvd. |
|-----|----------|------|--------|
|-----|----------|------|--------|

|                           |                              |
|---------------------------|------------------------------|
| Designed by<br><b>TAS</b> | Checked by<br><b>PBS</b>     |
| Issued for                | Date<br><b>Nov. 22, 2016</b> |

Not Approved for Construction

# Drawing Title Infiltration System Cross Sections and Notes

Drawing Number

## C6.9

Sheet 0

Project Number  
57848.00



PROJECT COORDINATION    UPDATED 8/5/16

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 CLEARING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

1. Remove surface debris.
2. Clear site of plant life and grass.
3. Remove trees and shrubs.
4. Remove root system of trees and shrubs.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 PROTECTION

- A. Protect utilities that remain from damage.
- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect bench marks and existing structures from damage or displacement.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.02 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within marked areas. Remove stumps, roots and tap roots and other projections 14" or greater in diameter to 2'-0" below the excavated surfaces in cut areas and 2'-0" below the exposed subgrade in fill areas.

3.03 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. The Contractor shall coordinate Work with the Engineer and Owner in establishing suitable areas within the property limits for depositing debris, rocks and extracted plant life. The Contractor shall be responsible for backfilling (capping) and grading all waste sites.

3.04 UTILITIES

- A. Coordinate with utility companies and agencies as required.

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<br>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<br>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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 3"                | 100                                            |
| 3/4"              | 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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 1"                | 100                                            |
| 3/4"              | 90 – 100                                       |
| 3/4"              | 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 |
|-------------------|-------------------------|
| 3 1/2"            | 100                     |
| 3"                | 90 – 100                |
| 2"                | 75 – 100                |
| 1"                | 50 – 80                 |
| 1/2"              | 30 – 60                 |
| No. 4             | 15 – 40                 |
| No. 200           | 0 – 6                   |

2.1. RECYCLED ASPHALT PAVEMENT (RAP) 1 1/2" 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<br>Passing Square Mesh Sieve |
|-------------------|------------------------------------------------|
| 2"                | 100                                            |
| 1 1/2"            | 90 – 100                                       |
| No. 4             | 30 – 60                                        |
| No. 100           | 0 – 12                                         |
| No. 200           | 0 – 6                                          |

2.6 SAND BORROW AND CUSHION

- A. Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the requirements for Vermont AOT Standard Specifications and the gradation requirements shown in Table 703.03A of the Vermont AOT Standard Specifications.

| Sieve Designation | Percent Finer by Weight |
|-------------------|-------------------------|
| 2"                | 100                     |
| 1 1/2"            | 90 – 100                |
| 1/2"              | 70 – 100                |
| No. 4             | 60 – 100                |
| No. 100           | 0 – 20                  |
| No. 200           | 0 – 8                   |

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. 40 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 some 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 disk, 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<br>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.

SITE ENGINEER:



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

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CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 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.                                                                                                                                                                                                                                                                                                           |  | bituminous mixture, constructed on a prepared foundation in accordance with these Specifications and the type of surface being placed, and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer.                                                                          |  | C. Longitudinal joints that have become cold shall be coated with Emulsified Asphalt, Type RS-1, before the adjacent mat is placed. If they have been exposed to traffic, they shall be cut back to a clean vertical edge prior to painting with the emulsion. |  | distress in the buildings and verification of quality and quantity of water in all individual water systems.                                                                                                                                                                                                                                                                                         |  | from 1 inch to 12 inches, and at least 50 percent of the volume of the stone in place shall have a dimension of 4 inches.                                                                                                                                                                                                                                                           |  |
| 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. Unless otherwise directed, longitudinal joints shall be offset at least 6" from any joint in the lower courses of pavement. Transverse joints shall not be constructed nearer than one foot from the transverse joints constructed in lower courses.        |  | 2. Verify site conditions and note all subsurface irregularities, which may affect any work requiring blasting.                                                                                                                                                                                                                                                                                      |  | 2. Type II – The longest dimension of the stone shall vary from 2 inches to 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches.                                                                                                                                                                                       |  |
| D. The completed trench bottom shall be firm for its full length and width.                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                     |  | 3.07 TOLERANCES                                                                                                                                                                                                                                                |  | 3. Identify required lines, levels, contours and datum.                                                                                                                                                                                                                                                                                                                                              |  | 3. Type III – The longest dimension of the stone shall vary from 3 inches to 48 inches and at least 50 percent of the volume of the stone in place shall have a least dimension of 16 inches.                                                                                                                                                                                       |  |
| 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.                                                                                                                                                                                                                                                                                                |  | 1.02 QUALITY ASSURANCE                                                                                                                                                                                                                                                                                                                              |  | A. Use adequate numbers of skilled workers 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. Scheduled Compacted Thickness: Within 1/4 inch.                                                                                                                                                                                                                                                                                                                                                   |  | 4. Type IV – The longest dimension of the stone shall vary from 3 inches to 60 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 20 inches.                                                                                                                                                                                       |  |
| 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.                                                                                                                                                                                                                                                                         |  | A. All materials and installation shall be in accordance with The Asphalt Institute Manual (MS-4) and the VAOT Standard Specifications, (Latest Edition).                                                                                                                                                                                           |  | C. Mixing Plant: Conform to State of Vermont Standards.                                                                                                                                                                                                        |  | C. Variation from True Elevation: Within 1/2 inch.                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                     |  |
| G. Excavating for appurtenances:                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | D. Obtain materials from same source throughout.                                                                                                                                                                                                                                                                                                    |  | 1.03 PROJECT CONDITIONS                                                                                                                                                                                                                                        |  | 3.08 FIELD QUALITY CONTROL                                                                                                                                                                                                                                                                                                                                                                           |  | PART 3 – EXECUTION                                                                                                                                                                                                                                                                                                                                                                  |  |
| 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.                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                     |  | A. Bituminous concrete shall not be placed between November 1 and May 1. Material shall not be placed when the granular subbase is wet or when the air temperature at the paving site in the shade and away from artificial heat is as follows:                |  | A. Permit no vehicular traffic on surfaces until thoroughly cool and hard.                                                                                                                                                                                                                                                                                                                           |  | 3.01 INSPECTION                                                                                                                                                                                                                                                                                                                                                                     |  |
| 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.                                                                                                                                                                                                                                                               |  |                                                                                                                                                                                                                                                                                                                                                     |  | Air Temperature<br>Degrees Fahrenheit                                                                                                                                                                                                                          |  | C. Settlement – Should any pavement settle within one year of completion of the Contract, such pavement shall be repaired at the Contractor's expense. If the Contractor fails to make such repairs promptly upon receipt of notice to do so from the Owner, then the Owner may make such repairs as necessary and the Contractor shall pay the Owner for all costs incurred in making such repairs. |  | A. Examine the areas and conditions under which storm sewer system work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.                                                                                        |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  | Pavement<br>Compacted Depth                                                                                                                                                                                                                                    |  | 3.09 REPAIR OF SUBSIDENCE                                                                                                                                                                                                                                                                                                                                                                            |  | 3.02 GENERAL                                                                                                                                                                                                                                                                                                                                                                        |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  | 40 Degrees or below                                                                                                                                                                                                                                            |  | A. Settlement – Should any pavement settle within one year of completion of the Contract, such pavement shall be repaired at the Contractor's expense. If the Contractor fails to make such repairs promptly upon receipt of notice to do so from the Owner, then the Owner may make such repairs as necessary and the Contractor shall pay the Owner for all costs incurred in making such repairs. |  | A. 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.                                                                                                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  | 50 Degrees or below                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 3.03 PREPARATION                                                                                                                                                                                                                                                                                                                                                                    |  |
| H. Excavation shall not interfere with normal 45° bearing splay of foundations.                                                                                                                                                                                                                                                                                                                                                                                                            |  | PART 2 – PRODUCTS                                                                                                                                                                                                                                                                                                                                   |  | Less than 1 1/4"                                                                                                                                                                                                                                               |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. Hand trim excavation (where necessary) to required elevations. Correct over-excavations with fill material.                                                                                                                                                                                                                                                                      |  |
| I. All trenching shall be in accordance with the latest OSHA requirements.                                                                                                                                                                                                                                                                                                                                                                                                                 |  | 2.01 MATERIALS                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | B. The slopes shall be graded to match the grade as shown on the plans. Where required, end sections shall be placed and backfilled to prevent undermining.                                                                                                                                                                                                                         |  |
| 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.                                                                                                                                                                                |  | A. Materials shall be combined and graded to meet the criteria as defined in the VAOT Standard Specifications, Division 700 for bituminous concrete.                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | C. Remove large stones or other hard matter which could damage drainage structures or impede consistent backfilling or compaction.                                                                                                                                                                                                                                                  |  |
| K. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.                                                                                                                                                                                                                                                                                                                                                       |  | B. Gradation: Materials shall be combined and graded to meet composition limits specified in VAOT Standard Specification, Section 406.03, for the base course and finish course. Unless specifically shown on the Plans, all                                                                                                                        |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 3.04 INSTALLATION OF PIPE                                                                                                                                                                                                                                                                                                                                                           |  |
| 3.03 BEDDING                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | 1. Bituminous concrete pavement shall be designed in conformance with the design criteria for heavy duty bituminous concrete pavement. (75 blows/side)                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. All pipe and fittings shall be carefully examined for defects and no pipe or fittings shall be laid which are known to be defective. If any defective piece is discovered after laying, it shall be removed and replaced at the Contractor's expense. All pipes and fittings shall be cleaned before they are laid and shall be kept clean until accepted in the completed work. |  |
| 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.                                                                    |  | 2. All Asphalt Cement used in the bituminous concrete pavement shall be PG 58-28 (or VTrans approved mix) unless otherwise noted.                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | B. The pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.                                                                                                                         |  |
| 3.04 BACKFILLING                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | C. Thickness of paving for drives and parking lots shall be as shown on the plans, consisting of base course and finish course.                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | C. Unless otherwise permitted by the Engineer, the Contractor shall provide for the temporary diversion of water to permit the installation of the pipe in a reasonably dry trench.                                                                                                                                                                                                 |  |
| A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.                                                                                                                                                                                                                                                                                                                                                                  |  | D. For pavement reconstruction areas due to trenching, the depth of each course shall be increased by 1/2". Pavement reconstruction caused by trench reopening due to improper placement or non-approved placement shall be performed at no additional cost to the Owner.                                                                           |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | D. Where the pipe is to be laid below the existing ground line, 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.                                                                                                                         |  |
| 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 ½ inch thick, or stones greater than 50 pounds or larger than six inches in the widest dimension. |  | PART 3 – EXECUTION                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | E. The completed trench bottom shall be firm for its full length and width.                                                                                                                                                                                                                                                                                                         |  |
| C. If additional material is required, it shall be furnished from approved sources.                                                                                                                                                                                                                                                                                                                                                                                                        |  | 3.01 INSTALLATION                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | F. If indicated on the plans or directed by the Engineer, unsuitable foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with Granular Backfill, or other specified or approved material.                                                                                                                                          |  |
| 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.                                                                                                                                                                                                                                   |  | A. Install in accordance with VAOT Standard Specifications, Section 406.                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | G. The Contractor shall take all necessary precautions to prevent floatation of the pipe in the trench.                                                                                                                                                                                                                                                                             |  |
| 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.                                                                                                                                                                                                                                                                                             |  | 3.02 EXAMINATION                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | H. When pipe laying is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe is eliminated.                                                                                                                         |  |
| 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.                                                                                                                                                                                                                                                                    |  | A. Verify that compacted granular base is dry and ready to support paving and imposed loads.                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 3.05 MANHOLES                                                                                                                                                                                                                                                                                                                                                                       |  |
| G. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.                                                                                                                                                                                                                                                                                                                                                                                           |  | B. Verify gradients and elevations of base are correct.                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. Precast concrete structures:                                                                                                                                                                                                                                                                                                                                                     |  |
| 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.                                                                                                                                                                |  | 3.03 PREPARATION                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 1. Place precast concrete structures and covers as shown on the Drawings.                                                                                                                                                                                                                                                                                                           |  |
| 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.                                                                                                                                                                                                                                                  |  | A. Matching Surfaces: When a new pavement is to match an existing bituminous pavement for a roadway or trench, the Contractor shall vertically smooth cut the existing pavement, over the existing gravel base. The smooth cut shall be thoroughly cleaned and coated with Emulsified Asphalt, RS-1, just prior to paving.                          |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2. Where manholes occur in pavement, set tops of frames and covers flush with finish surface.                                                                                                                                                                                                                                                                                       |  |
| 1. Around all structures, under roadway paving, shoulder and embankments – 95%.                                                                                                                                                                                                                                                                                                                                                                                                            |  | 3.04 PREPARATION – TACK COAT                                                                                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 3. Provide rubber joint gasket complying with ASTM C443.                                                                                                                                                                                                                                                                                                                            |  |
| 2. All other areas – 90%.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | A. When the bottom course of bituminous concrete pavement is left over the winter, or paving is to be made over an existing bituminous concrete pavement, the existing surface shall be cleaned and Emulsified Asphalt applied before the next course is applied.                                                                                   |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | CURBS AND WALKS                                                                                                                                                                                                                                                                                                                                                                     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | B. Also apply to contact surfaces of curbs.                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | PART 1 – GENERAL                                                                                                                                                                                                                                                                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | C. Coat surfaces of manhole and catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.                                                                                                                                                                                                                 |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 1.01 SUMMARY                                                                                                                                                                                                                                                                                                                                                                        |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 3.05 PLACING ASPHALT PAVEMENT                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. Section includes:                                                                                                                                                                                                                                                                                                                                                                |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | A. Place to compacted thickness identified on the plans.                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 1. Concrete Curbs                                                                                                                                                                                                                                                                                                                                                                   |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | B. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2. Concrete Sidewalks                                                                                                                                                                                                                                                                                                                                                               |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | C. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.                                                                                                                                                                                                                                                 |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | PART 2 – PRODUCTS                                                                                                                                                                                                                                                                                                                                                                   |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 3.06 JOINTS                                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2.01 CONCRETE                                                                                                                                                                                                                                                                                                                                                                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | A. Joints between old and new pavements or between successive day's work shall be made so as to insure a thorough and continuous bond between the old and new mixtures. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed from the mat and a joint constructed. |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. The concrete shall have a minimum compressive strength of 4,000 psi at 28 days and shall conform to the requirements of Cast-in-Place Concrete.                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | B. Butt joints shall be formed by cutting the pavement in a vertical plane at right angles to the centerline where the pavement has a true surface as determined by the use of a straight-edge. The butt joint shall be thoroughly coated with Emulsified Asphalt, Type RS-1, just prior to depositing the paving mixtures.                         |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2.02 ADMIXTURES                                                                                                                                                                                                                                                                                                                                                                     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | A. Air-entraining admixture shall meet or exceed ASTM C260. Air content shall range from minimum of 5% to 7%.                                                                                                                                                                                                                                                                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2.03 EXPANSION JOINT MATERIAL                                                                                                                                                                                                                                                                                                                                                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                                                                                                                                     |  |
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PART 3 – EXECUTION

3.01 INSTALLATION

A. Install in accordance with VAOT Standard Specifications, Section 406.

3.02 EXAMINATION

A. Verify that compacted granular base is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.03 PREPARATION

A. Matching Surfaces: When a new pavement is to match an existing bituminous pavement for a roadway or trench, the Contractor shall vertically smooth out the existing pavement, over the existing gravel base. The smooth out shall be thoroughly cleaned and coated with Emulsified Asphalt, RS–1, just prior to paving.

3.04 PREPARATION – TACK COAT

A. When the bottom course of bituminous concrete pavement is left over the winter, or paving is to be made over an existing bituminous concrete pavement, the existing surface shall be cleaned and Emulsified Asphalt applied before the next course is applied.

B. Also apply to contact surfaces of curbs.

C. Coat surfaces of manhole and catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.05 PLACING ASPHALT PAVEMENT

A. Place to compacted thickness identified on the plans.

B. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

C. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.06 JOINTS

A. Joints between old and new pavements or between successive day's work shall be made so as to insure a thorough and continuous bond between the old and new mixtures. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed from the mat and a joint constructed.

B. Butt joints shall be formed by cutting the pavement in a vertical plane at right angles to the centerline where the pavement has a true surface as determined by the use of a straight–edge. The butt joint shall be thoroughly coated with Emulsified Asphalt, Type RS–1, just prior to depositing the paving mixtures.

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Base Courses

2. Leveling Courses

3. Finish Course

B. General: This work shall consist of one or more courses of

C. Longitudinal joints that have become cold shall be coated with Emulsified Asphalt, Type RS–1, before the adjacent mat is placed. If they have been exposed to traffic, they shall be cut back to a clean vertical edge prior to painting with the emulsion.

D. Unless otherwise directed, longitudinal joints shall be offset at least 6" from any joint in the lower courses of pavement. Transverse joints shall not be constructed nearer than one foot from the transverse joints constructed in lower courses.

3.07 TOLERANCES

A. The surface will be tested by the Engineer using a 16 foot straight–edge at selected locations parallel with the centerline. Any variations exceeding 3/16 of an inch between any two contacts shall be satisfactorily eliminated. A 10 foot straight–edge may be used on a vertical curve. The straight–edges shall be provided by the Contractor.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from True Elevation: Within 1/2 inch.

3.08 FIELD QUALITY CONTROL

A. Permit no vehicular traffic on surfaces until thoroughly cool and hard.

3.09 REPAIR OF SUBSIDENCE

A. Settlement – Should any pavement settle within one year of completion of the Contract, such pavement shall be repaired at the Contractor's expense. If the Contractor fails to make such repairs promptly upon receipt of notice to do so from the Owner, then the Owner may make such repairs as necessary and the Contractor shall pay the Owner for all costs incurred in making such repairs.

ROCK AND BOULDER EXCAVATION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work included: Furnish all labor and equipment required for excavation, disposal and replacement of rock and boulders.

a. All boulders within the range boundaries shown on the site plans to be removed shall be included as part of the Contractors mass rock removal.

1.2 SUBMITTALS

A. Blasting Plan: For record purposes; approved by authorities having Jurisdiction.

B. Seismic Survey Report: For record purposes; from seismic survey agency.

C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.3 QUALITY ASSURANCE

A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:

1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

2. Seismographic monitoring during blasting operations.

3. Explosive Firm: The company specializing in explosives for disintegration of rock with a minimum of five (5) years documented experience.

B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

2. Seismographic monitoring during blasting operations.

3. Seismic Survey Firm: The company specializing in seismic surveys with a minimum of five (5) years documented experience.

1.4 SCHEDULING

A. Drilling operations shall be conducted Monday through Friday, from 7:00 A.M. to 4:00 P.M.

B. Blasting operations shall be conducted Monday through Friday, from 8:00 A.M. to 4:00 P.M.

C. Notification: Notify adjacent property owners and residents (within 1,500') a minimum of seven (7) days in advance of all anticipated blasting operations. Explain blasting and seismic operation and schedule.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Pre–Blast Survey and Site Examination:

1. Conduct a pre–blast survey on all adjacent buildings and individual water systems within a distance of 1,500 feet. Also include pre–blast surveys for up to six (6) residences along Range Road in Underhill Center. The survey shall include pictures and notes of all signs of

distress in the buildings and verification of quality and quantity of water in all individual water systems.

2. Verify site conditions and note all subsurface irregularities, which may affect any work requiring blasting.

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

4. Obtain a seismic survey prior to rock excavation to determine maximum charges that can be used without damaging adjacent properties, other work or existing utilities.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, and other hazards created by blasting operations.

B. When ledge rock or boulders are encountered, the material shall be uncovered and the Contractor shall take cross–sections of the ledge rock surface. If the Contractor uncovers ledge but fails to cross section the undisturbed material, the Contractor shall have no right-of–claim to any classification other than that allowed by the Owner.

3.3 EXPLOSIVES

A. Explosives: Obtain written permission and all necessary permits from authorities having jurisdiction (local, state and federal) before bringing explosives to Project site or using explosives on Project site.

1. Perform blasting without damaging adjacent structures, property, or site improvements.

2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least–practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

A. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction.

3.5 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavations under construction.

1. If rock below grade is shattered by blasting caused by holes drilled too deep, or too heavy charges of explosives, or any other circumstance due to blasting, and if such shattered rock does not provide suitable foundation, the rock shall be removed and the excavation refilled with screened gravel at the expense of the Contractor.

DRAINAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Culvert pipe and appurtenances.

2. Stone fill.

3. Drainage Structures

1.02 REFERENCES

A. Vermont Agency of Transportation Standard Specifications, Latest Edition.

1.03 SUBMITTALS

A. Manufacturer's technical data for:

1. Pipe and appurtenances.

2. Structures.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of the same type and class of material as the conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer.

B. All culverts and storm drains shall meet the requirements of Section 601 of the Standard Specifications.

2.02 DRAINAGE PIPE & PERFORATED PIPE

A. Culvert / Drainage Pipe

1. Corrugated Polyethylene pipe and fittings (smooth interior) meeting the requirements of AASHTO M–294 and M–252

2. for drainage piping installed by directional boring techniques, use PE 3408 high density polyethylene pipe meeting ASTM D3350 Standard (SDR 11 or better)

2.03 CONCRETE STRUCTURES

A. ASTM C478, sized as indicated.

2.04 METAL ACCESSORIES

A. Manhole frames and covers:

1. Grey cast iron, ASTM A48, as shown on plans.

2.05 STONE FILL

A. Stone for stone fill shall be approved, hard, blasted angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). The least dimension of the stone shall be greater than 1/3 of the longest dimension. The stone fill shall be reasonably well graded from the smallest to the maximum size stone specified so as to form a compact mass when in place.

1. Type 1 – The longest dimension of the stone shall vary

from 1 inch to 12 inches, and at least 50 percent of the volume of the stone in place shall have a dimension of 4 inches.

2. Type II – The longest dimension of the stone shall vary from 2 inches to 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches.

3. Type III – The longest dimension of the stone shall vary from 3 inches to 48 inches and at least 50 percent of the volume of the stone in place shall have a least dimension of 16 inches.

4. Type IV – The longest dimension of the stone shall vary from 3 inches to 60 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 20 inches.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which storm sewer system work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 GENERAL

A. 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.

3.03 PREPARATION

A. Hand trim excavation (where necessary) to required elevations. Correct over–excavations with fill material.

B. The slopes shall be graded to match the grade as shown on the plans. Where required, end sections shall be placed and backfilled to prevent undermining.

C. Remove large stones or other hard matter which could damage drainage structures or impede consistent backfilling or compaction.

3.04 INSTALLATION OF PIPE

A. All pipe and fittings shall be carefully examined for defects and no pipe or fittings shall be laid which are known to be defective. If any defective piece is discovered after laying, it shall be removed and replaced at the Contractor's expense. All pipes and fittings shall be cleaned before they are laid and shall be kept clean until accepted in the completed work.

B. The pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.

C. Unless otherwise permitted by the Engineer, the Contractor shall provide for the temporary diversion of water to permit the installation of the pipe in a reasonably dry trench.

D. Where the pipe is to be laid below the existing ground line, 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.

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

F. If indicated on the plans or directed by the Engineer, unsuitable foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with Granular Backfill, or other specified or approved material.

G. The Contractor shall take all necessary precautions to prevent floatation of the pipe in the trench.

H. When pipe laying is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe is eliminated.

3.05 MANHOLES

A. Precast concrete structures:

1. Place precast concrete structures and covers as shown on the Drawings.

2. Where manholes occur in pavement, set tops of frames and covers flush with finish surface.

3. Provide rubber joint gasket complying with ASTM C443.

CURBS AND WALKS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Concrete Curbs

2. Concrete Sidewalks

PART 2 – PRODUCTS

2.01 CONCRETE

A. The concrete shall have a minimum compressive strength of 4,000 psi at 28 days and shall conform to the requirements of Cast-in–Place Concrete.

2.02 ADMIXTURES

A. Air–entraining admixture shall meet or exceed ASTM C260. Air content shall range from minimum of 5% to 7%.

2.03 EXPANSION JOINT MATERIAL



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| A. Expansion joint material shall be premolded bituminous filler conforming to ASTM D994.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  | excluded for such additional time as the Engineer may direct. |  |  | change in size of direction shall be gradual and even. |  |  | Department. Concrete for thrust blocks and anchors shall be Class B concrete. Steel rods and clamps as required shall be galvanized and rust proofed or painted. |  |  | 2. Vacuum Test: This method of testing manholes for leakage involves the use of a device for sealing the top of the manhole cone section and pumping the air out of the manhole, creating a vacuum and holding this vacuum for a prescribed period of time. The procedure for this test is as follows: |  |  | SITE ENGINEER:<br><br>CIVIL ENGINEERING ASSOCIATES, INC.<br>10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403<br>802-864-2323 FAX: 802-864-2271 web: www.ces-vt.com<br>COPYRIGHT © 2016 – ALL RIGHTS RESERVED                                                                                                                                                                        |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
| PART 3 – EXECUTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | DRAWN<br>SAL                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  | CHECKED<br>DSM                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |
| 3.01 CONCRETE CURBS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | APPROVED<br>DSM                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  | CLIENT:                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |
| A. Excavation shall be made to the required depth and the base material upon which the curb is to be set shall be compacted to a firm, even surface. All soft and unsuitable material shall be removed and replaced with suitable material which shall be thoroughly compacted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | a. All lifting holes and exterior joints shall be filled and pointed with an approved non-shrinking mortar. The completed manhole shall not be backfilled prior to testing. Manholes which have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage by means of the exfiltration leakage test.                                                                                          |  |  | BC COMMUNITY HOUSING, LLC<br><br>P.O. BOX 1335<br>BURLINGTON VERMONT 05402                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| B. Installation: The curb shall be set so that the front top line is in close conformity to the line and grade required. All space under the curbing shall be filled and thoroughly tamped with material meeting the requirements of the material for the bed course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | b. All pipes and other openings into the manhole shall be suitably plugged in a manner to prevent displacement.                                                                                                                                                                                                                                                                                                                                                         |  |  | PROJECT:                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |
| C. Concrete Mixing and Placing: Compaction of concrete placed in the forms shall be by spading or other approved methods. Forms shall be left in place for 24 hours or until the concrete has set sufficiently so that they can be removed without injury to the curbing. Upon removal of the forms, the curb shall be immediately rubbed down to a smooth and uniform surface but no plastering will be permitted. For this work, competent and skillful finishers shall be employed.                                                                                                                                                                                                                                                                                                                                                                 |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | c. A plate with an inflatable rubber ring the size of the top of the manhole shall be installed by inflating the ring with air to pressure adequate to prevent leakage of air between the rubber ring and the manhole wall.                                                                                                                                                                                                                                             |  |  | CAMBRIAN RISE                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
| D. Sections: Curbing shall be constructed in sections having a uniform length of ten feet, unless otherwise ordered. Sections shall be separated by open joints 1/8 inch wide except at expansion joints.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | d. Air shall then be pumped out of the manhole through an opening in the plate until a vacuum is created inside of the manhole equal to 10 inches of mercury on an approved vacuum gauge. The removal of air shall then be stopped and the test begun.                                                                                                                                                                                                                  |  |  | 311 & 329 NORTH AVE.<br>BURLINGTON, VT                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| E. Expansion Joints: Expansion joints shall be formed at the intervals shown on the plans using a pre-formed expansion joint filler having a thickness of 1/4 inch cut to conform to the cross-section of the curb. They shall be constructed at 60 foot intervals or as directed by the Engineer. When the curb is constructed adjacent to or on concrete pavement, expansion joints shall be located opposite or at expansion joints in the pavement.                                                                                                                                                                                                                                                                                                                                                                                                |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | e. The manhole shall pass this test if the vacuum holds at 10" Hg or drops no lower than 9" Hg within the following times:                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | f. If the vacuum drop exceeds 1" Hg during the specified time periods, the manhole shall be resealed and Steps 2 through 5 above repeated until the vacuum holds for the specified time.                                                                                                                                                                                                                                                                                |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | g. After the manhole passes the vacuum test, it shall be backfilled carefully so that no leaks are created. If the manhole is disturbed in any way during backfill, it shall again be vacuum tested according to Steps 1 through 5 above. If the manhole fails the vacuum test, the Contractor shall test the manhole using the manhole exfiltration test.                                                                                                              |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | h. The Contractor shall provide the Engineer with a written log of each manhole leakage test result.                                                                                                                                                                                                                                                                                                                                                                    |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | i. Manholes shall be tested and accepted prior to building manhole inverts.                                                                                                                                                                                                                                                                                                                                                                                             |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
| 3.02 GRANITE CURBING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 3.07 PRESSURE PIPE TESTING                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
| A. Sloped granite curbing shall be hard, durable, reasonably uniform in appearance and free from weakening seams. Surfaces shall be as follows:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | A. General: All force mains shall pass the hydrostatic pressure test and leakage test described herein. Prior to testing, all anchors and braces shall be installed. All concrete thrust blocks and restraints shall be in place and cured at least seven days. All buried pipe shall be backfilled. Suitable test plugs shall be installed and air release valves shall be installed at the high points.                                                               |  |  | B. Hydrostatic Test: The following procedure shall be used:                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |
| – Top: 6" wide, sawn true plane.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 1. All air release valves shall be opened and the pipe shall be filled with water at a rate not to exceed the venting capacity of the air release valves.                                                                                                                                                                                                                                                                                                               |  |  | 1. All air release valves shall be opened and the pipe shall be filled with water at a rate not to exceed the venting capacity of the air release valves.                                                                                                                                                                                                                                                                                                               |  |  |
| – Front Face: Smooth quarry split, right angle top (No drill holes showing in top 10")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 2. The water pressure shall be raised to 150 percent of the designed operating pressure or 60 psi minimum at the highest point.                                                                                                                                                                                                                                                                                                                                         |  |  | 2. The water pressure shall be raised to 150 percent of the designed operating pressure or 60 psi minimum at the highest point.                                                                                                                                                                                                                                                                                                                                         |  |  |
| – Back Face Exposed: Plane parallel with front face, straight split to 1 1/2" below surface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 3. Failure to hold the designated pressure within 5 psi of the specified test pressure for the two hour period constitutes a failure of the section tested.                                                                                                                                                                                                                                                                                                             |  |  | 3. Failure to hold the designated pressure within 5 psi of the specified test pressure for the two hour period constitutes a failure of the section tested.                                                                                                                                                                                                                                                                                                             |  |  |
| – End Face Exposed: Square planes on top and face.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C. Leakage Test: The following procedure shall be used:                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  | C. Leakage Test: The following procedure shall be used:                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |
| – Joints Exposed: Maximum 1" and pointed with mortar. Exposed faces shall be finished with a jointer. Remove all excess mortar from exposed faces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 1. Leakage shall be defined as the quantity of water that must be supplied into the pipe being tested to maintain pressure within 5 psi of the specified test pressure.                                                                                                                                                                                                                                                                                                 |  |  | 1. Leakage shall be defined as the quantity of water that must be supplied into the pipe being tested to maintain pressure within 5 psi of the specified test pressure.                                                                                                                                                                                                                                                                                                 |  |  |
| – Length: Minimum length 3'.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 2. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:                                                                                                                                                                                                                                                                                                                                                      |  |  | 2. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Provide curved curbing to conform to radii indicated on the Contract Plans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | L = ND(P) <sup>0.5</sup><br>7,400                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  | L = ND(P) <sup>0.5</sup><br>7,400                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | L = SD(P) <sup>0.5</sup><br>133,100                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  | L = SD(P) <sup>0.5</sup><br>133,100                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | S = Length of Pipe Testing<br>L = Allowable Leakage in Gal/Hr<br>D = Nominal Diameter of Pipe (")<br>P = Average Test Pressure (psi)<br>N = Number of Joints in the Pipeline Tested                                                                                                                                                                                                                                                                                     |  |  | S = Length of Pipe Testing<br>L = Allowable Leakage in Gal/Hr<br>D = Nominal Diameter of Pipe (")<br>P = Average Test Pressure (psi)<br>N = Number of Joints in the Pipeline Tested                                                                                                                                                                                                                                                                                     |  |  |
| 3.03 CONCRETE SIDEWALKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | All testing shall be conducted in accordance with AWWA C600-87 or latest revision.                                                                                                                                                                                                                                                                                                                                                                                      |  |  | All testing shall be conducted in accordance with AWWA C600-87 or latest revision.                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| A. Excavation and Foundation: Excavation shall be made to the required depth and to a width that will permit placing of bed course material and the installation and bracing of the forms. Bed course material shall be placed to the depth and section shown on the plans. When the layer required exceeds six inches, two layers of approximately equal depth shall be placed and each layer thoroughly compacted so that it is hard and unyielding. The wetting of bed course material may be required to obtain the compaction.                                                                                                                                                                                                                                                                                                                    |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 3.08 PUMP STATION AND STORAGE TANK TESTING                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  | 3.08 PUMP STATION AND STORAGE TANK TESTING                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| B. Finishing: The surface shall be finished with a wooden float. No plastering will be permitted. The edges shall be rounded with an edger having a radius of 1/4 inch. The surface of the sidewalk, after the floating and screeding process is completed, shall be finished with a broom of a type approved by the Engineer, drawn over the surface parallel to the transverse joints. Special texturing on sidewalk ramps shall be installed in accordance with construction plan details.                                                                                                                                                                                                                                                                                                                                                          |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | A. Pump Station and Storage Tank Testing: All manholes and storage tanks shall be tested for leakage in accordance with the following procedure:                                                                                                                                                                                                                                                                                                                        |  |  | A. Pump Station and Storage Tank Testing: All manholes and storage tanks shall be tested for leakage in accordance with the following procedure:                                                                                                                                                                                                                                                                                                                        |  |  |
| C. Joints: Unless otherwise indicated on the plans or directed by the Engineer, expansion joints shall not be used in the sidewalk. Expansion joints shall be formed around all appurtenances such as manholes, utility poles and other obstructions extending into and through the sidewalk. Pre-formed joint filler 1/4 inch thick shall be installed in these joints. Expansion joint filler of the thickness indicated shall be installed between concrete sidewalks and any fixed structure such as a building or bridge. This expansion joint material shall extend for the full depth of the walk. Between the expansion joints, the sidewalk shall be divided at intervals of 5 feet by dummy joints formed by sawcutting or other acceptable means as directed to provide grooves approximately 1/16 inch wide and at least 1/3 of the depth. |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | B. Water Test: After the structure has been assembled in place, all lifting holes and exterior joints shall be filled and pointed with non shrinking mortar. All pipes and other openings into the structure shall be suitably plugged and the plugs placed to prevent blowout.                                                                                                                                                                                         |  |  | B. Water Test: After the structure has been assembled in place, all lifting holes and exterior joints shall be filled and pointed with non shrinking mortar. All pipes and other openings into the structure shall be suitably plugged and the plugs placed to prevent blowout.                                                                                                                                                                                         |  |  |
| When the sidewalk is constructed next to a concrete curb expansion, joint material shall be placed between sidewalk and curb for the depth of the sidewalk.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 1. Each structure shall be checked for exfiltration by filling with water to the top of the cone section. A stabilization period of one hour shall be provided to allow for absorption. At the end of this period, the structure shall be refilled to the top of the cone, if necessary, and the measuring time of at least six hours begun. At the end of the test period, the structure shall be refilled to the top of the cone measuring the volume of water added. |  |  | 1. Each structure shall be checked for exfiltration by filling with water to the top of the cone section. A stabilization period of one hour shall be provided to allow for absorption. At the end of this period, the structure shall be refilled to the top of the cone, if necessary, and the measuring time of at least six hours begun. At the end of the test period, the structure shall be refilled to the top of the cone measuring the volume of water added. |  |  |
| D. Curing: During the curing period all traffic, both pedestrian and vehicular, shall be excluded. Vehicular traffic shall be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | 2. This amount shall be converted to a 24-hour rate and                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  | 2. This amount shall be converted to a 24-hour rate and                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |                                                               |  |  |                                                        |  |  |                                                                                                                                                                  |  |  |                                                                                                                                                                                                                                                                                                        |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  | C7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |
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service, the applicant's developer/contractor will be responsible for any necessary repairs or corrections as part of the project warranty. At the end of a one-year period, an inspection will be performed by the Town Water Department prior to the system owner assuming ownership of any of the lines and appurtenances. The contractor shall correct any punch list items accumulated during the inspection after receipt of this list. Incomplete work on the system shall not be included in the initial inspection, but shall be inspected as the project continues. The contractor shall repair, replace, or retest promptly as directed by the Town Water Department and without further charges, all work equipment, materials or parts, which may fail during the one year warranty period.

- B. A final walk-through inspection shall be conducted by the Town Water Department prior to the water system being accepted for ownership by the system owner. This inspection shall include but not be limited to:

- Valves, hydrants, and curb stops operating properly.
- Valve boxes and covers set plumb and at proper elevations.
- Proper hydrant nozzle height above grade.
- Proper hydrant opening direction, nozzle thread, and barrel color.
- Proper distance from the face of the curb of hydrant nozzles.
- Hydrant flags meeting Town Water Department specifications installed on each fire hydrant at the time of installation.
- Static and residual hydrant pressures and flow rates.
- Curb boxes inside ROW, set to grade, containing operating rod, and plumb.
- Tie information and record drawings complete and submitted.
- Material testing results, lab reports, manufacturers' certificates, and leakage test results complete and on file.
- General appearance and restoration.
- Submittal of O&M manuals in hard copy and Adobe Acrobat Reader (.pdf) format.
- Submittal of As-Built in hard copy format and Auto-CAD.DWG Version 2000 format or newer within 14 days of completion.

3.07 GENERAL INFORMATION

- A. All persons taking water must keep the fixtures and service pipe within their own premises in good repair and fully protected from frost, and must prevent unnecessary leakage of water. The Town Water Department shall not be liable for leakage of hydrants, pipes or fixtures upon the premises of any consumer, nor for obstructions therein by freezing or otherwise, nor for damages resulting from any of the foregoing causes. All leaks that are on the building side of the curb stop will be the owner's responsibility and repaired at the owner's expense.
- B. Water rates shall be collected for all water used until the water is shut off at the curb stop by the Town Water Department. No abatement of water rates will be allowed by reason of disuse, diminished use, or vacancy of premises without proper notice to the Town Water Department.
- C. The Town Water Department or system owner shall not be liable for any injury, loss or damage of whatever nature occasioned by the failure to maintain a constant or uniform pressure in the water mains, or for damages occasioned by or growing out of a stoppage of said water by frost or other cause, or for damage occasioned by or growing out of an insufficient supply of the same, or for accident or damage of any kind caused by or growing out of the use or failure of said water.
- D. No person shall open any hydrant or draw water there from except the Town Water Department personnel or persons under their direction, or the officers or designees of the municipal fire department and members of the fire companies under their direction for fire purposes, or those individuals who have been granted approval on a hydrant use application by the Town Water Department, in which case, all such usage shall be metered. Fines for unauthorized use of any hydrant or connection may be incurred, according to the Rules and Regulations of the Town Water Department.
- E. One curb stop and one water meter shall be installed for each individual dwelling unit, condominium unit, apartment unit, commercial or office occupancy. Exceptions may be permitted in cases where a condominium association signs a binding agreement to be responsible for all collection of water bills. In cases where condominiums are converted into separate apartments, separate curb stops and water meters shall be installed for each unit. Town Water Department employees shall install all water meters. Under no circumstances are plumbers or persons other than those authorized by the Town Water Department permitted to turn water on or off at the curb stop. The water will not in any instance be turned on to any premise for use until the Town Water Department has suitably attached a meter.
- F. The owner of the premises shall be responsible for all water payments. A change of tenants or premises will not relieve the owners from payment of a back bill.

STORM WATER PONDS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
- Construction of storm water detention pond.

PART 2 – PRODUCTS

- A. Compacted Fill/Granular Borrow: The material for the fill shall be obtained from the designated areas and shall conform to the requirements of Section 02210 – Site Earthwork. The material shall be free from stumps, wood,

brush, roots, sod, rubbish, and other matter that may decay. It should be free of stones over 2 inches in diameter where compacted by hand or mechanical tampers, or over 6 inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill, nor shall the fill material be placed on a frozen foundation.

- B. Stone Fill: Stone fill shall conform to the requirements of Type I Stone Fill as specified in Section 02439 – Stone Fill.
- C. Riser and Drain Pipe: Riser and drain pipe shall conform to the requirements of Section 02725 – Drainage.

PART 3 – EXECUTION

3.01 SITE PREPARATION

- A. The area to be covered by the pond and embankments shall be cleared of all trees, brush, stumps, roots and other objectionable material. The area to be covered by the earth embankment and the surface of the borrow area shall be stripped of all grass, roots, organic materials, or other objectionable materials to a depth that will insure the removal of any materials which will prevent bond between the foundation and the fill. Material cleared shall be disposed of in accordance with Section 02110 – Site Clearing. Where the embankment will be 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.

3.02 COMPACTED FILL/GRANULAR BORROW

- A. Preparation of Foundation: Upon completion of the clearing operation and just prior to placing the fill material on any portion of the foundation, that portion shall be scarified, plowed, or disked to a depth of 3 inches. All objectionable material exposed by this operation shall be disposed of outside the limits of the fill.
- B. Placing and Spreading Material: The placing and spreading of material shall be started at the lowest part of the section under construction and the fill constructed in layers of 6 inches. The layers shall slope slightly towards the reservoir to prevent puddles and provide for faster runoff in case of rain. Where possible, the layers shall extend over the entire area of the fill. The distribution and gradation of the materials throughout the fill shall be such that there be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The most porous borrow material shall be placed on the downstream portions of the embankment.
- C. Compaction: All fill shall be compacted to 95 % maximum density per ASTM D-698.
- D. Limits: The embankment shall be constructed where located and as detailed in the Contract Plans. Side slope shall be 1 vertical to 3 horizontal.
- E. Revisions to the proposed design of the detention pond may be necessary if, in the opinion of the Engineer, unsuitable material is found at the pond location.

3.03 SLOPE PROTECTION

- A. Placement: Stone Fill Type I shall be placed at locations indicated on the plans to a minimum thickness of 1'-0" in one course in a manner that will result in a reasonably well graded surface. Care shall be taken in the placing to avoid displacing of the underlying material. The stones shall be placed and distributed so that there will be no accumulations of either the larger or the smaller stones. Re-arrangement of the stone fill by hand labor or mechanical equipment may be required to obtain the specified results.

3.26 LANDSCAPING

- A. At completion of grading, slopes, ditches, and all disturbed areas shall be smooth and free of pockets with sufficient slope to ensure drainage. All disturbed areas shall receive a minimum of four inches (4") of topsoil and shall be seeded, fertilized, limed, and mulched in accordance with the following:

- Seed mixture in all areas shall be urban mix conforming to the table below. For seeding between September 1 and October 1, winter rye shall be used at an application rate of 100 pounds per acre.
- Fertilizer shall be standard commercial grade conforming to the State Fertilizer Law and to the Standards of the Association of Official Agricultural Chemists. Dry fertilizer, if used, shall be applied at the rate of 500 pounds per acre. Liquid fertilizer, if used, shall be applied in a 1-2-1 ratio with the minimum rate to include 100 pounds of nitrogen, 200 pounds of phosphate, and 100 pounds of potash per acre.
- Limestone shall conform to all State and Federal regulations and to the Standards of the Association of Official Agricultural Chemists. The limestone shall be applied at a rate of one ton per acre as directed.
- Within twenty-four (24) hours of application of fertilizer, lime, and seed, the surface shall be mulched with a hay mulch. Mulch shall be spread uniformly over the area at a rate of two (2) tons per acre.
- All turf establishment shall be performed in accordance with the Vermont Standard Specifications for Construction, Section 651.

URBAN MIX GRASS SEED

| Percentage<br>By Weight | Pounds Live Seed<br>Per Acre  | Type of Seed                                           |
|-------------------------|-------------------------------|--------------------------------------------------------|
| 37.50%                  | 45.0                          | Creeping Red Fescue                                    |
| 37.25%                  | 37.5                          | Kentucky Blue Grass,<br>Winter Hardy, Perennial Rye    |
| 31.25%                  | 37.5                          | (variety Pennfine, Manhattan,<br>or similar varieties) |
| 100%                    | 120 pounds live seed per acre |                                                        |

LANDSCAPE GRADING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
- Finish grading; bring rough grade in areas to design elevations as shown on the drawings.
  - Topsoil: Work shall consist of furnishing, placing and shaping topsoil, or placing, spreading, and shaping topsoil form stockpiles or stripped areas.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be loose, friable, reasonably free of admixtures of subsoil, free from refuses, stumps, roots, brush, weeds, rocks, and stones 1 1/4 inch in overall dimensions. The topsoil shall also be free from any material that will prevent the formation of a suitable seedbed or prevent seed germination and plant growth. It shall contain not less than three (3) nor more than twenty (20) percent organic matter. Any material which has become mixed with undue amounts of subsoil during any operation at the source or during placing or spreading will be rejected and shall be replaced by the Contractor with acceptable material.

PART 3 – EXECUTION

3.01 SUBGRADE PREPARATION

- A. Clean subgrade of all stumps, stones, roots, trash or other materials which might hinder proper tillage or spreading.
- B. All surfaces on which topsoil is to be placed shall be graded to a reasonably true surface and scarified by raking, discing or other approved means to a minimum depth of two inches before placing topsoil.

3.03 PLACING TOPSOIL

- A. Minimum final depth of topsoil shall be 4 inches.
- B. Place topsoil when seeding operations can closely follow spreading operations. Use topsoil in relatively dry state.
- C. Topsoil shall be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The depth stated in the contract to which the topsoil is to be placed is that required after final rolling of the material has taken place. All stones, roots and debris over 1 1/4 inch in diameter along with any sodding weeds and other undesirable material shall be removed.
- D. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.
- E. It shall be the Contractor's responsibility to restore to the line, grade and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the work.

SEEDING

PART 1 – GENERAL

1.1 Section Includes:

- A. Seeding.
- Furnish all labor, materials and equipment to complete all seeding work as shown on the drawings and specified herein.
  - Except where otherwise shown or specified, the Contractor shall seed all areas where new contours are shown on the drawings and all areas where existing ground cover has been disturbed by the Contractor's operations.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 PROJECT CONDITIONS

Planting Restrictions: Seeding and initial fertilizing shall be done between May 1st and September 15th unless otherwise authorized. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. If seeding is done during July or August, additional mulch material may be required. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 SEED

- A. Conservation Seed Mix:

| Kind of Seed        | Minimum<br>Purity | Minimum<br>Germination | Lbs./Acre |
|---------------------|-------------------|------------------------|-----------|
| Creeping Red Fescue | 98%               | 85%                    | 22.5      |
| Tall Fescue         | 95%               | 95%                    | 22.5      |
| Red Top             | 95%               | 90%                    | 3         |
| Birdsfoot Trefoil   | 98%               | 85%                    | 9         |
| Annual Ryegrass     | 95%               | 85%                    | 3         |
| TOTAL =             |                   |                        | 60        |

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 85 percent calcium carbonate equivalent and as follows:

- Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2.3 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer

of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

2.4 MULCHES

- A. Mulch: Provide air-dry, clean, mildew- and seed-free, hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

- Organic Matter Content: 50 to 60 percent of dry weight.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  - Protect grade stakes set by others until directed to remove them.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.
- Apply fertilizer directly to subgrade before loosening.
    - Do not mix fertilizer with planting soil if planting will not proceed within a few days.
    - Mix lime with dry soil before mixing fertilizer.
  - Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
  - Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
  - Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.2 APPLICATION RATES

- A. When a soil test is not available, the following minimum amounts should be applied:
- Agricultural limestone: 2 tons/acre.
  - Nitrogen (N): 50 lbs./acre.
  - Phosphate: 100 lbs./acre.
  - Potash: 100 lbs./acre.
    - This is the equivalent of 500 lbs./acre of 10-20-20 fertilizer or 1,000 lbs./acre of 5-10-10.
  - Hay mulch: 2 tons/acre.

3.3 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
- Do not use wet seed or seed that is moldy or otherwise damaged.
  - Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- C. Protect seeded areas with slopes exceeding 1:3 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- D. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a depth of 3/16 inch, and roll surface smooth.

3.4 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
- Mix slurry with fiber-mulch manufacturer's recommended tackifier.
  - Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.5 MAINTENANCE

- A. Maintain and establish seeding by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original

installation.

- In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
- Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
  - Seeded Areas: 90 days from date of Substantial Completion.
  - When initial maintenance period has not elapsed before end of planting season, or if seeding is not fully established, continue maintenance during next planting season.

3.6 SATISFACTORY CONDITIONS

- A. Installations shall meet the following criteria as determined by Engineer/Owner:
- Satisfactory Seeded Area: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
- B. Use specified materials to reestablish area that do not comply with requirements and continue maintenance until areas are satisfactory.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by work. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

SITE ENGINEER:



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

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DRAWN

SAL

CHECKED

DSM

APPROVED

DSM

CLIENT:

BC COMMUNITY  
HOUSING, LLC

P.O. BOX 1335  
BURLINGTON VERMONT  
05402

PROJECT:

CAMBRIAN RISE

311 & 329 NORTH AVE.  
BURLINGTON, VT

DATE

CHECKED

REVISION

SITE  
SPECIFICATIONS

DATE

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SCALE

NONE

PROJ. NO.

14215

DRAWING NUMBER

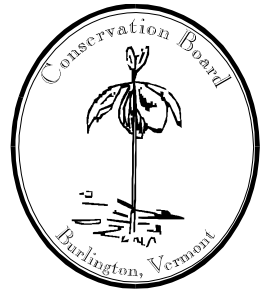
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## Burlington Conservation Board

149 Church Street  
Burlington, VT 05401  
<http://www.ci.burlington.vt.us/planning/>  
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Matt Moore, Chair  
Will Flender, Vice Chair  
Scott Mapes  
Don Meals  
Jeff Severson  
Miles Waite  
Damon Lane  
Zoe Richards  
Stephanie Young



## Conservation Board Meeting Minutes

Monday, December 19, 2016 – 5:30 pm  
Main Meeting Room – Burlington Electric Department  
585 Pine Street

### Attendance

- **Board Members:** Zoe Richards (ZR), Matt Moore (MM), Jeff Severson (JS), Will Flender (WF), Damon Lane (DL), Miles Waite (MW), Scott Mapes (SM), Stephanie Young (SY), Don Meals (DM)
- **Absent:**
- **Public:** Eric Farrell, Owiso Makuku, Peter Smiar, Dave Marshall
- **Staff:** Scott Gustin (Planning & Zoning)

MM, Chair, called the meeting to order at 5:32 p.m.

Brief discussion about possibility for 2<sup>nd</sup> January meeting. SG noted the mall redevelopment, UVM business addition, City Hall Park, and 400 Pine Street CA/MA application. Board members agreed to a 2<sup>nd</sup> "special meeting" in January.

### Project Review

#### 1.17-0623CA/MA; 329 North Ave (Ward 4N, NAC-CR) BC Community Housing, LLC

Proposed development consisting of 11 buildings containing 733 residential units, approximately 45,000 sq. ft. of non-residential support/amenity space, approximately 45000 sq. ft. of neighborhood commercial spaces and 1093 parking spaces.

MM stated that he will recuse from this project review. His employer is involved in this project although he is not personally.

MW said he will also recuse. He is a paid consultant for the applicant regarding this property.

JS said he will also recuse. He has served as a wetlands consultant for the applicant regarding this property.

Eric Farrell overviewed the project. He bought 33.65 acres and sold 12 acres to the city. A total of 21.65 acres are subject to the development proposal. He anticipates that the 12 acres of parkland will be converted to RCO zone following approval of this application. He noted the new NAC zone affecting the properties included in this proposal. Overall coverage is 65% (43% including the 12 acres of city land).

ZR, do you now own the orphanage? Mr. Farrell, yes. It sits on its own 6 acre parcel with the former college space. Now that the college has closed, there is an agreement to purchase the former classroom building. He noted the pending subdivision application. 12 lots in all, including the city-owned parcel. The lots are generally arranged around new city streets.

Mr. Farrell said he's proposing one application for one project. All of the project in one review. He anticipates a 6-8 year build out. He said it took 10 years to build what's behind Shaw's in South Burlington. That included a 3-year period without building.

The programs and services of the Dept. of Planning and Zoning are accessible to people with disabilities. For accessibility information call 865-7188 (865-7142 TTY).



Mr. Farrell overviewed the entire site plan and pointed out the locations of the various buildings and uses, including a hotel use not previously proposed. He pointed out garden space within the development for residents. He noted the multi-use rec path through the development. Mr. Farrell pointed out some rooftop planting locations, particularly on building corners. A dog park will be provided within the development. Bio-retention is proposed alongside "west" street. It will be constructed as a green street. Mr. Farrell noted that 2/3 of parking will be structured within or under the buildings.

Mr. Farrell touched on the sustainability standards incorporated into the development agreement. He is exploring geothermal energy. District-type heating is contemplated. Solar panels will be installed. He pointed out the bike facilities standard in every residential building. Biking will be encouraged. This project will be part of CATMA to encourage utilization of alternative transportation options.

Peter Smiar overviewed stormwater management. He related existing conditions, including soils onsite. Test pits have been dug to determine soil types and water table. Soils are generally sandy. Sheet flow goes east to west towards the lake except for a small portion along North Avenue. Combined and MS4 sewers run past the property on North Avenue. A roof drain presently discharges into the combined system. That will be disconnected and treated within the onsite stormwater management system.

Mr. Smiar said that stormwater goals include infiltration as much as possible. Under the state permitting program and under Chapter 26, the focus is on the first inch of stormwater. This project is "green field" development, so the state and city stormwater standards are similar. We will go above the minimum standards for this project. He pointed out the "green street" infrastructure. An existing 24" pipe into the lake will be replaced with a 36" pipe. He expects that overflows will be infrequent.

SM, the narrative said we'd see no difference in the 10-year versus the 25-year storm event. Mr. Smiar, there will be full infiltration of the 1-year storm. We will match for the 10-year event. Full infiltration of the 25-year event may be possible, but he's not run the model yet. We may expect to see some water come out the bottom of "south" road. We're more focused on stability than infiltration for the 25-year event. SM, the narrative states that the community won't notice any change up to the 25-year event. You may want to revise that wording.

Dave Marshall overviewed the culvert under existing conditions and the proposed work. The proposed work would remain above elevation 102' and will address existing erosion. A plunge pool is proposed to absorb and mitigate energy from discharge flows. Erosion will be minimized. SM, who will maintain this feature? Mr. Farrell, Parks & Rec will maintain it once it's built.

DL, especially with the city maintaining this feature, I think we should consider that we can expect to see 103' lake level again in our lifetime. It seems that the lake level is getting higher over time. Mr. Marshall said that the transition area provides a significant distance between the lake level and the discharge point.

Mr. Smiar said that design for peak flow events when discharging into the lake is not the main component of stormwater management under the state or city standards.

Mr. Marshall said there's been a lot of heavy lifting trying to get the stormwater design to match existing conditions for the 10-year storm event.

Mr. Smiar pointed out the details of the green street bio-retention elements. Mr. Marshall pointed out that the rain gardens will not be under-drained. Subsurface infiltrations are included within the project design. Half-pipes with crushed stone underneath will be installed for infiltration.

Mr. Farrell pointed out the phasing plan for the project. Mr. Smiar addressed how stormwater will be managed during construction. He pointed out that control of construction sediment will be important. The infiltration measures are predicated on a stabilized site. Mr. Smiar noted interim stormwater management measures, including temporary stormwater ponds. These measures will be incorporated into the state stormwater permit.



WF, what will happen when the last phase is constructed? Is there risk of sedimentation at the north end of "west" road? Mr. Smiar said that the contractor is responsible for cleaning out the system and repairing damage before turning over the system to the owner. Mr. Smiar pointed out a sediment tank swirl unit that will be in place as a protective measure.

SM, if the contractor is on the permit, they are obligated to report back.

DL likes the idea for district heating. He thinks the phasing will present a challenge. What's the idea behind it? Mr. Farrell responded that there will be central heating "plants" within the development, i.e. one heater for several buildings. He wants the buildings to be as efficient as possible. DL pointed out the solar orientation and the challenge to lay out the buildings along the streets. DL, will inclusionary units be spread out in the development? Mr. Farrell said the nonprofits are satisfying the inclusionary requirement for the entire development. They will be built early on.

DM, are the roof plantings decorative or are you aiming for functional green roofs? Mr. Farrell said they're mostly associated with rooftop patios. Mr. Smiar said they're not part of the stormwater system.

SY, the narrative mentions a survey relative to resident carpooling. Owiso Makuku said this pertains to CATMA. We're using other projects as test cases – like Thayer commons. We gathered information from the residents about taking the bus. What was preventing them from using the bus and what could get them to use the bus? As part of CATMA, we can provide discount passes for the bus. A special event was held at Thayer Commons for folks interested in carpooling. Mr. Farrell pointed out the transportation hub at the corner of "south" street and North Avenue. He said this route is GMT's busiest one. He is considering free bus passes to start. SY, is the main concern cost or ease of use? Ms. Makuku said that convenience is the main concern. She noted the "guaranteed ride home" perk.

ZR thinks it's exciting that CATMA is part of this project.

SM, this location is right in the middle of kids going to Edmunds or Hinds, maybe Smith. Ms. Makuku said we've been in touch with GMT for school children service.

SM, what is the plan along the west property line to promote the path network? What will discourage "goat paths?" Mr. Farrell said an inventory of trees has been done along the boundary. Parks & Recreation wants the natural area to flow up to the buildings to the north. The southern end of the western boundary is fairly heavily wooded. Further north, the land is more open. Parks & Rec planted a number of trees in this area recently. Mr. Farrell said the main east/west corridor will be "south" road. There is another ADA access to the north. SM, is the path depicted on the project plans conceptual or final? Mr. Farrell, conceptual. He'll meet with Parks & Rec next week.

DL likes the focus on bikes and bus service. Few people will walk downtown. What part of the city sidewalk will be reconstructed? Mr. Farrell, along North Avenue frontage. Ms. Makuku said that Local Motion and Old Spokes Home have been consulted as part of this project.

SY, will there be parking for public access to the bike path? Mr. Farrell, all of the on-street parking will be open to the public.

DM was surprised to hear about a hotel. What role will it play in the life of this project? Mr. Farrell said that folks staying here would most likely be here for extended stays. There will be 45 suites. The use also adds some diversity to the community. He does not want to build an exclusively residential development.

A MOTION was made by DL and SECONDED by DM:

Recommend approval of the project as presented. The Board appreciates the stormwater management design and that the applicant joined CATMA. This project can serve as model for other developments.

Vote: 6-0-0, motion carries.



**Adjournment**

The meeting adjourned at 7:35 PM.