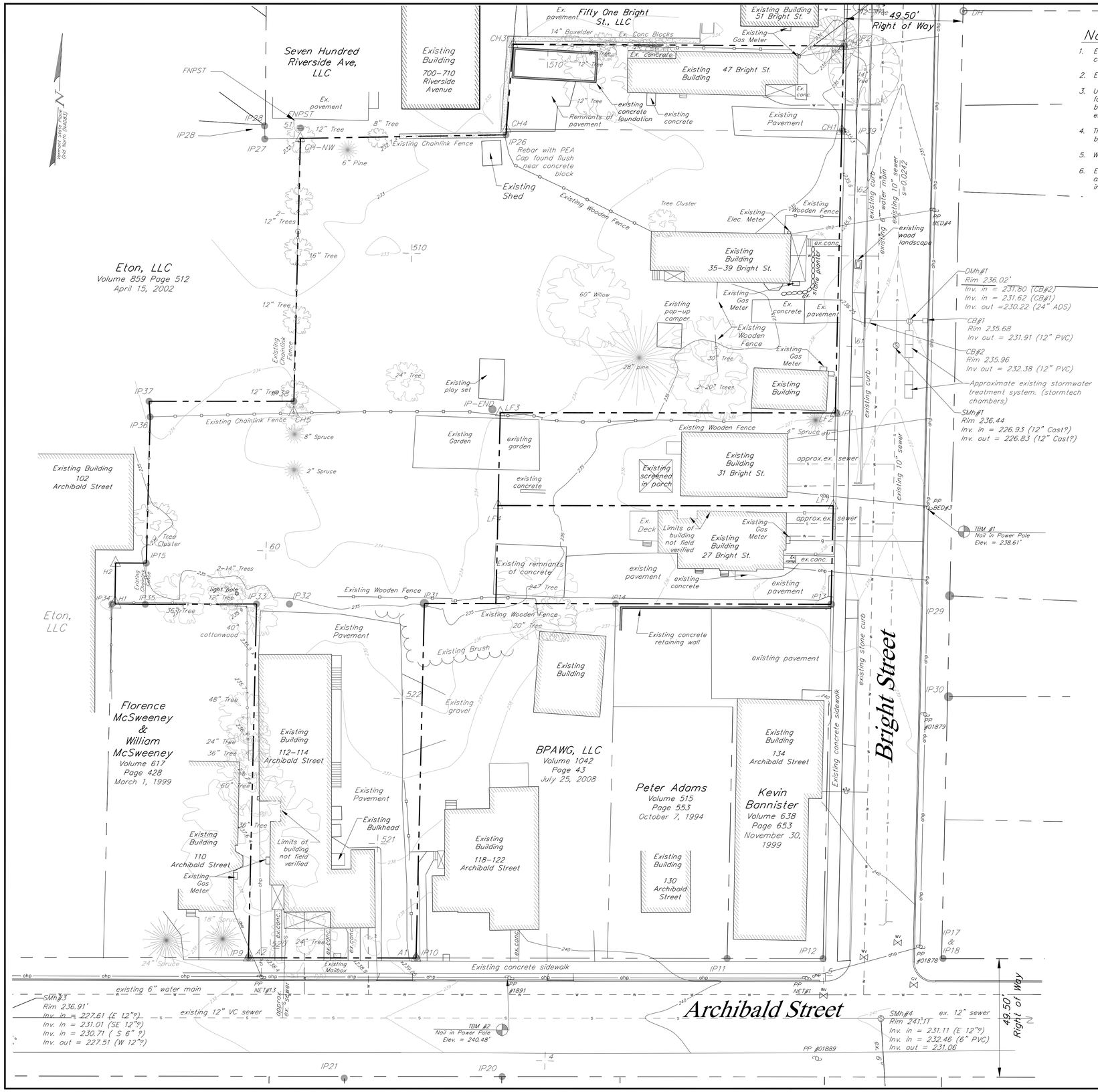
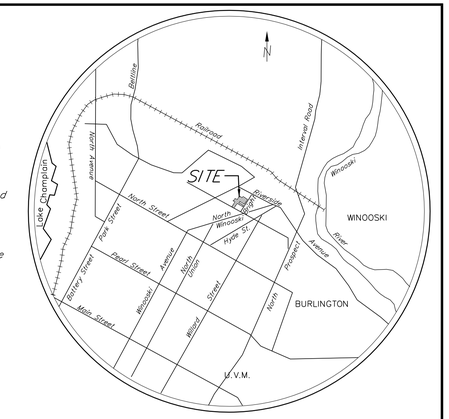


Notes:

1. Existing topographic information is from a field survey completed by Krebs & Lansing in October of 2013.
2. Elevations are based on the NAVD 88 vertical datum.
3. Utilities shown on this plan are based on visible evidence found in the field. Underground utilities are not warranted to be exact or complete. Contact Dig Safe prior to any excavation.
4. This is not a boundary survey. See Boundary Survey prepared by Krebs and Lansing Engineers for boundary information.
5. Waterline information is based on City of Burlington Mapping.
6. Existing gas service lines shown on this plan are approximate and not complete. Contact VGS for complete and accurate information regarding existing gas lines.



Location Map
N.T.S.

Legend

- Survey Control Point
- Existing Sign
- Existing Light Pole
- Existing Deciduous Tree
- Existing Evergreen Tree
- Existing Spot Grade Elevation
- Existing Contour
- Existing Gas Line/Valve
- Existing Sewer Line/Manhole
- Existing Sewer Forcemain
- Existing Storm Line/Manhole/Basin
- Existing Overhead Electric Line/Power Pole
- Existing Overhead Utility
- Existing Communications Line
- Existing PBX Line
- Existing Underground Electric & Telephone Line
- Existing Site Lite Line
- Existing Steam Line
- Existing Wetland
- Existing Guardrail
- Existing Tree Line
- Existing Chain Link Fence
- Existing Barbed Wire Fence
- Existing Stockade Fence
- Existing Underground Power
- Existing Water Line/Hydrant/Valve/Shutoff
- Approximate Property Line
- Existing Setback
- Existing Easement

0' 20' 40' 80' 120'

Bar Scale 1" = 20'

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEDDE III — No. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Survey	RAK/RAW
Drawn	RAW
Checked	IAJ
Scale	1" = 20'
Date	April 4, 2014
Project	13220

Existing Conditions Plan

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

Rok-464

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EX-1

Terminate existing water services at the main. Turn corporation off. Coordinate work with Burlington Water Department. (typ.)

New 6" tapping sleeve and valve. Enlarge new pipe to 8" after tapping valve. Restore existing pavement, subbase and sidewalk to existing conditions. (typ.)

New SMh A (Dog House)
Rim 236.20
Inv. in: =227.25(New)
Inv.=226.25± (ex.)

Install new granite curbing in place of old curb cuts, typical. Install 9' section of recessed curb.

DMh#1
Rim 236.02'
Inv. in = 231.80 (CB#2)
Inv. in = 231.62 (CB#1)
Inv. out =230.22 (24" ADS)

CB#1
Rim 235.68
Inv out = 231.91 (12" PVC)

CB#2
Rim 235.96
Inv out = 232.38 (12" PVC)

Approximate existing stormwater treatment system. (stormtech chambers)

SMh#1
Rim 236.44
Inv. in = 226.93 (12" Cast?)
Inv. out = 226.83 (12" Cast?)

Remove existing concrete sidewalk. Install New thickened concrete walk. (typical) (See Details)

TBM #1
Nail in Power Pole
Elev. = 238.61'

New trench drain
See Mechanical plan for connect to interior pump station

Remove existing curbing, install new recessed curb

TBM #2
Nail in Power Pole
Elev. = 240.48'

Remove existing concrete sidewalk. Install New thickened concrete walk. (typical) (See Details)

Terminate existing water service at the main. Turn corporation off. Coordinate work with Burlington Water Department.

Connect new sewer to the existing stub.

SMh#3
Rim 236.91'
Inv. in = 227.61 (E 12"?)
Inv. In = 231.01 (SE 12"?)
Inv. in = 230.71 (S 6" ?)
Inv. out = 227.51 (W 12"?)

SMh#4
Rim 241.11
Inv. in = 231.11 (E 12"?)
Inv. in = 232.46 (6" PVC)
Inv. out = 231.06

Location Map

N.T.S.

Legend

- Pre-construction Excavation
- New Deciduous Tree
- New Evergreen Tree
- 314.7 x — Finish Grade Spot Grade Elevation
- Finish Grade Direction of Flow
- 150 — Finish Grade 5-foot Contour Interval
- 153 — Finish Grade 1-foot Contour Interval
- G — GV — New Gas Line/Valve
- S — S — New Sewer Line/Manhole
- FM — New Sewer Forcemain
- ST — D — New Storm Line/Manhole/Basin
- UD — New Underdrain
- RD — New Roof Drain
- W — WV — New Water Line/Hydrant/Valve/Shutoff
- PBX — New PBX Line
- UGP — New Underground Power
- New Clearing Limits
- New Chain Link Fence
- New Stockade Fence
- CF — Construction Fence
- BF — Barrier Fence
- Silt Fence
- New concrete
- New Structural concrete
- New concrete (exposed aggregate)
- New pavement and subbase

See Notes On Sheet EX-1:

0' 20' 40' 80' 120'

GRAPHIC SCALE 1" = 20'

Date revised	Description	Checked	Date

PERMIT REVIEW ONLY

Design	WHN
Drawn	TJB
Checked	
Scale	1" = 20'
Date	April 4, 2014
Project	13220

Site Plan

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

13A-464 — bright base current.dwg

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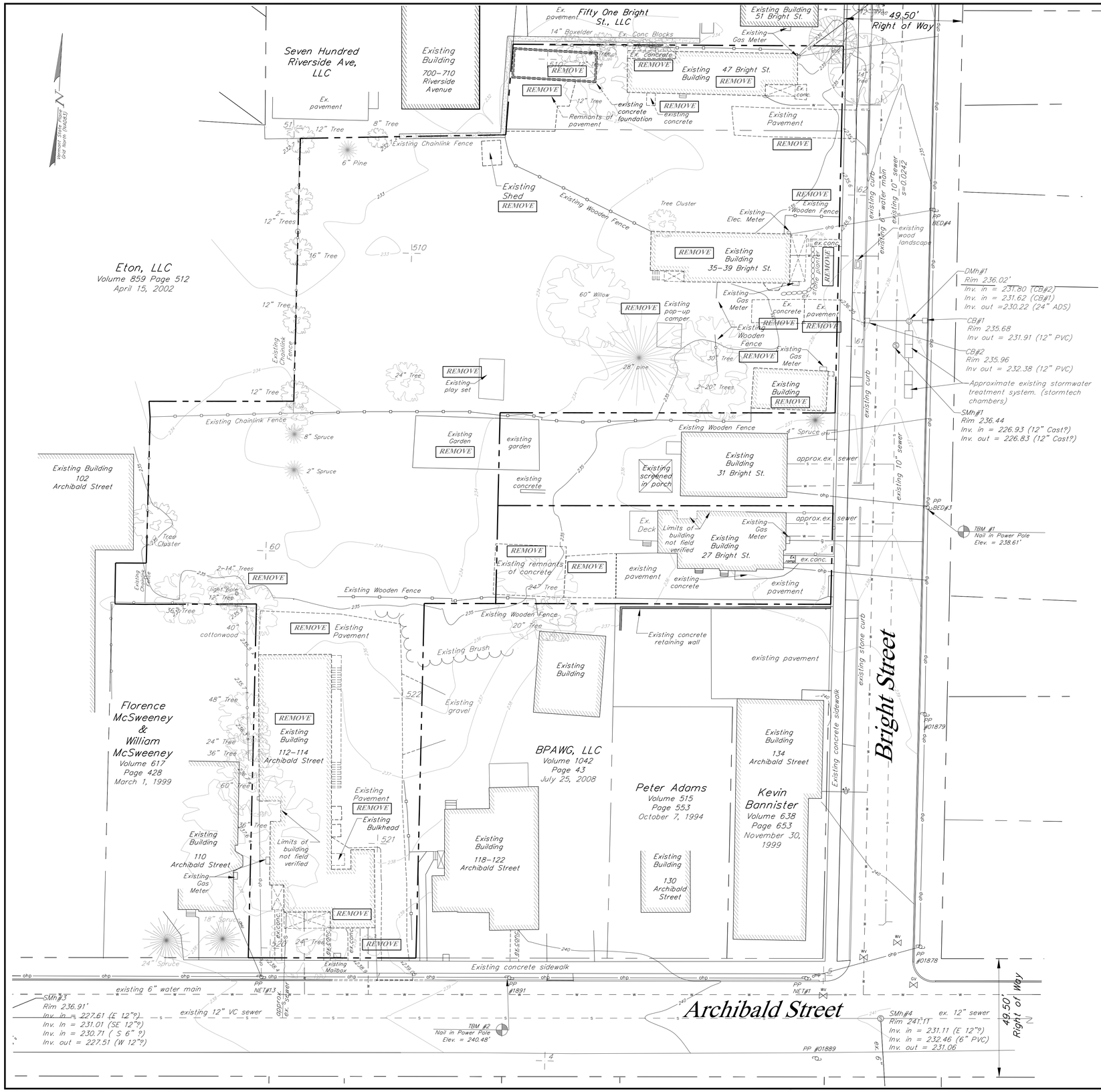
SP-1



Demolition Notes

1. The location of underground electrical lines which service the site lights are not shown on the Civil Plans. Other electrical lines may exist which are not shown on this plan.
2. Refer to specifications for detailed scope of demolition work.
3. Prior to disrupting existing utilities, Contractor shall be responsible for confirming status of all utilities to be abandoned.
4. All abandoned utilities outside 6 ft. of the new building footprints shall be cut, capped, and abandoned in-place unless the removal of the abandoned utility is required during construction. All abandoned utilities within 6 ft. of the new building footprints shall be removed. All abandoned manholes, catch basins, and utility vaults shall be demolished and removed. Plug open ends of all abandoned pipes or conduits with concrete or water tight end cap. See Structural Plans for backfill requirements for all items removed from within the influence of the new building footprints. Use sand fill (703.03) for all demolition backfill outside the influence of the new building footprints (95% standard proctor compaction).
5. The Contractor shall establish snow fence protection barrier at the drip edge of all existing trees to remain within 10 ft. of construction disturbance.
6. All excess fill, stumps, rock, topsoil, waste, and other material is the exclusive property of the Contractor and shall be removed from the property and disposed of in a State approved disposal location.
7. Contractor shall maintain water and sanitary services to all existing buildings to remain.
8. **Contractor shall demolish and remove all existing infrastructure necessary to construct the new project as designed. This plan does not show every item to be demolished and may not accurately show the limits of the items to be partially demolished.**
9. See Specifications for recycling requirements for site and building.
10. This drawing refers to Civil Site Engineering items, located outside the building, only.
11. See Landscape Architect plans for demolition of existing trees, other existing vegetation and fencing.

0' 20' 40' 80' 120'

Bar Scale 1" = 20'

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEDDE III — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Designed	WHN
Drawn	TJB
Checked	
Scale	1" = 20'
Date	April 4, 2014
Project	13220

Site Demolition Plan

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

fbk-464

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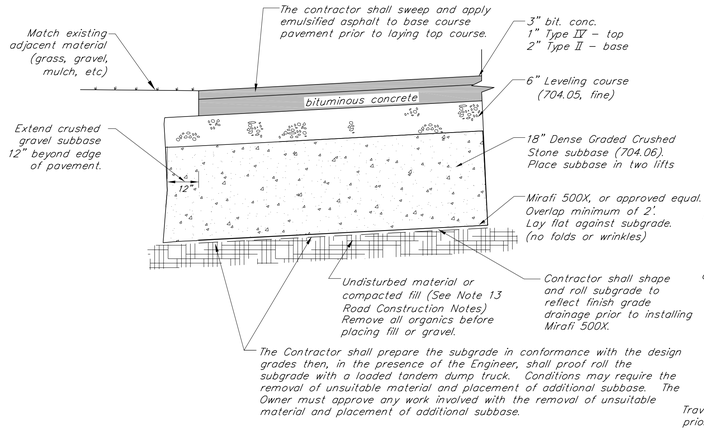
SP-2

Construction Notes

1. The methods and materials of construction shall conform to the latest standards of the City of Burlington and the State of Vermont. All work shall be in conformance with all permits and approvals issued for the project. In case of conflict, the more stringent specification shall apply as directed by Engineer. All work shall be done in a workmanlike manner and completed in the time specified by Owner.
2. The Contractor shall be responsible for all work and materials shown and required to make the job complete. These drawings do not show every fitting or appurtenance. Materials shall be as specified on the drawings. Manufacturer's product specifications shall be submitted for all materials to the Engineer for approval prior to installation.
3. The location and size of existing underground utilities is not warranted to be exact or complete. The Contractor shall field locate all utilities and shall contact the affected utility company, the Engineer and the City of Burlington prior to making any hook ups. The Contractor shall be solely responsible for all existing utilities and their uninterrupted services. All off-site backfill, sheeting and shoring, dewatering, clearing and grubbing, erosion control, dust control, traffic control, grading, and all incidentals shall be included as part of the required work.
4. Repair of all disturbed areas, grading, seeding, mulching, repair of roads and curbs, paving, and other incidentals are included as part of the required work. All disturbed areas shall be loamed and mulched until permanent ground cover is established.
5. The Contractor shall verify all horizontal control and temporary bench marks before use.
6. The workmen and public shall be protected by the Contractor from any and all hazards connected with the construction work. Open trenches, materials, or equipment within the working limits are to be guarded by the use of adequate barricades or flag men. All barricades left in position overnight are to be properly lighted. Kerosene pots are not acceptable. When work narrows the usable pavement, flag men shall be employed to aid the flow of traffic so that there will be no undue delays. The Contractor shall be held responsible for the safety of all workmen and the general public and all damages to property occurring from or upon the work occasioned by negligence or shall be held responsible for the safety of all workmen and the general public and all damages to property occurring from or upon the work occasioned by negligence or day or night within the working area. All work shall be in conformance to OSHA regulations, Title 19, Parts 1926.651 and 1926.652, and applicable to VOSHA regulations.
7. Definition of "Preconstruction Excavation" for these contract documents shall be:
   The site contractor shall expose utility and obtain all necessary information, including but not limited to, invert elevation, size, depth, pipe type, joint location, etc. Contractor shall transit survey the location and elevations of the utility. Contractor shall provide the engineer with sketches indicating horizontal and vertical information of pipe or conduit type and size, cross-section information, concrete encasement information (top and bottom elevations, width, etc.), joint location, etc. of each required existing underground utility. Accuracy of horizontal location is within 1 foot, and accuracy of vertical elevation is within 0.02 ft. (1/4").
   Coordinate all excavation with City, Owner, and Engineer. Preconstruction excavations shall occur prior to ordering structures and prior to utility construction, to facilitate redesign if necessary.
8. Contractor shall contact Dig Safe prior to any excavation.
9. All new storm extending from catch basin structures shall be laid with a laser to elevation and slope as shown on the plans.
10. The Contractor shall sawcut all existing pavement to be removed. The Contractor shall minimize the pavement area disturbance. Contractor shall be responsible for all pavement repair and restoration necessary to complete the work.
11. The Contractor shall be responsible for all construction layout.
12. Temporary silt fence shall be erected prior to any clearing or construction. Fencing may be erected in phases, but in no case shall construction of clearing proceed fencing. Special areas may be designated by the Owner for preservation of existing trees. These areas shall be the Contractor's responsibility to insure no damage is done to designated trees.
13. Existing plantings are located in general areas as shown on the plans. Contractor shall protect plantings scheduled to remain so as not to damage these or their root systems.
15. Contractor shall comply with all permits and approvals issued for this project.
16. Contractor shall sign on as the Co-Permittee for the State of Vermont Erosion Prevention and Sediment Control permit for the project.
17. Slope stability upon unsaturated soil conditions. If during construction saturated soils are encountered, contact the Engineer immediately.



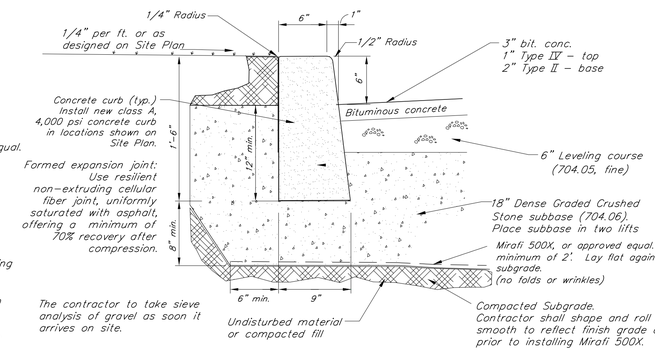
Without Curb

Concrete Curb

- Broom finish concrete
- All joints to be tool finished
- Expansion/contraction joints every 20' with 1/2" joint filler.
- Score 1/3 total depth at 10' intervals
- Apply 2 coats of Euclid Everclear VOX cure/seal compound to all concrete surfaces, per the manufacturer's specifications.

All concrete used in the construction of concrete curb shall be air entrained (5 - 7 %) and made with Portland cement. The concrete shall meet section 501 of the State of Vermont Standard Specification for Class A concrete and have min. 28 day compressive strength of 4,000 psi.

Provide a 6' taper at end of curb.



Travel over gravel with any vehicle tracking soil prior to placement of pavement is prohibited.

If gravel is contaminated after placement, the Contractor shall be responsible removal of all contaminated gravel and paying for all recommended sieve analysis as determined by the Engineer.

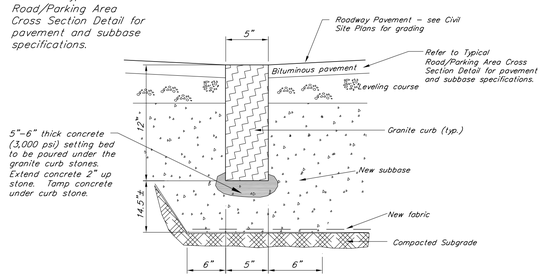
The Contractor shall prepare the subgrade in conformance with the design grades then, in the presence of the Engineer, shall proof roll the subgrade with a loaded tandem dump truck. Conditions may require the removal of unsuitable material and placement of additional subbase. The Owner must approve any work involved with the removal of unsuitable material and placement of additional subbase. Minimum proof roll area per inspection = 8,000 sf.

With Concrete Curb

Typical Road/Parking Area Cross Section Detail

N.T.S.

Refer to Typical Road/Parking Area Cross Section Detail for pavement and subbase specifications.



Flush Granite Curb

N.T.S.

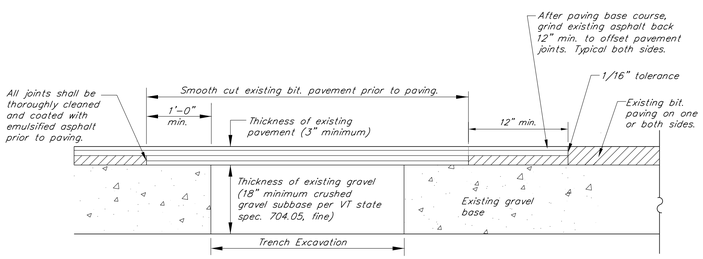
Road Construction Notes

(All references to road shall apply to parking areas as well.)

1. New road shall be constructed to the line and grade shown on the drawings. The road and utility locations shall be as typically detailed unless otherwise shown.
2. All road and parking construction shall be completed in accordance with the Vermont Agency of Transportation "Standard Specifications for Construction" 2011, hereafter called Vermont Highway Specifications, specifications found on these plans, and project specifications. In case of conflict, the more stringent specification shall apply as determined by the Engineer.
3. The Contractor shall follow Vermont Highway Specifications (2011) Section 203.11 for placing and spreading embankments.
4. Fill material for road embankment shall meet Note #13 below and be approved by the Engineer. Fill shall be placed in 12" lifts, wetted and compacted with satisfactory compaction equipment to 95% of maximum density (Standard Proctor).
5. Road in fill sections shall be placed and compacted a minimum of 3 feet above top of any utility to be installed before trench is excavated for pipe placement. In trenches and cut sections, the Contractor shall provide all necessary sheeting, shoring and bracing to maintain compliance with all OSHA/VOSHA regulations.
6. Methods for construction of subgrade shall conform to Vermont Highway Specifications (2011) 203.12 or as determined by the Engineer.
7. Any subgrade or subbase disturbed by Contractor, or rendered unsuitable by construction machinery, shall be removed and replaced with approved granular backfill at the Contractor's expense. The subgrade shall be compacted to attain at least 95% of the maximum density (Standard Proctor) before placing road or embankment materials.
8. The Owner will pay for on site soils testing (compaction, sieve, and proctor). The Contractor shall pay for failing tests.
9. Sand borrow and cushion shall conform to Vermont Highway Specifications (2011) 703.03. Granular borrow shall conform to the Vermont Highway Specifications 703.04.
10. Gravel subbase for pavement shall conform to Vermont Highway Specifications (2011) 704.06, Dense Graded Crushed Stone. Substitute materials identified in VAOT Specifications Section 301 - Subbase are not allowed.
11. Leveling course shall conform to Vermont Highway Specifications (2011) 704.05, fine grading. Shoulders shall conform to Section 704.12, Aggregate for Shoulders. Substitute materials identified in VAOT Specifications Section 301 - Subbase are not allowed.
12. Bituminous concrete pavement shall conform to Vermont Highway Specifications (2011) Section 404 and 406. Binder course shall be Type I + II, and finish wearing course shall be Type III, IV, or as detailed.
13. Embankment fill for all impervious areas, EXCLUDING BUILDINGS, shall be a sieve specification as follows:

Sieve	% Finer
4"	100
2"	85-100
#4	60-100
#200	30 maximum

14. Dense graded crushed stone, crushed gravel and sand borrow shall not be contaminated by work. Construction traffic shall not travel over exposed areas of this material.
15. Contractor is responsible for all pavement markings (ie. parking striping, handicap markings, stop bars, etc.) shown or implied on the Plans. This includes both new and replacement of existing.
    - Paint for pavement markings shall be Hydrophast Waterborne Traffic Paint by Franklin Paint Company. It shall be reflective, VOC compliant fast drying, 100% acrylic waterborne traffic paint.
    - Traffic paint shall be applied with a uniform thickness and at a rate such that no pavement is visible after drying. Additional paint application will be required if underlying pavement is visible.

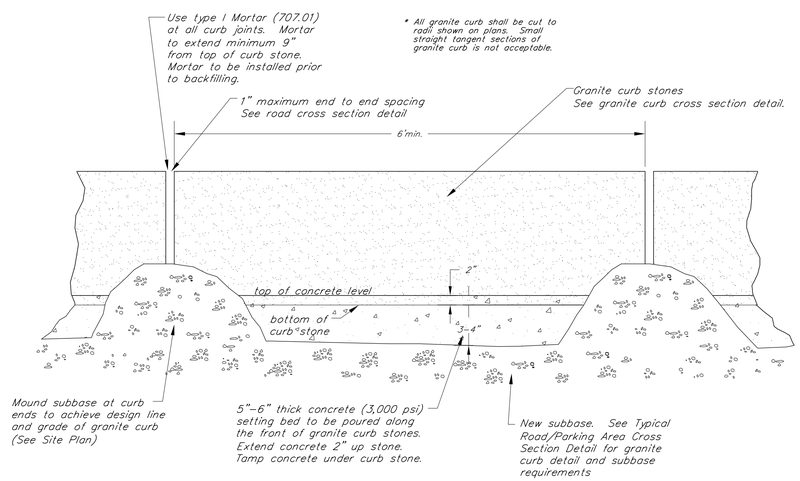


1. Set up and maintain signs and other safety control devices.
2. Reshape hole and patch area by cutting with a concrete saw into square or rectangular shape and cut side faces vertically. Reshape downward solid material and around hole to sound pavement.
3. Backfill trench in 6" lifts and compact each lift to 95% of maximum density of optimum moisture content as determined by ASTM D698 standard proctor.
4. Remove all loose material and thoroughly sweep the hole area clean of mud and standing water.
5. Apply liquid asphalt tack to vertical faces in a uniform manner. Do not puddle tack coat on bottom of hole.
6. Fill top of hole with type IV bituminous concrete and compact in lifts no more than 2" thick. Each lift should be thoroughly compacted with a vibratory plate compactor or a portable roller. Experience has shown that 15 to 20 passes with a vibratory roller and mix temperature above 250F (121C) are necessary to ensure good compaction. Hand tamp should only be be used for small areas (less than 1 s.f.)
7. Clean up area. Do not leave excess fill or excavated material on the pavement. Remove safety signs.

Replacement of Existing Road Subbase and Bituminous Pavement

N.T.S.

* All granite curb shall be cut to radii shown on plans. Small straight tangent sections of granite curb is not acceptable.



Typical Granite Curb Section Detail

N.T.S.

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEDDE III — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Design	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name: Bright-Details.dwg
Printing date

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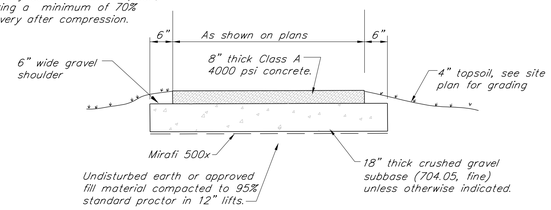
CD-1

Concrete Slab

- Broom finish concrete with tooled edges.
- Expansion joints shall be spaced 20 ft. on center unless otherwise indicated on Site Plan.
- Score control joints 1-1/4" depth at intervals equal to width of sidewalk.
- Apply 2 coats of Euclid Everclear VOX cure/seal compound to all concrete surfaces, per the manufacturer's specifications.
- Concrete construction shall conform to section 618.03 of the current VAOT Standard Specifications for Construction

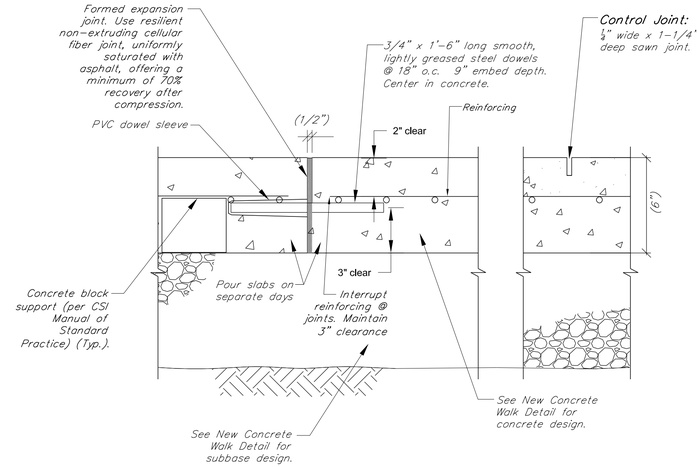
All concrete used in the construction of concrete sidewalk shall be air entrained and made with Portland cement. The concrete shall meet section 501 of the State of Vermont Standard Specification for Class A concrete and have 28 day compressive strength of 4,000 psi.

Joint filler shall be resilient non-extruding cellular fiber joint, uniformly saturated with asphalt, offering a minimum of 70% recovery after compression.



Cross Section
New Thickened Concrete Walk Detail

N.T.S.



Concrete Construction Joint/Control Joint Detail

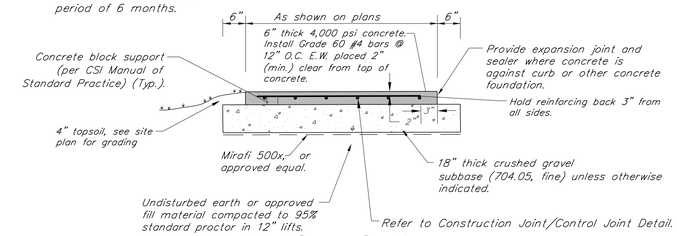
N.T.S.

All concrete used in the construction of concrete sidewalk shall be air entrained (5 - 7 %) and made with Portland cement. The concrete shall meet section 501 of the State of Vermont Standard Specification for Class A concrete and have 28 day compressive strength of 4,000 psi.

Note:
Owner or Contractor is not allowed to place deicing materials on newly poured concrete sidewalk for a period of 6 months.

Concrete Slab

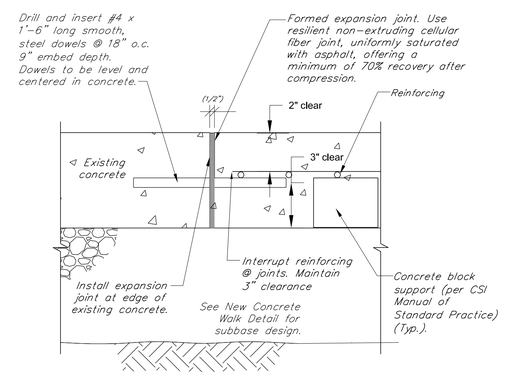
- Broom finish concrete with tooled edges
- Construction joints shall be spaced max. 24' in all directions. See Site Plan for layout.
- Score control joints 1-1/4" depth at intervals equal to width of sidewalk.
- Apply 2 coats of Euclid Everclear VOX cure/seal compound to all concrete surfaces, per the manufacturer's specifications.
- Concrete construction shall conform to section 618.03 of the current VAOT Standard Specifications for Construction



Cross Section
New Concrete Walk Detail

(For Concrete Walks 7 ft. Wide or Greater)

N.T.S.



Concrete Slab Joint Detail for Connection to Existing Concrete

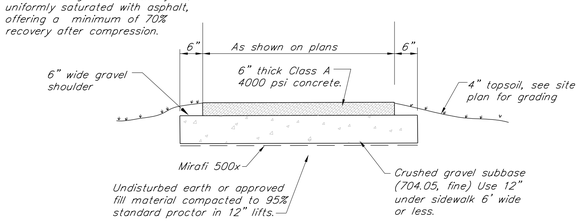
N.T.S.

All concrete used in the construction of concrete sidewalk shall be air entrained and made with Portland cement. The concrete shall meet section 501 of the State of Vermont Standard Specification for Class A concrete and have 28 day compressive strength of 4,000 psi.

Joint filler shall be resilient non-extruding cellular fiber joint, uniformly saturated with asphalt, offering a minimum of 70% recovery after compression.

Concrete Slab

- Broom finish concrete with tooled edges.
- Expansion joints shall be spaced 20 ft. on center unless otherwise indicated on Site Plan.
- Score control joints 1-1/4" depth at intervals equal to width of sidewalk.
- Apply 2 coats of Euclid Everclear VOX cure/seal compound to all concrete surfaces, per the manufacturer's specifications.
- Concrete construction shall conform to section 618.03 of the current VAOT Standard Specifications for Construction



Cross Section
New Concrete Walk Detail

(For Concrete Walks 6ft. Wide or Less)

N.T.S.

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEUKOM — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Design	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name: Bright-Details.dwg
Printing date

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CD-2

Construction Notes

The Contractor will be responsible for all construction of water main, storm and sanitary sewer systems as shown on the plans. The Contractor will be responsible for all necessary adapters, fittings, etc. to make connections to the existing and proposed units. The Contractor shall be responsible for all work shown or implied on the plans and/or referenced in the specifications and permits. The Contractor shall submit, for approval by the Engineer, all types of materials and products used.

Water Main (Applies to new domestic water mains and services) (See also Fire Service Main Notes)

1. The pipe for water main shall be CL52 ductile iron. Ductile iron fittings shall conform to AWWA C110, 350 pounds working pressure. Valves shall be manufactured to meet all requirements of AWWA specification C509.

2. All pipe shall be installed in accordance with AWWA C600. The pipe shall be kept free of foreign matter and debris during installation. When the process of pipe laying has stopped, any open ends of pipe shall be plugged. There shall be a minimum of 6'–0" (1.82 m) cover over all pipe and service lines. Any pipe deflection shall not exceed fifty (50%) percent of recommended manufacturer's maximum deflection. Backfill materials and procedures shall be as detailed on the drawings. The Contractor shall be responsible for any and all sheeting and/or shoring necessary to comply with OSHA – VOSHA regulations.

3. The testing of the water main shall consist of the testing of all installed pipe, services and hydrants in accordance with AWWA C600. The testing shall consist of a pressure test and leakage test. All testing shall be done with potable water and in the presence of the Engineer and a representative from the Burlington Water Department. The pressure test consists of maintaining a minimum internal pipe pressure of 200 psi (140,620 kg/m^2) for two (2) hours. If the pressure drops more than 5 psi (3515 kg/m^2) in the first hour, this constitutes failure of the test for the particular section of pipe. Failure of any test section will necessitate repair and/or replacement of the failed section.

4. Chlorinating of the system shall be accomplished after the water main has been successfully pressure tested and thoroughly flushed. Disinfecting shall be in accordance with AWWA C–651. The disinfecting process shall be deemed acceptable only after two samples of water from the flushed disinfected main shows no evidence of bacteriological contamination. Use minimum 25 mg/l chlorine concentration for 24 hours. The concentration must remain above 10 mg/l. Tablet disinfecting is not acceptable.

5. The water main shall be thoroughly flushed with a minimum flow velocity of 2.5 ft/s to flush foreign materials out of the valves and hydrants. Prior to flushing, the Contractor shall contact the Owner, Fire Department in the municipality, the District Water Supply company, and the Engineer.

Fire Service Main

1. The pipe for water main shall be CL52 ductile iron. Ductile iron fittings shall conform to AWWA C110, 350 pounds working pressure. Valves shall be manufactured to meet all requirements of AWWA specification C509.

2. All pipe shall be installed in accordance with AWWA C600. The pipe shall be kept free of foreign matter and debris during installation. When the process of pipe laying has stopped, any open ends of pipe shall be plugged. There shall be a minimum of 6'–0" cover over all pipes and service lines. Any pipe deflection shall not exceed fifty (50%) percent of recommended manufacturer's maximum deflection. Backfill materials and procedures shall be as detailed on the drawings. The Contractor shall be responsible for any and all sheeting and/or shoring necessary to comply with OSHA – VOSHA regulations.

3. The testing of the water main shall consist of the testing of all installed pipe, services and hydrants in accordance with NFPA 24. The testing shall consist of a pressure test and leakage test. All testing shall be done with potable water and in the presence of the Engineer. The pressure test consists of maintaining a minimum internal pipe pressure of 200 psi (140,620 kg/m^2) for two (2) hours. The amount of leakage at the joints shall not exceed 2 qt/hr per 100 gaskets or joints, irrespective of pipe diameter. If the pressure drops more than 5 psi (3515 kg/m^2) in the first hour, this constitutes failure of the test for the particular section of pipe. Failure of any test section will necessitate repair and/or replacement of the failed section.

4. Chlorinating of the system shall be accomplished after the water main has been successfully pressure tested and thoroughly flushed. Disinfecting shall be in accordance with AWWA C–651. The disinfecting process shall be deemed acceptable only after two samples of water from the flushed disinfected main shows no evidence of bacteriological contamination. Use minimum 25 mg/l chlorine concentration for 24 hours. The concentration must remain above 10 mg/l. Tablet disinfecting is not acceptable.

5. Acceptable water main flushing requirements are provided below. Prior to flushing, the Contractor shall contact the Owner, Fire Department in the municipality, the District Water Supply company, and the Engineer.

Underground piping, from the water supply to the system riser, and lead–in connections to the system riser shall be completely flushed before the connection is made to downstream fire protection system piping.

The flushing operation shall be continued for a sufficient time to ensure thorough cleaning.

The minimum rate of flow shall be not less than one of the following:

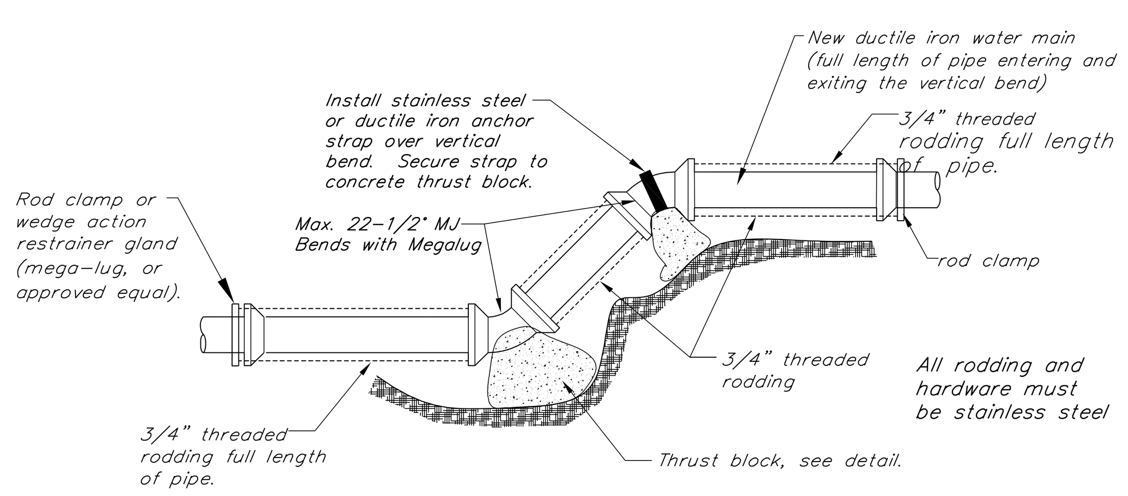
(1) Hydraulically calculated water demand flow rate of the system, including any hose requirements. (provided by the mechanical/sprinkler consultant)

(2) Flow necessary to provide a velocity of 10 ft/sec (3.1 m/sec) in accordance with the table below.

(3) Maximum flow rate available to the system under fire conditions.

Flow Required to Produce a Velocity of 10 ft/sec (3 m/s) in Pipes

Pipe Size		Flow Rate	
in.	mm	gpm	L/min
4	102	390	1,476
6	152	880	3,331
8	203	1,560	5,905
10	254	2,440	9,235
12	305	3,520	13,323



Notes:

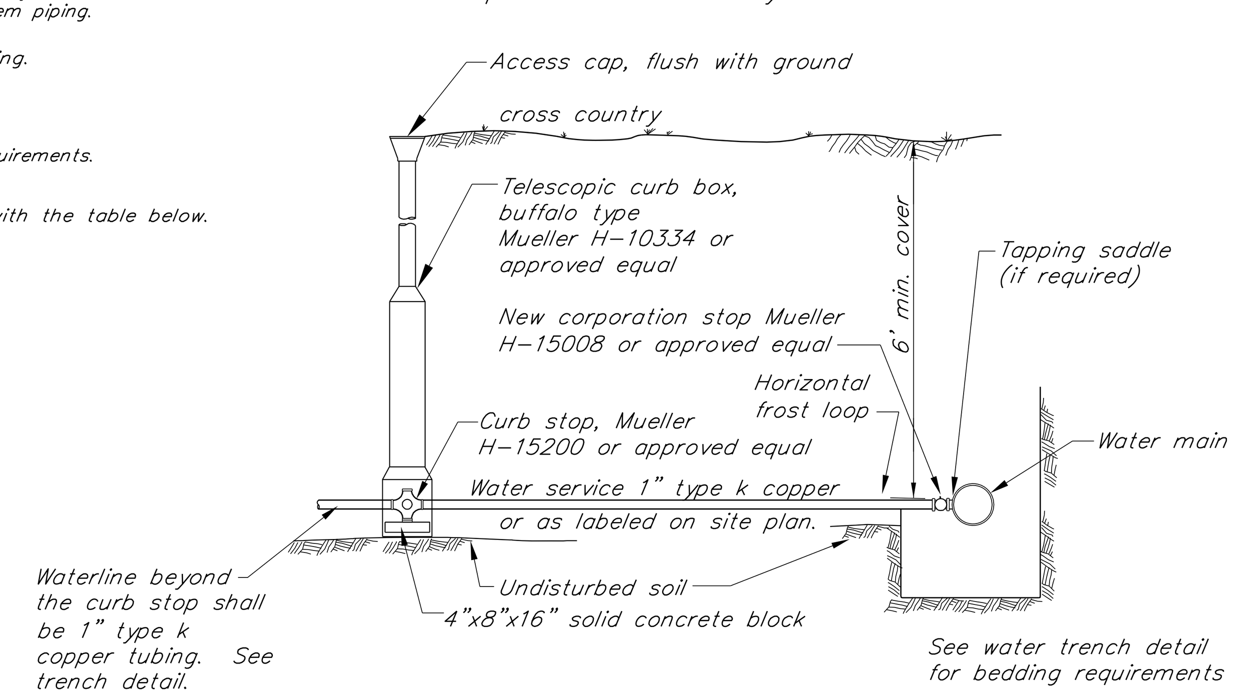
1. See thrust block detail for additional information.
2. Prior to pouring thrust blocks, all fittings are to be wrapped with 4 mil. polyethylene

Vertical Bend Thrust Block Restraint Detail

N.T.S.

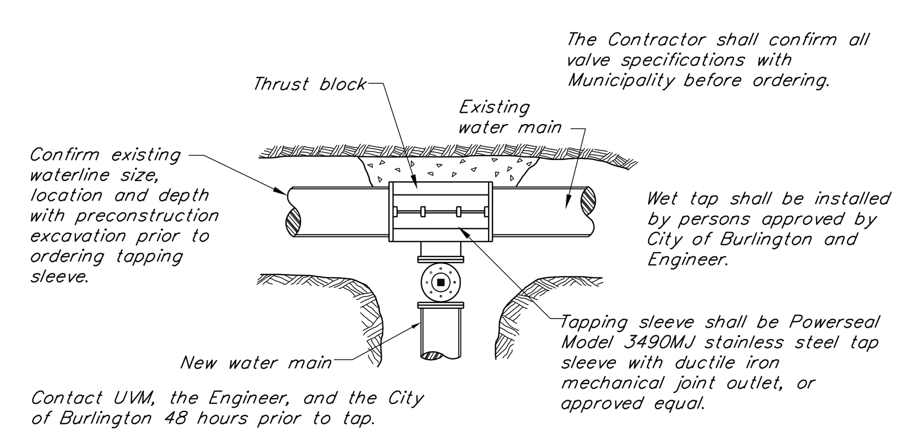
NOTE:

1. Tap may be made directly to ductile iron pipe. With other pipes use either a coupling containing a factory–tapped brass bushing or use a double strap service clamp.
2. All taps larger than 3/4" require the use of bronze saddles.
3. All brass unions and adapters shall be Mueller, Cambridge or McDonald.
4. Submit shop drawings to Engineer for all components of the water system.



Water Service Detail

N.T.S.

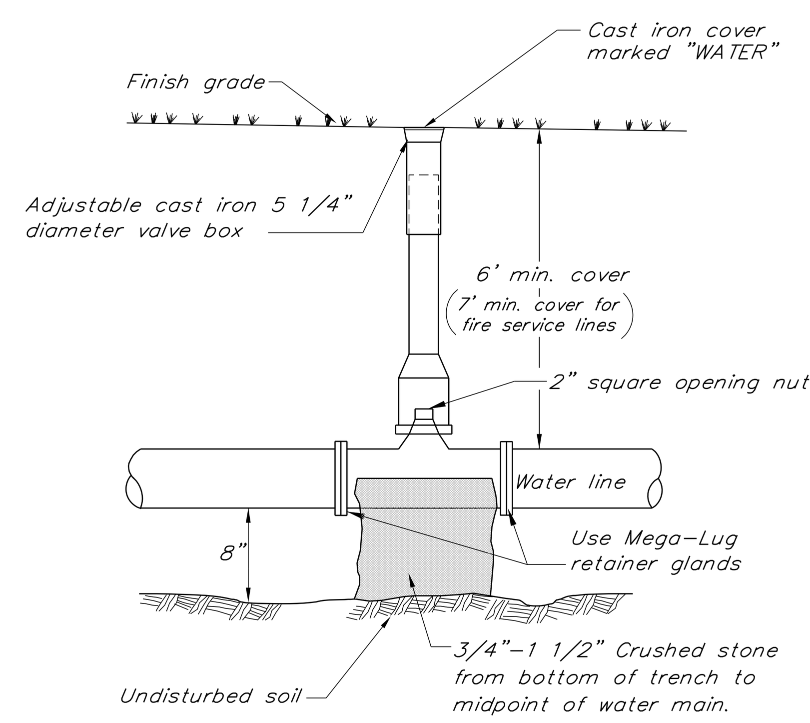


Typical Tapping Sleeve and Valve

N.T.S.

*The Contractor shall confirm all hydrant * specifications with Municipality before ordering.

1. Gate valves shall be A.W.W.A. C 509 Standard Gate Valves with mechanical joints of sizes as required on the plans. All valves shall be of cast or ductile.
2. All valves shall be of cast or ductile iron body, parallel brass seats, non–rising stem, inside screw, double disk construction with "O" Ring Stem Seals.
3. **The gate valves shall open counter–clockwise and be designed for a working pressure of 200 psi. Verify open direction with City of Burlington Water Department.**
4. All valves to be equipped with a valve box for a minimum of 6 feet (6') of cover material.

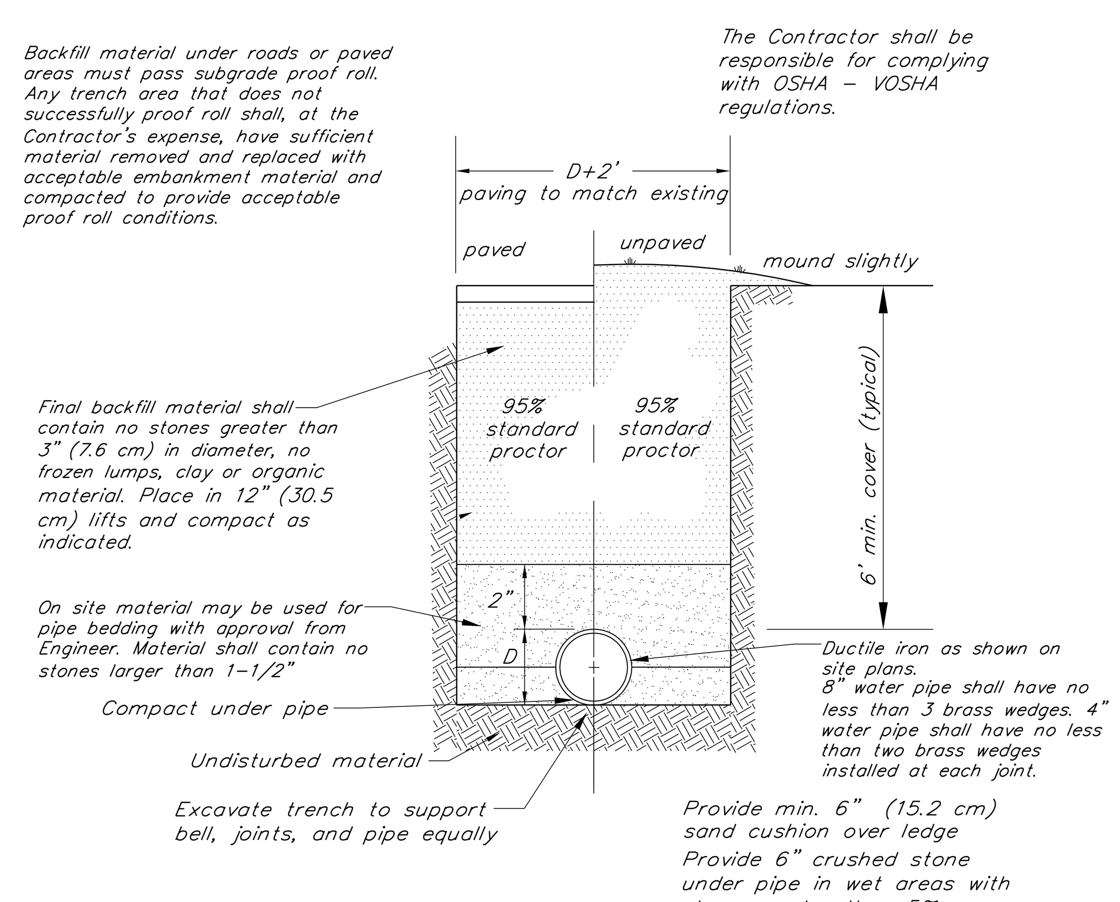


Typical Resilient Seat Gate Valve

N.T.S.

General Water Main Notes:

1. Four–inch and six–inch pipe shall have no less than 2 brass wedges installed at each joint. Eight–inch pipe shall have no less than 3 wedges installed at each joint.
2. The Contractor shall coordinate the termination/shutdown of the existing water service with the Burlingtonn Water Department and the Civil Engineer.
3. These plans provide design and details of water main beyond 5 ft. outside the building.
4. These plans provide design and details of water main beyond 5 ft. outside the building. The Site Contractor shall be responsible for extending the waterline to the plumbing connection within the building. See Mechanical/Plumbing Engineers plans for scope, design and specifications within 5 ft. of the building.
5. Contractor shall provide all necessary fittings and appurtenances to complete the waterline construction work. This includes temporary fittings and gauges necessary to safely complete the flushing activities required prior to making connections with building plumbing.



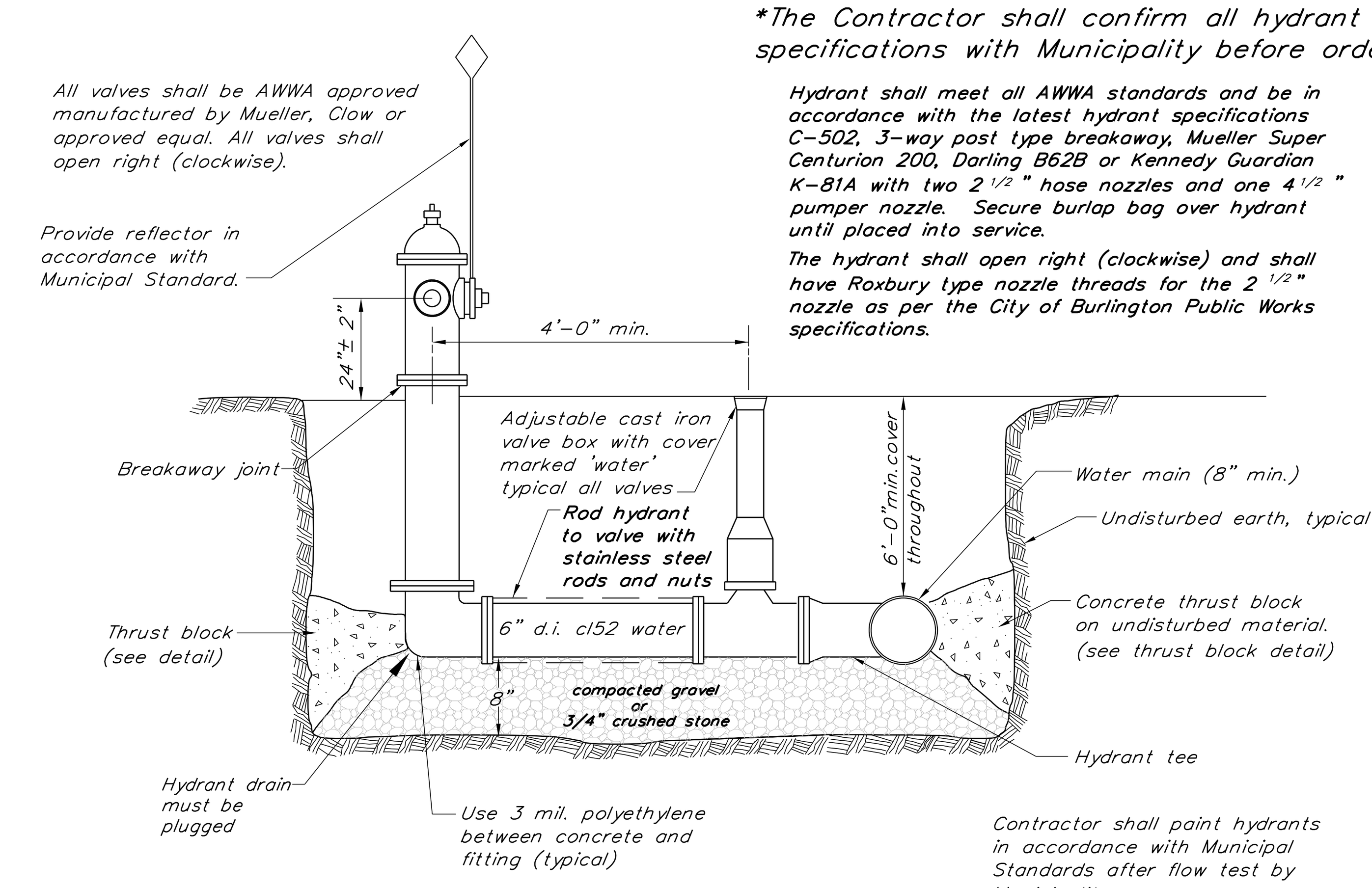
Typical Water Trench Detail

N.T.S.

*The Contractor shall confirm all hydrant * specifications with Municipality before ordering.

Hydrant shall meet all AWWA standards and be in accordance with the latest hydrant specifications C–502, 3–way post type breakaway, Mueller Super Centurion 200, Darling B62B or Kennedy Guardian K–81A with two 2 1/2" hose nozzles and one 4 1/2" pumper nozzle. Secure burlap bag over hydrant until placed into service.

The hydrant shall open right (clockwise) and shall have Roxbury type nozzle threads for the 2 1/2" nozzle as per the City of Burlington Public Works specifications.

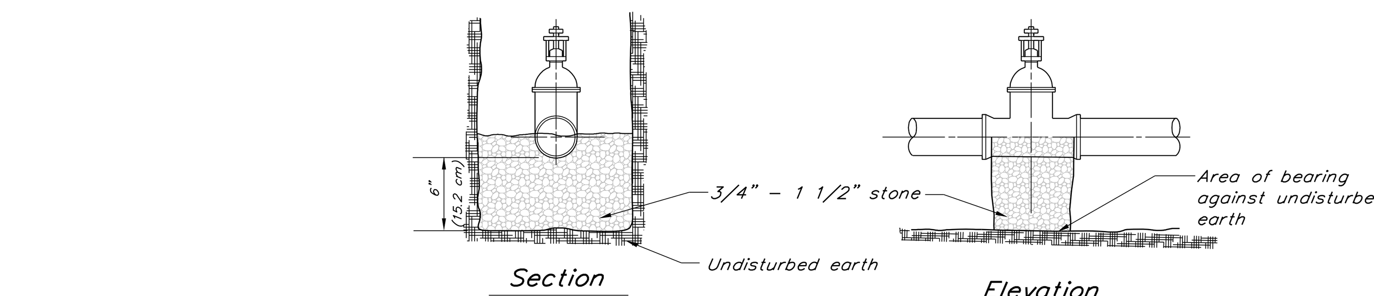


Contractor shall paint hydrants in accordance with Municipal Standards after flow test by Municipality.

Typical Hydrant

(City of Burlington)

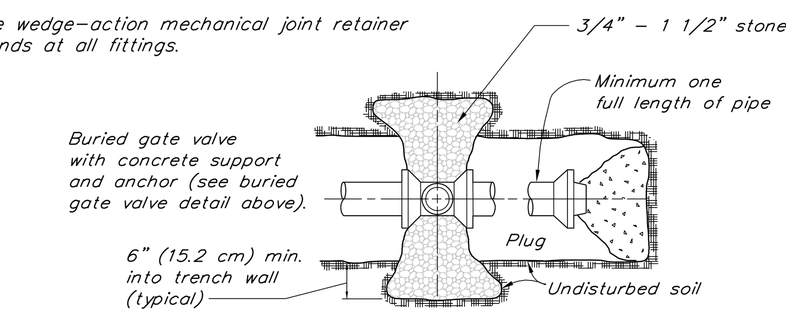
N.T.S.



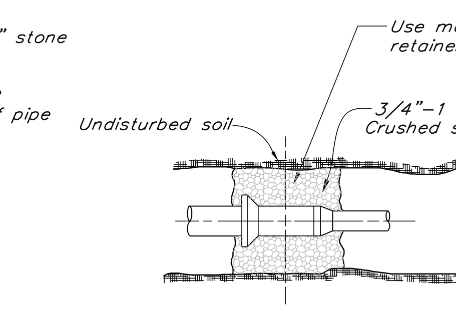
Anchorage of Valves

Note

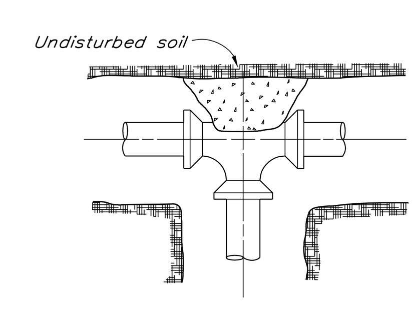
1. A thrust block shall be installed at all water main bends, end caps, and tees.
2. Precast thrust blocks are NOT acceptable.
3. Redi–mix concrete (2,500 psi min) must be used for thrust blocks. Sacrete is NOT acceptable.
4. Use wedge–action mechanical joint retainer glands at all fittings.



Valve/Dead End



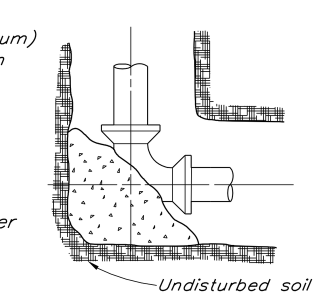
Reducer



Tee

Note: Place 4 mil. (minimum) polyethylene sheet between all concrete thrust blocks and pipe/or fittings to prevent bond.

Concrete shall not cover bolts, etc. of fittings.



90°,45°, 22 1/2°, or 11 1/4° Bend

Minimum Area of Bearing Surface of Concrete Thrust Block (in square feet)

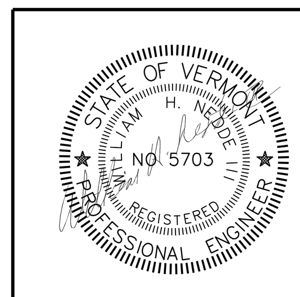
3"				4"				6"				8"				12"				SOIL CONDITION	SAFE BEARING LOAD(PSF)
ENDS & TEES	VALVES 90° ELB.	REDUC. 45° ELB.	22.5° ELB.	ENDS & TEES	VALVES 90° ELB.	REDUC. 45° ELB.	22.5° ELB.	ENDS & TEES	VALVES 90° ELB.	REDUC. 45° ELB.	22.5° ELB.	ENDS & TEES	VALVES 90° ELB.	REDUC. 45° ELB.	22.5° ELB.	ENDS & TEES	VALVES 90° ELB.	REDUC. 45° ELB.	22.5° ELB.		
0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	4.0	5.5	3.0	1.5	Sound shale	10,000
1.0	1.0	1.0	0.5	1.5	2.0	1.0	0.5	3.0	4.0	2.0	1.0	4.5	6.5	3.5	2.0	10.0	14.0	7.5	4.0	Cemented gravel & sand	4,000
1.0	1.0	1.0	0.5	2.0	0.5	1.5	1.0	3.5	5.0	3.0	1.5	6.0	8.5	5.0	2.5	13.0	18.5	10.0	5.0	Coarse & fine compact sand	3,000
1.5	2.5	1.5	1.0	2.5	3.5	2.0	1.0	5.5	7.5	4.0	2.0	9.0	13.0	7.0	3.5	20.0	27.5	15.0	8.0	Medium clay (can be spaded)	2,000
3.0	4.5	2.5	1.5	5.0	7.0	4.0	2.0	10.5	15.0	8.0	4.0	18.0	25.0	14.0	7.0	39.0	55.0	30.0	15.0	Soft clay	1,000

Maximum water pressure = 200 PSI (140,620 kg/m^2)

Thrust Block Details

N.T.S.

Date revised	Description	Checked	Date



PERMIT REVIEW ONLY

Design WHN
Drawn DMR
Checked
Scale N.T.S.
Date April 3, 2014
Project 13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name Bright–Details.dwg
Printing date

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CD–3

Testing and Contractor Coordination Requirements (applies to water and sanitary sewer)

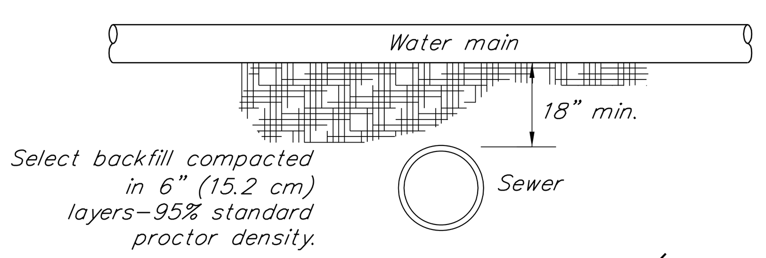
1. All water lines and sewer lines shall be thoroughly tested by the Contractor in accordance with the Environmental Protection Rules (09/29/07), and the Chapter 21 Water Supply Rules (the more stringent rule shall apply).
2. All private or municipal waterlines shall be tested by the Contractor in accordance with the procedures outlined in AWWA C600 and/or NFPA 24.
3. No water main shall be closer than ten (10) feet to any sanitary sewer or sanitary manhole and five (5) feet to any catch basin or storm sewer line. Provide minimum of 18" vertical separation between water main and storm/sanitary sewer crossing.
4. The Contractor shall be responsible for construction as-builts to service locations, and any water main fittings. As-builts shall be recorded in accordance with the outlined procedures.
5. The Contractor shall be responsible for contacting Engineer at least 24 hours prior to starting construction on any portion of the exterior water or sanitary systems. This notification requirement shall continue to the completion of the water and sanitary systems.
6. Utility Testing. The Contractor shall be responsible for scheduling water and sanitary testing, with the Engineer and the Municipality Public Works Department, at a minimum of 24 hours prior to the test. Based on availability of Engineer's staff, the Engineer shall accommodate the testing schedule within 24 hours of the Contractor requested test date/time.
7. The Contractor shall pre-test water for 2 hours. The Contractor shall notify Engineer immediately if pre-test failed.
8. The Contractor shall immediately contact the Engineer if pre-scheduled testing and/or water/sewer construction is canceled. If Contractor does not contact Engineer and Engineer visits the site, the Contractor shall be responsible for Engineer's fees/mileage for site visit.
9. The Contractor shall coordinate water construction with the City of Burlington. The Contractor shall leave thrust blocks and other required sections of new line exposed until City has inspected and approved it.

NOTES:

1. The location of sewer mains in relation to water mains shall be in accordance with the "Recommended Standards for Sewage Works" so-called Ten State Standards and Water Supply Rules.
2. Sewers shall be laid at least 10 feet horizontally from any existing or proposed water main. The distance shall be measured edge to edge. If this distance cannot be obtained, then the pipes shall be installed according to EPR, Chapter 1, Appendix 1-A-03(1)(11)a or b.
3. 18" separation shall be maintained whether water is over or under sewer. If this distance cannot be obtained, then the pipes shall be installed according to EPR Chapter 1, 11b.

Crossings:
Sewers crossing water mains shall be laid beneath the water main with at least 18 inches vertical clearance between the outside of the sewer and the outside of the water main. When it is possible to maintain the 18" vertical separation:

1.) the crossing shall be arranged so that one full length of sewer is centered above or below the water line with sewer joints as far as possible from water joints;
2.) the sewer pipe must be constructed to water main standards for a minimum distance of 20 feet either side of the crossing or a total of three pipe lengths, whichever is greater;
3.) the section constructed to water standards must be pressure tested to maintain 50 psi for 15 minutes without leakage prior to backfilling beyond one foot above the pipe to assure water tightness;
4.) where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.



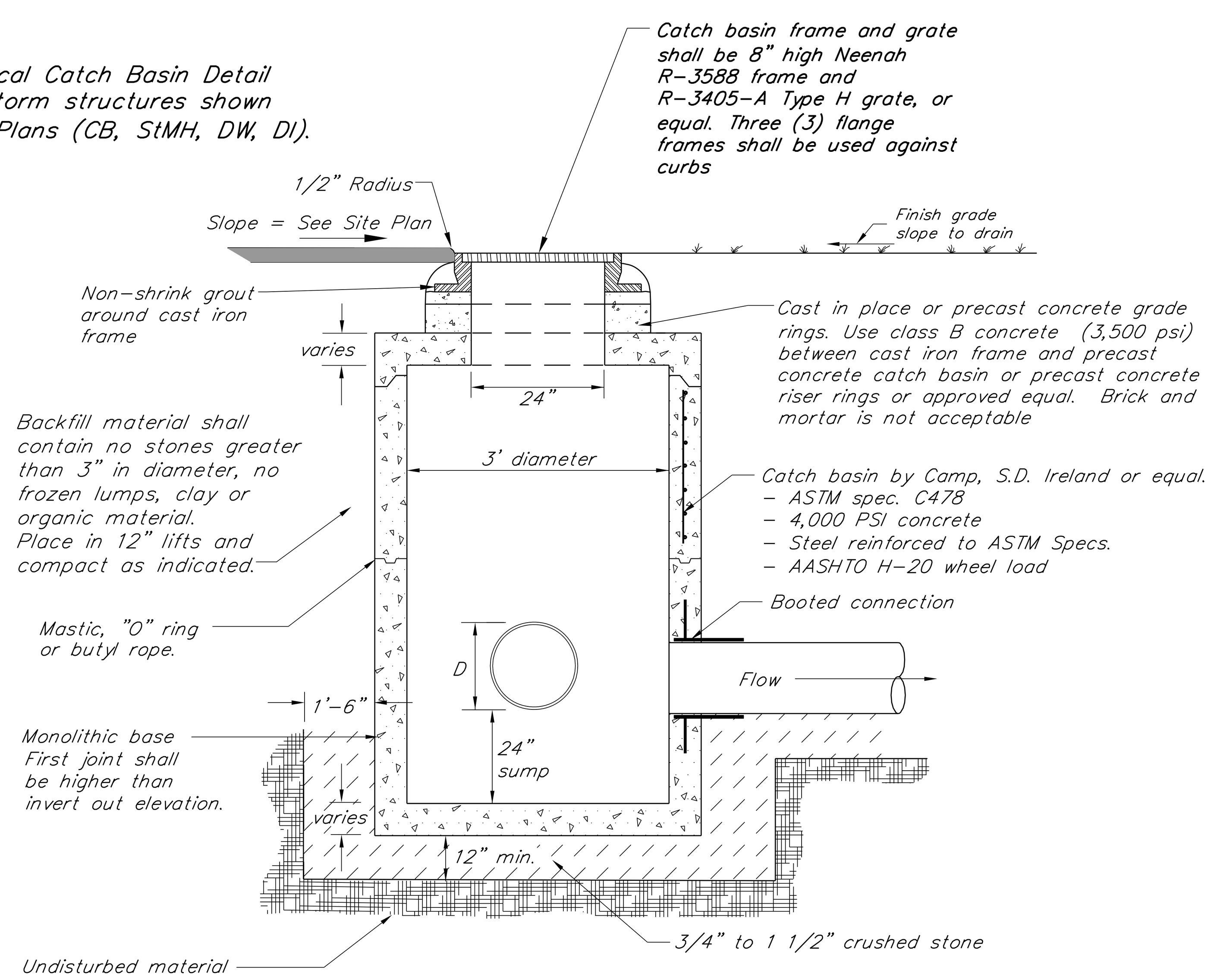
Sewer / Water Separation Detail

N.T.S.

The manhole frames may be set at base course pavement grade at any time. Prior to final course paving the frames set at base course paving grade shall be raised to final course grades using grout or Multi-purpose rubber adjustment risers placed under the frame. Manhole frames set at final grade must leave a 1" reveal against the frame after base course paving. Therefore, manhole frames may be set at final grade elevation prior to base course paving only if the following will occur:

1. Final course paving is to occur within 45 days of base course paving.
2. Final course paving is to occur before snow plowing.
3. Base course pavement around frame must be painted orange if road is open to traffic.

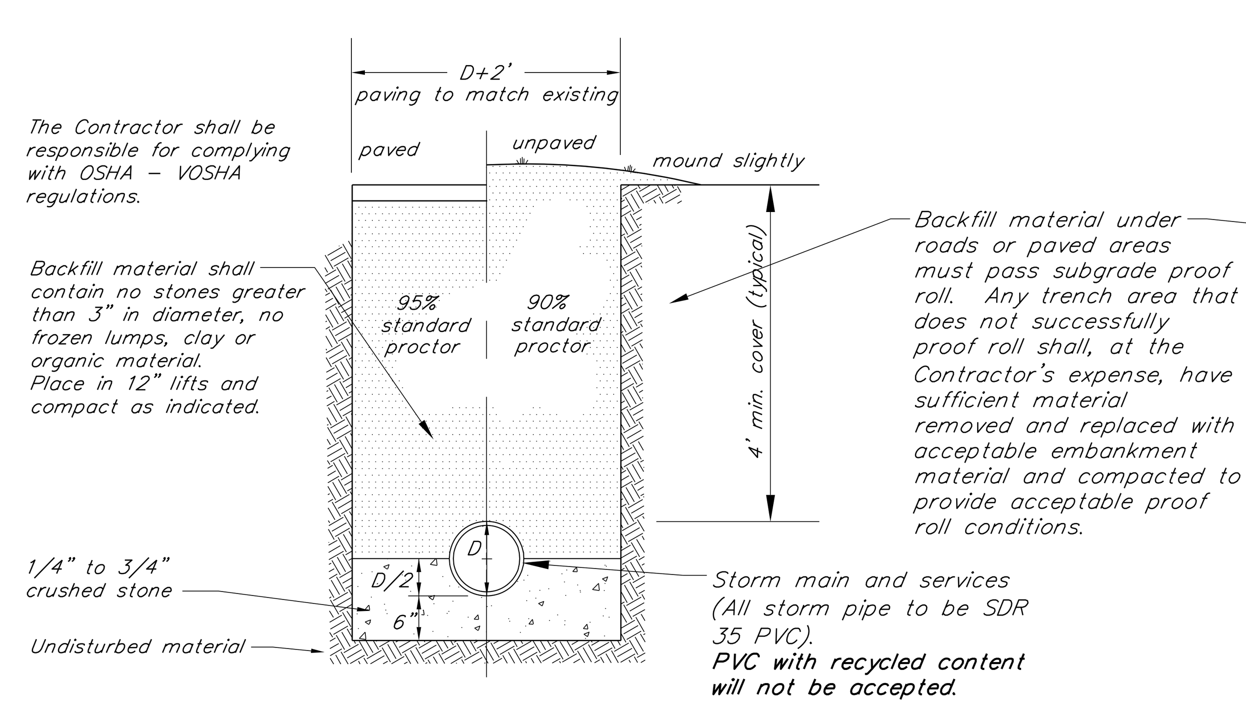
Use Typical Catch Basin Detail for all storm structures shown on Site Plans (CB, StMH, DW, DI).



Typical Catch Basin Inlet

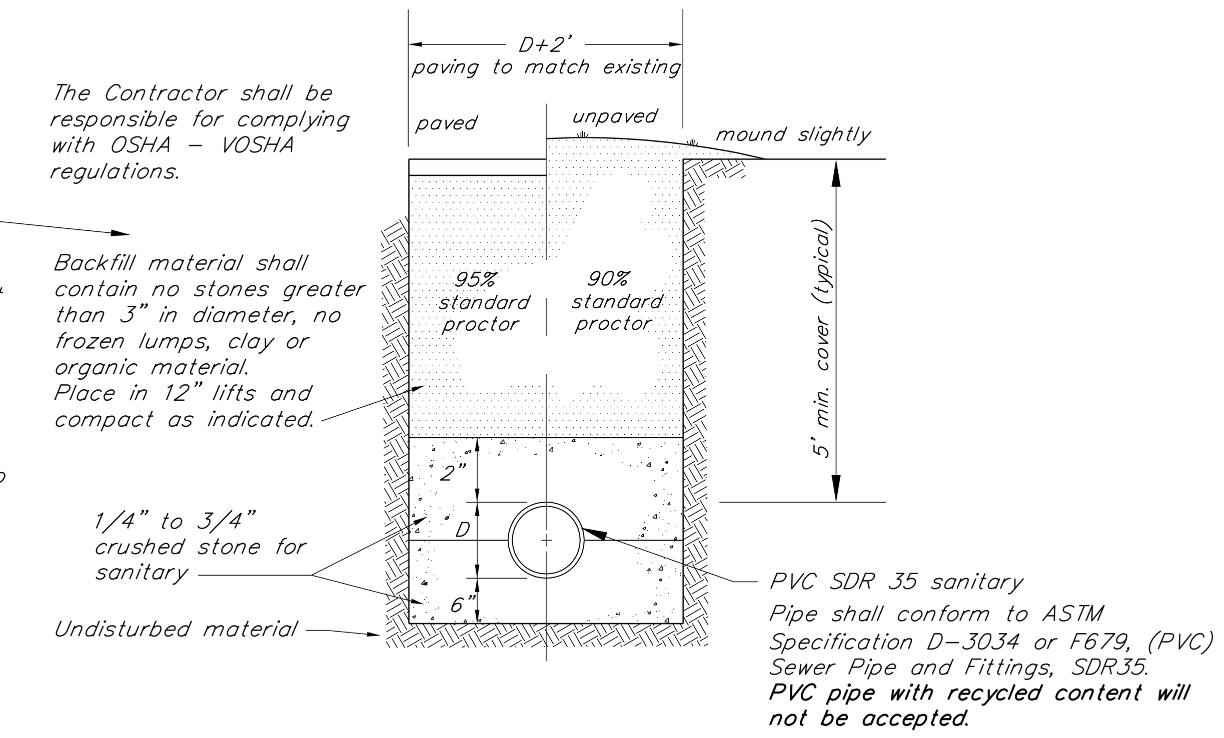
N.T.S.

PVC SDR 35 pipe shall not be installed when the temperature drops below 32° F or goes above 100° F unless prior approval is obtained from the Engineer. Extra care is required when handling PVC pipe during cold weather. PVC pipe shall not be stored outside and exposed to prolonged periods of sunlight as pipe discoloration and reduction in pipe impact strength will occur. If PVC pipe is to be stored on site for 1 month or longer it shall be covered with canvas or other opaque material.



Typical Storm Trench Detail

N.T.S.



Typical Sanitary Trench Detail

Storm Mains

The pipe for storm sewer shall be as shown on the plans and detailed below:
All pipe shall be laid to the line and grade as shown on the plans.

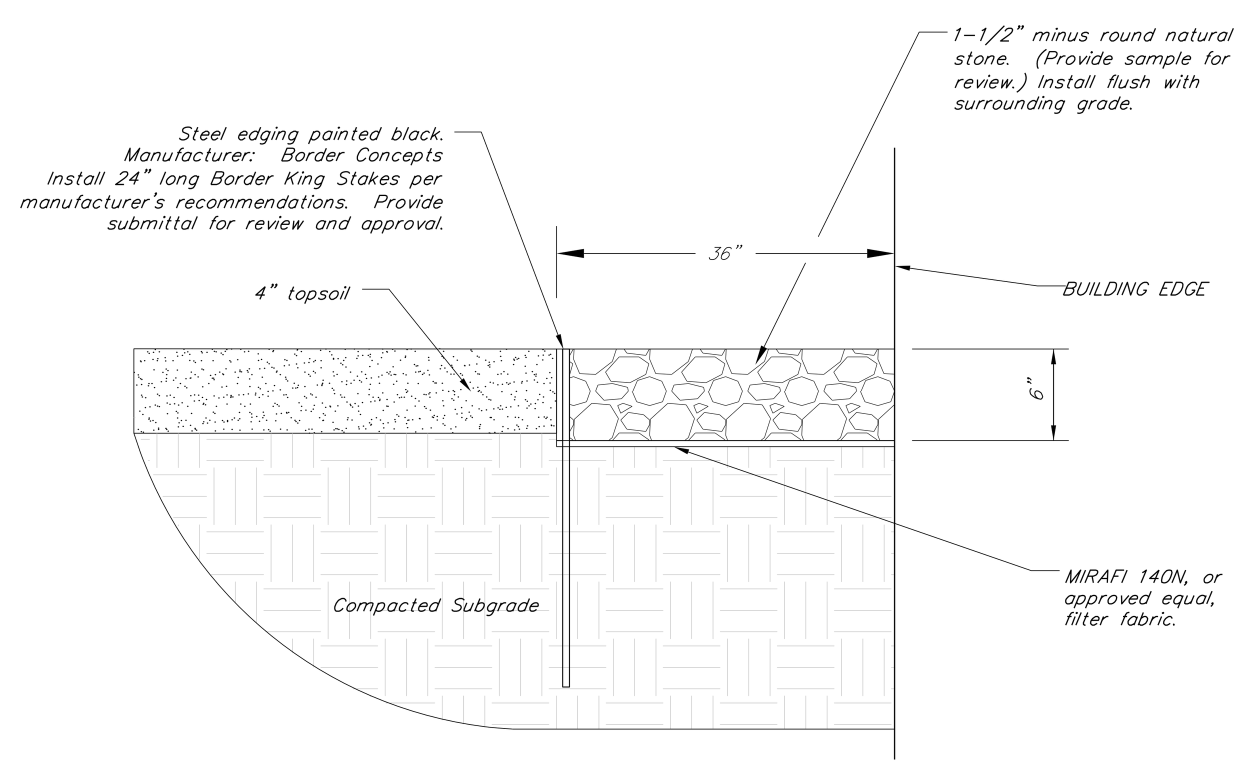
HDPE	– Smooth Walled Corrugated High Density Polyethylene Pipe	– Pipe shall be silt tight and conform to AASHTO M294*, Type S. (ADS N12 or approved equal)
PVC SDR 35	– Polyvinyl chloride pipe	– Pipe shall conform to ASTM Specification D-3034 or F679, (PVC) Sewer Pipe and Fittings, SDR35.

PVC SDR 35 pipe shall not be installed when the temperature drops below 32° F or goes above 100° F unless prior approval is obtained from the Engineer. Extra care is required when handling PVC pipe during cold weather. PVC pipe shall not be stored outside and exposed to prolonged periods of sunlight as pipe discoloration and reduction in pipe impact strength will occur. If PVC pipe is to be stored on site for 1 month or longer it shall be covered with canvas or other opaque material.

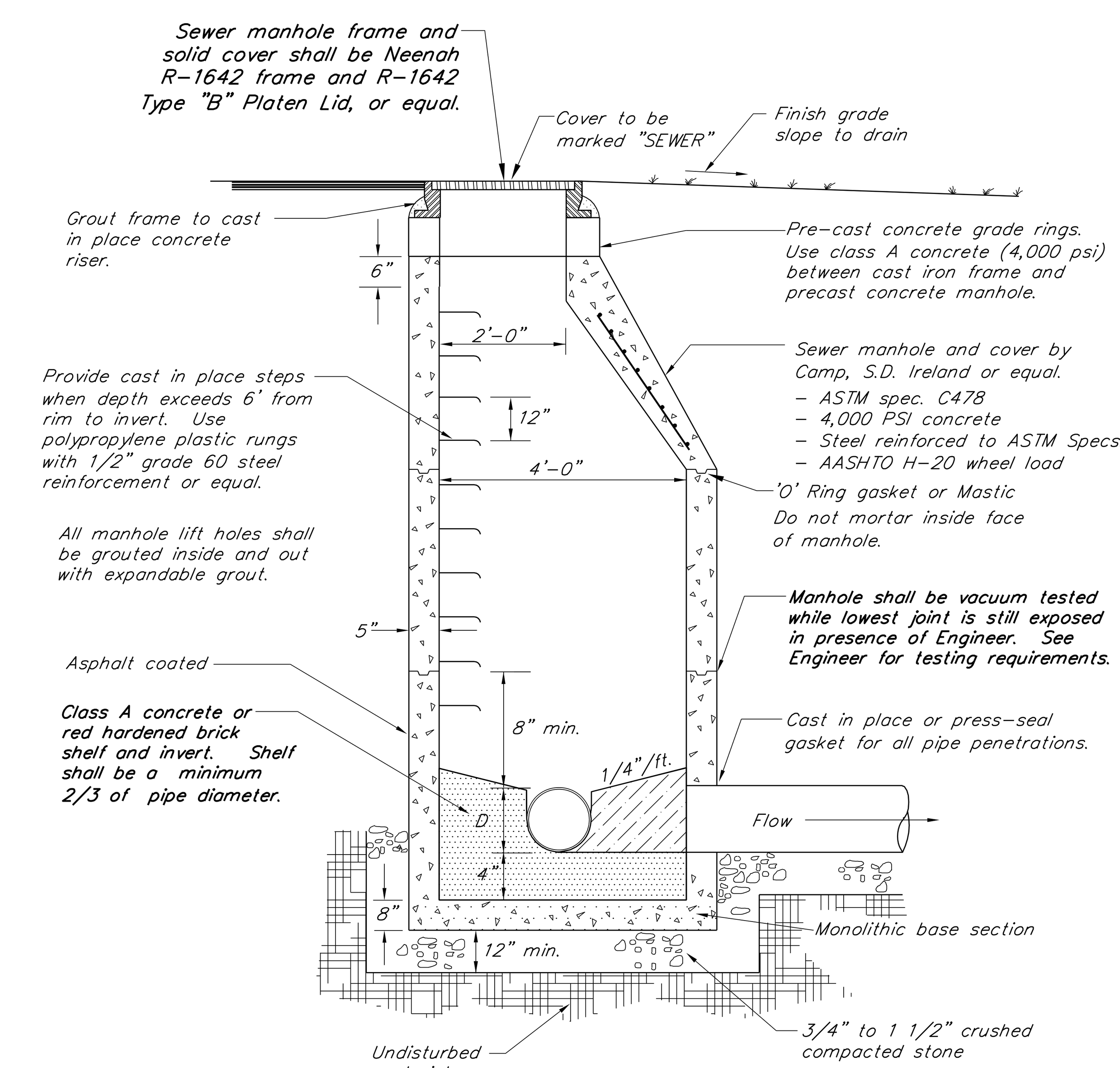
- **Contractor shall be responsible for all dewatering and stormwater by-pass procedures necessary to complete the project. No overnight pumping shall be allowed.**

Sanitary Testing Requirements

1. All sewer lines and manholes shall be thoroughly tested by the Contractor in accordance with the Environmental Protection Rules (09/29/07).
2. All sanitary manholes shall be vacuum tested in the presence of the Engineer. The structure shall be tested prior to backfill. Test procedures and pressure shall be determined jointly by the local approval agency and the Engineer. Failure of any vacuum test shall necessitate repair and/or replacement of the structure and retest. Water testing manholes is not acceptable.
3. All sanitary mains shall be air tested in the presence of the Engineer. At a minimum, the test pressure shall be 4 pounds per square inch at the highest point along the test for 4 minutes.
4. Utility Testing. The Contractor shall be responsible for scheduling sanitary testing at a minimum of 24 hours prior to the test. Based on availability of Engineer's staff, the Engineer shall accommodate the testing schedule within 24 hours of the Contractor requested test date/time.
5. The Contractor shall immediately contact the Engineer if pre-scheduled testing and/or water/sewer construction is canceled. If Contractor does not contact Engineer and Engineer visits the site, the Contractor shall be responsible for Engineer's fees/mileage for site visit.



Stone Drip Edge



Typical Precast Sewer Manhole

N.T.S.

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEDDE III — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Design	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name Bright-Details.dwg
Printing date

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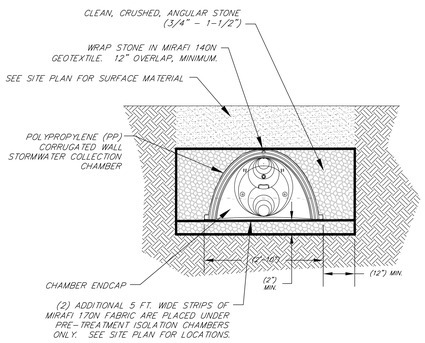
CD-4

Stormwater infiltration chambers detailed on this plan are based on specifications for the StormTech SC-310 system.

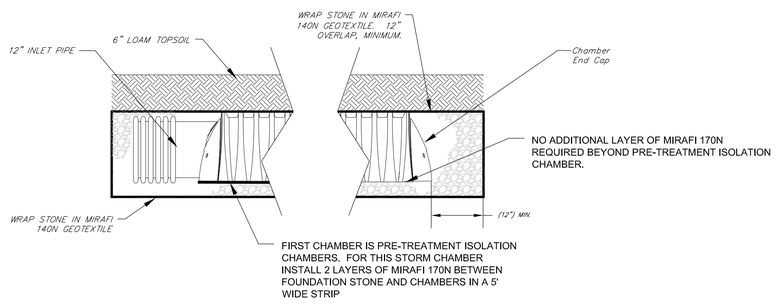
Infiltration System Construction Notes:

All upstream/upslope construction shall be complete and stabilized prior to allowing runoff from entering any infiltration systems. "Stabilized" shall mean paved surfaces, washed crushed stone, or vegetated areas that have established a dense and vigorous vegetative cover.



Typical Infiltration Trench Cross Section

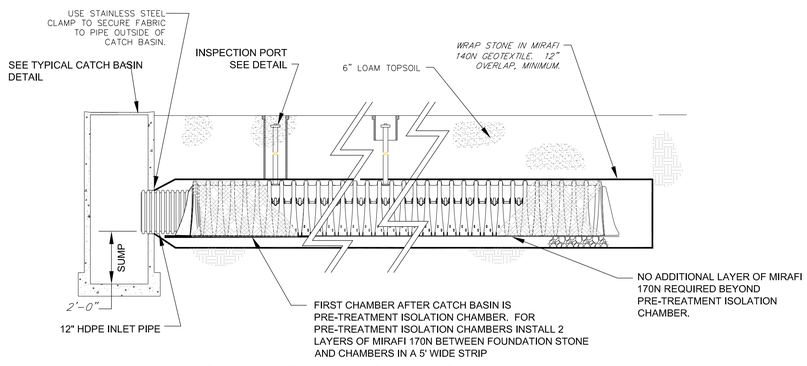
N.T.S.



Typical Infiltration Row Inlet and End

(System Southeast of Storage Facility)

N.T.S.

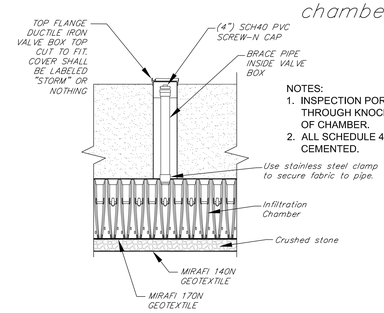


Overall Trench Cross Section

(System Southeast of Storage Facility)

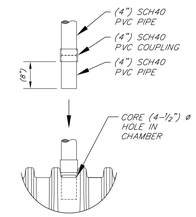
N.T.S.

Inspection ports shall be installed in all pre-treatment isolation chambers and in the first chamber outside the catch basin when no isolation chamber is specified.



NOTES:

1. INSPECTION PORT MUST BE CONNECTED THROUGH KNOCK-OUT LOCATED AT CENTER OF CHAMBER.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED.



CONNECTION DETAIL

NTS

Typical Inspection Port Cross Section

N.T.S.

SIGN MATERIALS:

THE SIGN BASE MATERIALS USED FOR REGULATORY SIGNS MAY BE ANY OF THE FOLLOWING OF THE MINIMUM THICKNESS NOTED.

	12" X 18" 18" X 24"	24" X 12" 24" X 24" 24" X 30" 24" X 36" 30" X 24"	36" X 48" 48" X 60"
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"

ALL PANELS SHALL HAVE RETROREFLECTIVE BACKGROUNDS

ALL SIGN POSTS SHALL BE SQUARE TUBE GALVANIZED STEEL PLACED IN GALVANIZED STEEL ANCHORS – SEE POST AND ANCHOR SELECTION CHART

GENERAL NOTES:

1. All square tube steel posts and anchors shall be formed into a size and shape in such a manner that neither flash nor weld shall interfere with the telescoping properties, nor damage the galvanizing.
2. Anchors may be driven or set into a dug hole and backfilled. If driven, a driving cap shall be used. The dug hole installation method shall be utilized in areas with poor soil conditions or as directed by the engineer. Backfill shall be compacted as directed by the engineer.
3. The tops of sign posts shall be at or near the top of sign. The post shall not extend above the top of sign.
4. Sign posts shall be installed a minimum of one foot below ground, inside the anchor. The length of anchor exposed above ground shall not exceed four inches.
5. All dimensions shown in inches.

POST AND ANCHOR SELECTION CHART

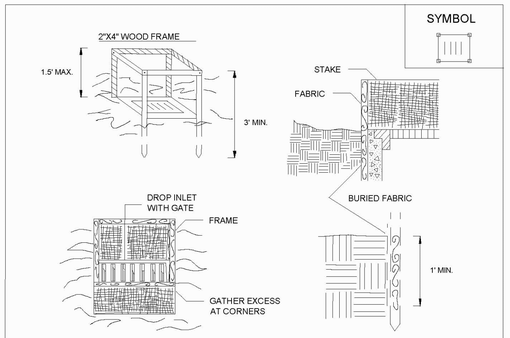
POST SIZE (IN.)	POST THICKNESS (IN.)	POST WEIGHT (LBS/FT.)	POST GAGE	SECTION MODULUS (IN.3)	ONE POST SV	TWO POST SV	THREE POST SV	POSTS PERMITTED IN 8' PATH	ANCHOR SIZE (IN.)	ANCHOR GAGE	MINIMUM ANCHOR LENGTH
1.75	.083	1.88	14	0.222	45	90	135	TWO	2.00	12	30
2.00	.109	2.42	12	0.393	80	160	240	TWO	2.25	12	48
2.50	.109	3.35	12	0.673	137	274	41 1	ONE	3.00	7	48

NOTES:

1. All sign posts shall have 7/16 inch holes every one inch on center (all four sides).
2. The number of sign posts permitted within an eight foot path assumes that the sign assembly is not protected by guardrail or is located within a guardrail's deflection distance determined per the current "American Association of State Highway and Transportation Officials" (AASHTO) roadside design guide. additional posts may be installed using slip bases that meet "national cooperative highway research program" (NCHRP) report 350 or the AASHTO "Manual For Assessing Safety Hardware" (mash). The appropriate resource shall be determined as described in the mash publication.
3. To use the selection value (SV) columns in the table above, multiply a sign's surface area in square feet (H X L) by the sign's height in feet measured from the ground to the centroid of the sign assembly (H). This result must be less than or equal to the corresponding selection value. Note, that for signs with multiple posts, the largest height dimension shall be used to calculate the post selection value.
4. The design criteria utilized in sign post and anchor selection is as follows: wind speed of 70 mph (10 year mean recurrence interval), wind pressure of 19 psf, steel minimum yield of 55,000 psi, and an allowable stress of 1.4 (0.60 fy).

Roadway Sign and Post Details

N.T.S.



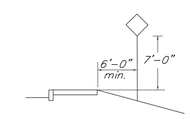
CONSTRUCTION SPECIFICATIONS

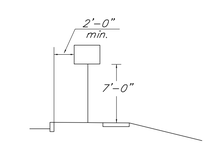
1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUN DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: NY STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	FILTER FABRIC DROP INLET PROTECTION

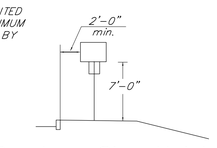
Figure 5.3b Storm Drain Inlet Protection: Filter Fabric





IF SUFFICIENT CLEARANCE IS NOT AVAILABLE BETWEEN CURB AND SIDEWALK MOUNT SIGN BEHIND SIDEWALK AS SHOWN AT TOP. CHECK FOR ADEQUATE R.O.W..

IF A SECONDARY SIGN IS MOUNTED BELOW ANOTHER SIGN, THE MINIMUM CLEARANCE MAY BE REDUCED BY ONE FOOT.



Roadway Sign Height Details

N.T.S.

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. IRESON — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Design	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name: Bright-Details.dwg
Printing date

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CD-5

Erosion Prevention and Sediment Control Notes

1. Contractor shall be responsible for complying with all State and Local erosion prevention and sediment control standards and permit requirements during construction.
2. The limit of disturbance shall be clearly defined by Contractor's surveyor prior to clearing. Erosion and sediment control devices shall be established to trap sediment on site.
3. All erosion control shall be placed as shown on the drawings or as ordered by the Engineer The Contractor shall maintain the erosion control measures until the Engineer is satisfied that permanent ground cover is established and that further measures are not required. It shall be the responsibility of the Contractor to employ appropriate erosion control as shown on these drawings and any other measures as necessary to trap sediment on site.
4. All areas of disturbance shall be permanently or temporarily stabilized as soon as possible and within 48 hours of final grading. All areas of disturbance shall be at least temporarily stabilized within 7 days of initial disturbance. Any disturbance after 7 consecutive days of exposed soil shall be stabilized daily unless the following exceptions apply:
   1. Stabilization is not required if earthwork is to continue in the area in the next 24 hours and there is no precipitation forecast in the next 24 hours.
   2. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 ft. or greater (e.g. house foundation excavation, utility trenches). Stabilization measures shall include mulch and netting, erosion control matting, crushed stone, gravel, or pavement.
5. Refer to the Low Risk Site Handbook for Erosion Prevention and Sediment Control for acceptable methods of stabilization.
6. The Contractor shall use water for dust control. **There will be a ZERO tolerance for dust**
7. The Contractor shall provide inlet protection around all catch basins (existing or new) that collect construction site stormwater runoff. Crushed stone inlet protection may be used in non-paved areas.
8. A stabilized construction entrance (See Detail) shall be installed and maintained at all construction access locations.
9. All paved roads used by construction vehicles shall be swept daily during periods of active construction, or at a greater frequency, if dirt or gravel is tracked from the site. The swept debris shall be immediately removed from the curb face if applicable.
10. All temporary erosion and sediment control measures shall be removed within 30 days after final stabilization or after the measures are no longer needed, unless otherwise authorized.
11. All sediment removed from sediment control practices shall be placed in an approved soil disposal area.
12. All areas that do not have established vegetation by October 15th must be stabilized in accordance with the Winter Construction Requirements listed on this sheet.
13. After permanent seeding the Contractor shall be responsible for watering, if necessary, to ensure adequate vegetative growth.
14. Water from dewatering activities that flows off site must be clear. Water must not be pumped into storms sewers, lakes, or wetlands unless the water is clear.
15. The Contractor shall be responsible for all inspection and maintenance of the erosion prevention and sediment control practices for the project. Inspections and corresponding reports shall be performed at a minimum, once a week and after every precipitation event that results in a discharge from the site.

    Contractor shall call 540-1748 or email Megan Moir (mmoir@ci.burlington.vt.us) at least 24 hours prior to initiating earth disturbance and submit name, cell phone number, and email contact information of the erosion control coordinator for the project.

    The perimeter of the site and all BMPs will be inspected at the **end of each workday** to ensure that sediment will not leave the site. If sediment has traveled beyond the site boundary, it shall be swept up or otherwise removed and deposited on-site in an upgradient area at the end of each workday.

Winter Construction Requirements (October 15th - April 15th)

1. For areas to be stabilized by vegetation, seeding shall be completed no later than September 15th to ensure adequate growth and cover.
2. If seeding is not completed by September 15th, additional non-vegetative protection must be used to stabilize the site for the winter period. This includes the use of Erosion Control Matting or netting of a heavy mulch layer.
3. Where mulch is used for temporary stabilization it must be applied at double the standard rate, or a minimum of 3 inches with an 80%-90% cover.
4. Stabilized Construction Entrances shall be enlarged to provide for snow stockpiling.
5. Limits of disturbance shall be moved or replaced to reflect any revised boundaries of winter work.
6. A snow management plan shall be prepared with adequate storage and control of meltwater, requiring cleared snow to be stored down slope of all areas of disturbance and out of stormwater treatment structures.
7. A minimum 25 foot buffer shall be maintained from perimeter controls such as silt fence.
8. Drainage structures must be kept open and free of snow and ice dams.
9. Silt fence and other practices requiring earth disturbance must be installed ahead of frozen ground.
10. To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day, with the following exceptions:
    - If no precipitation within 24 hours is forecast and work will resume in the same disturbed area within 24 hours, daily stabilization is not necessary.
    - Disturbed areas that collect and retain runoff, such as house foundation or open utility trenches.
11. Prior to stabilization, snow or ice must be removed to less than 1 inch thickness.
12. Use stone to stabilize areas such as the perimeter of buildings under construction or where construction vehicle traffic is anticipated. Stone paths should be 10-20 feet wide to accommodate vehicular traffic.

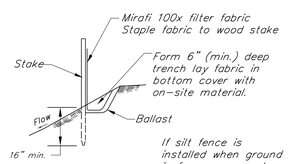
General Grading and Site Work Notes

1. All area disturbed and all areas within the clearing limits shall be graded and covered with a minimum of 4" of compacted loam topsoil. The areas to be loamed shall be free and clear of roots, waste material and other deleterious material. Topsoil shall be spread and lightly compacted to a depth of 4". Topsoil shall be approved by the Engineer.
2. All cut slopes shall be no steeper than 3h on 1v. All fill slopes shall be no steeper than 2.5h on 1v.
3. Temporary silt fence shall be erected prior to any clearing or construction. Fencing may be erected in phases, but in no case shall construction of clearing proceed fencing. Special areas may be designated by the Owner for preservation of existing trees. These areas shall be the Contractor's responsibility to insure no damage is done to designated trees.
4. Existing plantings are located in general areas as shown on this plan. Contractor shall protect plantings so as not to damage these or their root systems.
5. Slope stability based upon unsaturated soil conditions. If during construction saturated soils are encountered, contact the Engineer immediately

Construction Limit Barriers

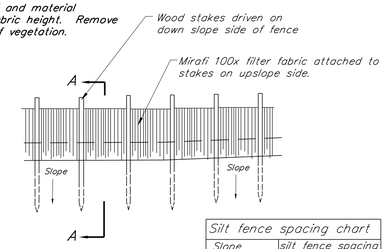
- Temporary chain-linked construction fence shall be used to delineate construction limits where practical.
- Orange construction fence or snow fence shall be used to demarcate short-term construction activities as well as around the drip line of any existing trees to remain.
- 3" thick orange polyester mesh webbing may also be used to demarcate construction limits except within 50 feet of any stream, lake, pond or wetland. For this project, polyester mesh webbing should not be used in areas that are proximate to pedestrian or vehicular traffic.

NOTE:
1. **Contractor shall be responsible for the installation, maintenance, and removal of silt fence in all locations shown on the plans.**
2. **Maintenance shall be performed as needed and material removed when sediment reaches half of fabric height. Remove silt fence after successful establishment of vegetation.**



Section A-A

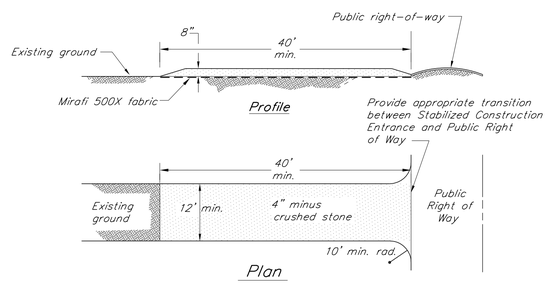
If silt fence is installed when ground is frozen, a gravel or sand ballast must be used.



Silt fence spacing chart	
Slope	silt fence spacing
5% to 10%	50 ft. or less
10% to 20%	25 ft. or less
> 20%	15 ft. or less

Typical Temporary Silt Fence

N.T.S.



Note:

- Contractor shall be responsible for the installation, maintenance, and removal of a stabilized construction entrance at each construction entrance for the project. The Construction Stabilized Entrance and its continued maintenance shall be a minimum measure to prevent tracking of sediment off-site.
- Contractor to use Mirafi 500x under stone for temporary construction roads.
- Stabilized construction entrances shall be repaired when voids are 80% filled with sediment. Repair shall include adding additional 4" minus crushed stone and/or removal of contaminated stone.

Temporary Stabilized Construction Entrance

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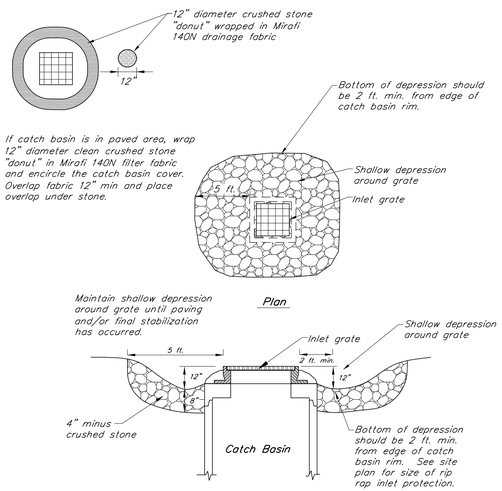

Catch Basin Inlet Protection

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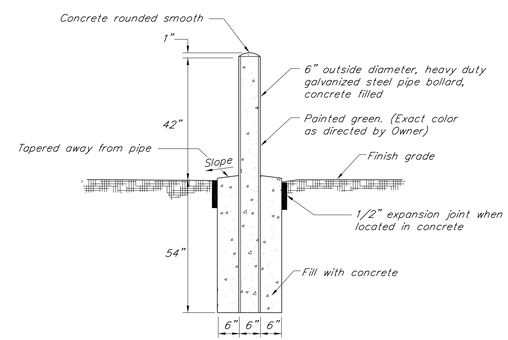

Bollard Detail

N.T.S.

Soil and Seeding Notes

1. Topsoil shall be screened and shall have a minimum 4" depth unless additional depth is specified on the plans. Topsoil shall be natural, fertile, friable soil representative of local productive soil and free of clay lumps, stones, subsoil or other foreign matter, not frozen or muddy. Acidity range PH 5-7 not less than three (3) percent humus. Samples will be required for approval. All soil testing costs will be paid by Contractor.
2. Commercial fertilizer shall be a complete plant food containing nitrogen (50% organic) phosphoric acid and potash. Soil tests will indicate composition required.
3. Hydro seeding is the preferred practice for turf establishment. Specifications are:

   Fertilizer: 19-19-19 75 lbs per 1,000 gallons of water
   Lime: 100 lbs. per 1,000 gallons of water
   Seed: 6 lbs per 1,000 square feet.
   71.46% Min. Futura 3000 Per Rye Grass Germ: 90%
   14.81% Min. Dynasty Tall Fescue Germ: 90%
   9.74% Min. Creeping Red Fescue Germ: 90%
   2.32% Max. Crop
   1.61% Max. Inert
   0.06% Max. Weed
   Mulch: 300 lbs. per 1,000 gallons of water.
   Tacifer: 5 lbs. per 1,000 gallons of water.
4. The grass seed may be applied by hand method at a rate of 6 lbs. per 1,000 sq. ft.
5. Areas having soil compaction as a result of construction shall be roto-tilled prior to seeding.
6. If hand seeding, only straw mulch is to be used and secured by netting either organic or inorganic. If inorganic is used, it must be removed before the first mowing.
7. Starter fertilizer shall be applied at the normal rate at the time of seeding. Fertilizer application will not be allowed in sensitive areas and adjacent to drainage ways as determined by the Engineer.
8. Watering is to be done by the Contractor to maintain proper growth. Contractor shall supply the water and all apparatus necessary to apply the water (i.e. hoses, sprinklers, etc.).
9. Staking of all topsoiled areas to control foot traffic will be required. Acceptable staking materials will be grade stakes and twine or string with flagging attached for visibility. Contractor is responsible to maintain stakes throughout the warranty period.
10. A guarantee through the first growing season is required with any sparse or bare areas larger than 1 sq. ft. to be redone.
11. The Contractor shall test topsoil to determine proper application rate of lime and fertilizer. Submit tests to Engineer for approval.
12. Seeding is permitted from May 15 - June 15, and August 15 - September 15. Other seeding is possible at other times with prior approval from the Engineer.

CONSTRUCTION STAKEOUT NOTES

The Contractor shall be responsible for all construction stakeout for the project. The Engineer shall provide the Contractor an AutoCAD R2000 drawing of the site design. The drawing will include horizontal and vertical survey control. Additional survey control will be the responsibility of the Contractor.

1. The Contractor shall be responsible for using proper survey equipment and having properly trained personnel to use this information. Any Contractor that does not have proper equipment or personnel shall subcontract the work to a competent consultant.

2. The horizontal control datum may be based on a coordinate system that is unique for this project. Project north may not refer to astronomic or magnetic north.

3. The Contractor shall check the integrity of survey control points by occupying a control point checking distance to back sight and checking distance and angle to another control point prior to any construction stakeout. The contractor shall not proceed with stakeout if either measured distances or angles do not match calculated values.

4. Graphical images of infrastructure in the AutoCAD drawing may not be in an accurate representation of its size. It is the Contractor's responsibility to verify size and shape of all items to be staked out.

5. After completion of radial stakeout with the survey transit, the Contractor shall check each stakeout point as necessary to verify the horizontal and vertical position of the point and that it is correct in relationship to the rest of the project.

6. The Contractor shall complete all construction stakeout to an accuracy of 0.1 feet (excluding building stakeout).

North American Green S75BN

Material Content

Straw	100% (.50 lbs/sq.yd.) (.27 kg/m2)
Netting	Leno woven, 100% biodegradable jute fiber
Weight	approximately 1.64 lbs/1000 s.f.
Thread	Biodegradable

Installed as per manufacturer's specifications.

Material Specifications

Erosion control blanket shall be a machine-produced mat of 100% agricultural straw.

The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with natural fiber netting having an approximate 1/2" X 1/2" mesh and be sewn together with biodegradable thread.

Straw erosion control blanket shall be S75BN as manufactured by North American Green, Inc. (812-867-6632) or equivalent. Erosion control blanket shall have the following properties:

Erosion Control Matting

Date revised	Description	Checked	Date

STATE OF VERMONT — WILLIAM H. NEDDER — NO. 5703 — REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Design	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Civil Details

Champlain Housing Trust Inc.

Bright Street — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

File name: Bright-Details.dwg
Printing date

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CD-6

The Low Risk Site Handbook
for
Erosion Prevention and Sediment Control

VERMONT
ENVIRONMENTAL CONSERVATION
August 2006

The Low Risk Site Handbook for Erosion Prevention and Sediment Control

Any construction activity that disturbs 1 or more acres of land, or is part of a larger development plan that will disturb 1 or more acres, requires a Vermont state permit for stormwater discharges from construction sites.

Construction General Permit 3-9020 guides an applicant in the determination of the potential risk to water quality from the construction activity and categorizes the applicant's activity as Low Risk, Moderate Risk, or that which requires an Individual Permit.

The standards in this handbook serve as the required Erosion Prevention and Sediment Control Plan for construction sites determined to be "Low Risk" under GP-3-9020.

Contact Information

VT DEC - Water Quality Division
Stormwater Section
103 South Main Street, Building 10 North
Waterbury, VT 05671-0408
Tel: 802-241-3770 or 4320
www.vtwaterquality.org/stormwater.htm

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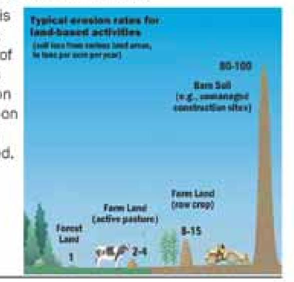
Section 1
Introduction
What is erosion prevention and sediment control?

Sediment washing into streams is one of the largest water quality problems in Vermont. Sediment can kill or weaken fish and other organisms and adversely impact aquatic habitat.

On most construction sites, vegetation that holds the soil in place and protects it from erosive forces of rain and runoff is removed, leaving large areas of soil exposed to the elements. During rainfall or snowmelt, the exposed soil may be easily eroded and transported to nearby streams, lakes, or wetlands.

To prevent this from happening, a small number of simple practices to prevent erosion and contain soil on the construction site must be used.



Do I need a permit?

Any construction activity that disturbs 1 or more acres of land, or is part of a larger development plan that will disturb 1 or more acres, requires a Vermont state permit for stormwater discharges from construction sites.

Application Process

1. Obtain a copy of the permit and determine the Risk Category of the proposed project. The permit is available online at: www.vtwaterquality.org/stormwater.htm.
2. Submit the Notice of Intent (NOI) form, notifying the Department of your intent to begin construction. **Submit the NOI to DEC at least 60 days before you plan to begin construction to allow sufficient time for processing.*
3. Upon receipt of written authorization from DEC, you are covered under the permit and may begin construction.
4. If your project is determined to be "Low Risk", you must follow this handbook for erosion prevention and sediment control on your construction site.
5. If your site is not classified as Low Risk, then you must follow the Department guidance in GP 3-9020 for Moderate Risk activities or those requiring an Individual Permit.

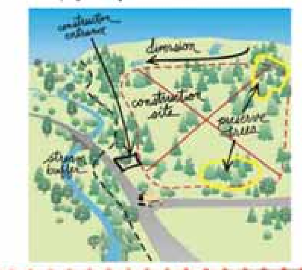
Section 2
The Requirements
1. Mark Site Boundaries

Purpose:

Mark the site boundaries to identify the limits of construction. Delineating your site will help to limit the area of disturbance, preserve existing vegetation and limit erosion potential on the site.

Requirements:

You must physically mark the limits of construction.



How to comply:

Before beginning construction, walk the site boundaries and flag trees, post signs, or install orange safety fence.

Fence is required on any boundary within 50 feet of a stream, lake, pond or wetland, unless the area is already developed (existing roads, buildings, etc.)

Properly placed barrier tape marks the boundaries and limits of construction on this site.

2. Limit Disturbance Area

Purpose:

Limit the amount of soil exposed at one time to reduce the potential erosion on site.

Requirements:

The permitted disturbance area is specified on the site's written authorization to discharge. Only the acreage listed on the authorization form may be exposed at any given time.

How to comply:

Plan ahead and phase the construction activities to ensure that no more than the permitted acreage is disturbed at one time.

Be sure to properly stabilize exposed soil with seed and mulch or erosion control matting before beginning work in a new section of the site.

This residential subdivision is being constructed in phases. To limit the total disturbance area, only a few home sites are under construction at one time.

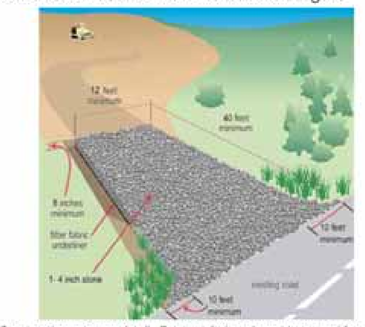
3. Stabilize Construction Entrance

Purpose:

A stabilized construction entrance helps remove mud from vehicle wheels to prevent tracking onto streets.

Requirements:

If there will be any vehicle traffic off of the construction site, you must install a stabilized construction entrance before construction begins.



Construction entrance detail. Entrance/exit pad must keep mud from tracking onto both paved and dirt roads.

How to install:

Rock Size: Use a mix of 1 to 4 inch stone
Depth: 8 inches minimum
Width: 12 feet minimum
Length: 40 feet minimum (or length of driveway, if shorter)
Geotextile: Place filter cloth under entire gravel bed

Maintenance:

Redress with clean stone as required to keep sediment from tracking onto the street.

Good stabilized construction entrance. Adequate width to accommodate construction traffic and prevent mud tracking onto neighboring streets. Ensure that the pad is 8 inches deep and 40 feet long.

Poor construction exit. Rock pad is poorly constructed; rock is too small. Use filter fabric under 1 - 4 inch rock. No mud should be tracked onto roads.

Rock sizing and placement look OK for residential site, and very little mud appears on the road. The pad should be at least 8 inches thick and 12 feet wide. Ensure that pad is used as the entrance and exit points - note track marks near curb. Entire area needs seed and mulch.

Rock pad was installed properly with right sized rock, but lack of filter fabric underliner is causing rock to spread and sink into the soil. Note tracking of mud onto road. Mud tracked on roadways violates the permit requirements and is a potential legal liability.

4. Install Silt Fence

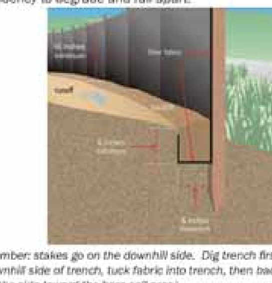
Purpose:

Silt fences intercept runoff and allow suspended sediment to settle out.

Requirements:

Silt fence must be installed:
- on the downhill side of the construction activities
- between any ditch, swale, storm sewer inlet, or waters of the State and the disturbed soil

* Hay bales must not be used as sediment barriers due to their tendency to degrade and fall apart.



Remember: stakes go on the downhill side. Dig trench first, install fence in downhill side of trench, tuck fabric into trench, then backfill on the uphill side (the side toward the bare soil area).

Where to place:

- Place silt fence on the downhill edge of bare soil. At the bottom of slopes, place fence 10 feet downhill from the end of the slope (if space is available).
- Ensure the silt fence catches all runoff from bare soil.
- Maximum drainage area is ¼ acre for 100 feet of silt fence.
- Install silt fence across the slope (not up and down hills!)
- Install multiple rows of silt fence on long hills to break up flow.
- Do not install silt fence across ditches, channels, or streams or in stream buffers.

How to install silt fence:

- Dig a trench 6 inches deep across the slope
- Unroll silt fence along the trench
- Ensure stakes are on the downhill side of the fence
- Join fencing by rolling the end stakes together
- Drive stakes in against downhill side of trench
- Drive stakes until 16 inches of fabric is in trench
- Push fabric into trench; spread along bottom
- Fill trench with soil and pack down

Maintenance:

- Remove accumulated sediment before it is halfway up the fence.
- Ensure that silt fence is trenched in ground and there are no gaps.

Very good use of continuous "super" (reinforced) silt fence. Note that wire fencing is installed between the filter fabric and the posts.

Good use of J-hook in silt fence to trap sediment in water running along the fence. Sediment must be removed before it reaches halfway to top of fence.

Very good installation of multiple silt fences on long slope. Turn ends of fencing uphill to prevent bypass. Leave silt fences up until grass is well established on all areas of the slope. Re-seed bare areas as soon as possible. Remove or spread accumulated sediment and remove silt fence after all grass is up.

Poor installation of silt fencing. Silt fence must be trenched in along bottom. Hay bales are not approved as sediment barriers.

5. Divert Upland Runoff

Purpose:

Diversion berms intercept runoff from above the construction site and direct it around the disturbed area. This prevents "clean" water from becoming muddied with soil from the construction site.

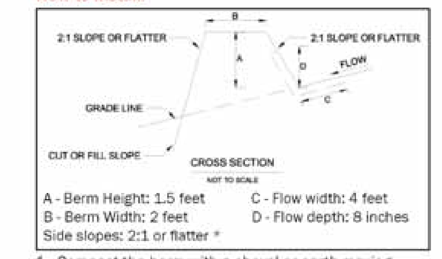
Requirements:

If stormwater runs onto your site from upslope areas and your site meets the following two conditions, you must install a diversion berm before disturbing any soil.

1. You plan to have one or more acres of soil exposed at any one time (excluding roads).
2. Average slope of the disturbed area is 20% or steeper.*

Berms and ditches divert clean upland runoff around construction sites and reduce erosion and sedimentation problems. Stabilize berms and ditches after construction.

How to install:



A - Berm Height: 1.5 feet C - Flow width: 4 feet
B - Berm Width: 2 feet D - Flow depth: 8 inches
Side slopes: 2:1 or flatter *

1. Compact the berm with a shovel or earth-moving equipment.
2. Seed and mulch berm or cover with erosion control matting immediately after installation.
3. Stabilize the flow channel with seed and straw mulch or erosion control matting. Line the channel with 4 inch stone if the channel slope is greater than 20%*.
4. Ensure the berm drains to an outlet stabilized with riprap. Ensure that there is no erosion at the outlet.
5. The diversion berm shall remain in place until the disturbed areas are completely stabilized.

* See page 39 for slope calculations.

Good construction, seeding, and stabilization of diversion berm. Note that diversion ditch is lined with grass on flatter part of slope, and with rock on steeper part.

Well built vegetated berm diverting runoff. Diversion berms and ditches should be seeded after construction. Use matting if slopes are steep.

Good installation of rock-lined berm to divert rain runoff around residential construction site on steep slope near a river. Diversion ditches can be lined with grass if channel slopes are 5% or less, and with 4 inch stone if they are steeper.

6. Slow Down Channelized Runoff

Purpose:

Stone check dams reduce erosion in drainage channels by slowing down the stormwater flow.

Requirements:

If there is a concentrated flow (e.g. in a ditch or channel) of stormwater on your site, then you must install stone check dams. Hay bales must not be used as check dams.

How to install:

Height: No greater than 2 feet. Center of dam should be 9 inches lower than the side elevation
Side slopes: 2:1 or flatter (see p.39 for slope calculation)
Stone size: Use a mixture of 2 to 9 inch stone
Width: Dams should span the width of the channel and extend up the sides of the banks
Spacing: Space the dams so that the bottom (toe) of the upstream dam is at the elevation of the top (crest) of the downstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

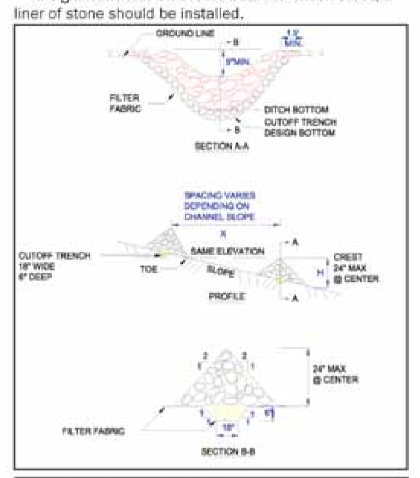
Spacing (in feet) = Height of check dam (in feet) / Slope in channel (ft/ft)

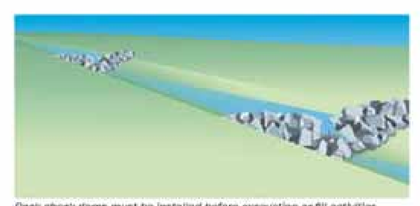
Maintenance:

Remove sediment accumulated behind the dam

as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.

If significant erosion occurs between check dams, a liner of stone should be installed.





Rock check dams must be installed before excavation or fill activities begin. See "How to install" for spacing directions.

Good installation of temporary rock check dams. The check dams should extend up the sides of the banks. Middle section should be lower than the sides. Clean out sediment as it accumulates. Remove check dams after site and channel are stabilized with vegetation.

Hay bales must not be used as check dams due to their high failure rates.

7. Construct Permanent Controls

Purpose:

Permanent stormwater treatment practices are constructed to maintain water quality, ensure groundwater flows, and prevent downstream flooding. Practices include detention ponds and wetlands, infiltration basins, and stormwater filters.

Requirements:

If the total impervious* area on your site, or within the common plan of development, will be 1 or more acres, you must apply for a State Stormwater Discharge Permit and construct permanent stormwater treatment practices on your site. These practices must be installed before the construction of any impervious surfaces.

How to comply:

Contact the Vermont Stormwater Program and follow the requirements in the Vermont Stormwater Management Manual.

The Stormwater Management Manual is available at: www.vtwaterquality.org/stormwater.htm

*An impervious suface is a manmade surface, including, but not limited to, paved and unpaved roads, parking areas, roofs, driveways, and walkways, from which precipitation runs off rather than infiltrates.

This wet pond is designed to treat stormwater runoff, recharge groundwater, regulate the flow of water into nearby streams, and prevent downstream flooding.

Install all permanent stormwater treatment practices before constructing any impervious surfaces on site. This stormwater wetland treats stormwater runoff from the adjacent parking lot.

8. Stabilize Exposed Soil

Purpose:

Seeding and mulching, applying erosion control matting, and hydroseeding are all methods to stabilize exposed soil. Mulches and matting protect the soil surface while grass is establishing.

Requirements:

All areas of disturbance must have temporary or permanent stabilization within 7, 14, or 21 days of initial disturbance, as stated in the project authorization. After this time, any disturbance in the area must be stabilized at the end of each work day.

The following exceptions apply:
- Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade (See page 33).

How to comply:

Prepare bare soil for seeding by grading the top 3 to 6 inches of soil and removing any large rocks or debris.

Seeding Rates for Temporary Stabilization
April 15 - Sept. 15 — Ryegrass (annual or perennial: 20 lbs/acre)
Sept. 15 - April 15 — Winter rye: 120 lbs/acre

Seeding Rates for Final Stabilization:

Choose from:	Variety	lbs./acre	lbs./1000 sq.ft.
Birdsfoot trefoil	Empire/Pardee	5[1]	0.10
or			
Common white clover	Common	8	0.20
plus			
Tall Fescue	KY-31/Rebel	10	0.25
plus			
Redtop	Common	2	0.05
or			
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[1] - Mix 2.5 each of Empire and Pardee OR 2.5 lbs. of Birdsfoot and 2.5 lbs. white clover per acre.

Mulching Rates
April 15 - Sept.15 – Hay or Straw: 1 inch deep (1-2 bales/1000 s.f.)
Sept.15 - April 15 – Hay or Straw: 2 in. deep (2-4 bales/1000 s.f.)

Erosion Control Matting
As per manufacturer's instructions

Hydroseed
As per manufacturer's instructions

Excellent stabilization of large slopes to limit the area of disturbance. Make sure to install erosion control matting within 48 hours of grading to ensure good contact between soil and mat.

Good tracking up and down slope. Tracking slows down runoff and promotes infiltration. More mulch is needed.

Hydroseeding exposed soil is a good option for stabilizing large areas. Hydroseed is a mixture of seed, fertilizer, water and a tackifier to hold the seed in place before it germinates.

Excellent application of hay mulch. Good mulch cover and sediment barrier around soil stockpile.

9. Winter Stabilization

Purpose:

Managing construction sites to minimize erosion and prevent sediment loading of waters is a year-round challenge. In Vermont, this challenge becomes even greater during the late fall, winter, and early spring months.

'Winter construction' as discussed here, describes the period between October 15 and April 15, when erosion prevention and sediment control is significantly more difficult.

Rains in late fall, thaws throughout the winter, and spring melt and rains can produce significant flows over frozen and saturated ground, greatly increasing the potential for erosion.

Requirements for Winter Shutdown:

For those projects that will complete earth disturbance activities prior to the winter period (October 15), the following requirements must be adhered to:

1. For areas to be stabilized by vegetation, seeding shall be completed no later than September 15 to ensure adequate growth and cover.
2. If seeding is not completed by September 15, additional non-vegetative protection must be used to

Stabilization and seeding of slopes before winter will reduce or eliminate erosion in the spring. The grass on this slope is holding the soil in place and promoting infiltration of the melting snow.

stabilize the site for the winter period. This includes use of Erosion Control Matting or netting of a heavy mulch layer. Seeding with winter rye is recommended to allow for early germination during wet spring conditions.

3. Where mulch is specified, apply roughly 2 inches with an 80-90% cover. Mulch should be tracked in or stabilized with netting in open areas vulnerable to wind.

Requirements for Winter Construction

If construction activities involving earth disturbance continue past October 15 or begin before April 15, the following requirements must be adhered to:

1. Enlarged access points, stabilized to provide for snow stockpiling.
2. Limits of disturbance moved or replaced to reflect boundary of winter work.
3. A snow management plan prepared with adequate storage and control of meltwater, requiring cleared snow to be stored down slope of all areas of disturbance and out of stormwater treatment structures.
4. A minimum 25 foot buffer shall be maintained from perimeter controls such as silt fence.
5. In areas of disturbance that drain to a water body within 100 feet, two rows of silt fence must be installed along the contour.
6. Drainage structures must be kept open and free of snow and ice dams.

7. Silt fence and other practices requiring earth disturbance must be installed ahead of frozen ground.
8. Mulch used for temporary stabilization must be applied at double the standard rate, or a minimum of 3 inches with an 80-90% cover.
9. To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day, with the following exceptions:
   - If no precipitation within 24 hours is forecast and work will resume in the same disturbed area within 24 hours, daily stabilization is not necessary.
   - Disturbed areas that collect and retain runoff, such as house foundations or open utility trenches.
10. Prior to stabilization, snow or ice must be removed to less than 1 inch thickness.
11. Use stone to stabilize areas such as the perimeter of buildings under construction or where construction vehicle traffic is anticipated. Stone paths should be 10–20 feet wide to accommodate vehicular traffic.

10. Stabilize Soil at Final Grade

Purpose:

Stabilizing the site with seed and mulch or erosion control matting when it reaches final grade is the best way to prevent erosion while construction continues.

Requirements:

Within 48 hours of final grading, the exposed soil must be seeded and mulched or covered with erosion control matting.

Lawn is fully established before construction is completed at this home site.

How to comply:

Bring the site or sections of the site to final grade as soon as possible after construction is completed. This will reduce the need for additional sediment and erosion control measures and will reduce the total disturbed area.

For seeding and mulching rates, follow the specifications under Rule 8, "Stabilizing Exposed Soil".

Within 48 hours of final grading, erosion control matting and mulch have been applied.

12. Dewatering Activities

Purpose:

Treat water pumped from dewatering activities so that it is clear when leaving the construction site.

Requirements:

Water from dewatering activities that flows off of the construction site must be clear. Water must not be pumped into storm sewers, lakes, or wetlands unless the water is clear.

How to comply:

Using sock filters or sediment filter bags on dewatering discharge hoses or pipes, discharge water into silt fence enclosures installed in vegetated areas away from waterways. Remove accumulated sediment after the water has dispersed and stabilize the area with seed and mulch.

Water is pumped from the construction site into a silt fence enclosure on a vegetated area or into a sock filter away from waterways.

12. Inspect Your Site

Purpose:

Perform site inspections to ensure that all sediment and erosion control practices are functioning properly. Regular inspections and maintenance of practices will help to reduce costs and protect water quality.

Requirements:

Inspect the site at least once every 7 days and after every rainfall or snowmelt that results in a discharge from the site. Perform maintenance to ensure that practices are functioning according to the specifications outlined in this handbook.

In the event of a noticeable sediment discharge from the construction site, you must take immediate action to inspect and maintain existing erosion prevention and sediment control practices. Any visibly discolored stormwater runoff to waters of the State must be reported.

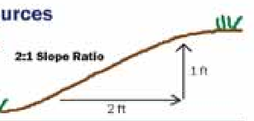
Forms for reporting discharges are available at: www.vtwaterquality.org/stormwater.htm

Example Site Inspection Form	Y	N
1. Boundary Limits		
• Site boundary markers are up and visible		
• Disturbance is only occurring within marked boundaries		
2. Limit Disturbance Area		
• Only the acreage listed on the *Authorization to Discharge* is disturbed at one time		
3. Construction Entrance		
• Off-site tracking of mud prevented		

Example Site Inspection Form	Y	N
4. Sediment Barriers		
• Silt fence is trenched into ground with no gaps		
• Accumulated sediment is less than ½ way up the fence		
5. Diversion Berms		
• All upland stormwater is diverted around the site		
6. Check Dams		
• Check dams are in place and stretch the width of the channel		
• Channels are stable with no erosion		
8. Stabilize Exposed Soil		
• Seed and mulch, and/or erosion control blankets are being used in accordance with the permit requirements		
9. Winter Stabilization		
• After September 15, all disturbed areas have been seeded and mulched to 3 inches deep, or covered in erosion control blankets.		
• For ongoing construction, exposed soil is mulched prior to forecasted rain events.		
10. Stabilize Soil at Final Grade		
• Within 48 hours of establishing final grade, soil is seeded and mulched or covered in erosion control matting		
Water flowing off the site		
• Water is free of sediment (water is clear)		

Section 3
Additional Resources

How to calculate slope:



Approximate Slope Conversions			
Steepness	**Percent**	**Slope ratio (ft/ft)**	**Degrees**
Very steep	100%	1:1	45°
	50%	2:1	27°
Moderate	33%	3:1	18°
	25%	4:1	14°
	10%	10:1	6°
Slight	5%	20:1	3°

How to estimate disturbance area:

1 acre = 43,560 square feet = 4,840 square yards

Area in acres (width in feet x length in feet) (w) x (l)	100	150	200	300	400	500
100	0.2	0.3	0.5	0.7	0.9	1.1
150	0.3	0.5	0.7	1.0	1.4	1.7
200	0.5	0.7	0.9	1.4	1.8	2.3
300	0.7	1.0	1.4	2.1	2.8	3.4
400	0.9	1.4	1.8	2.8	3.7	4.6
500	1.1	1.7	2.3	3.4	4.6	5.7

Acknowledgements
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VT Relay Service for the Hearing Impaired
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Vermont Department of Environmental Conservation
Water Quality Division - Stormwater Section
103 South Main Street, Building 10 North
Waterbury, VT 05671-0408
Tel: 802-241-3770 or 3777
Fax: 802-241-3287
www.vtwaterquality.org/stormwater.htm

Contractor shall employ as many of these best management practices to prevent soil from leaving the construction site. If evidence is found of soil leaving the construction site, the Engineer shall direct Site Contractor to implement additional best management practices at no additional cost to Owner.

Date revised	Description	Checked	Date

STATE OF VERMONT · WILLIAM H. NEDDE III · NO. 5703 · REGISTERED PROFESSIONAL ENGINEER

PERMIT REVIEW ONLY

Designed	WHN
Drawn	DMR
Checked	
Scale	N.T.S.
Date	April 3, 2014
Project	13220

Low Risk Site Handbook
for Erosion Prevention & Sediment Control

Champlain Housing Trust Inc.

Bright Street Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

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