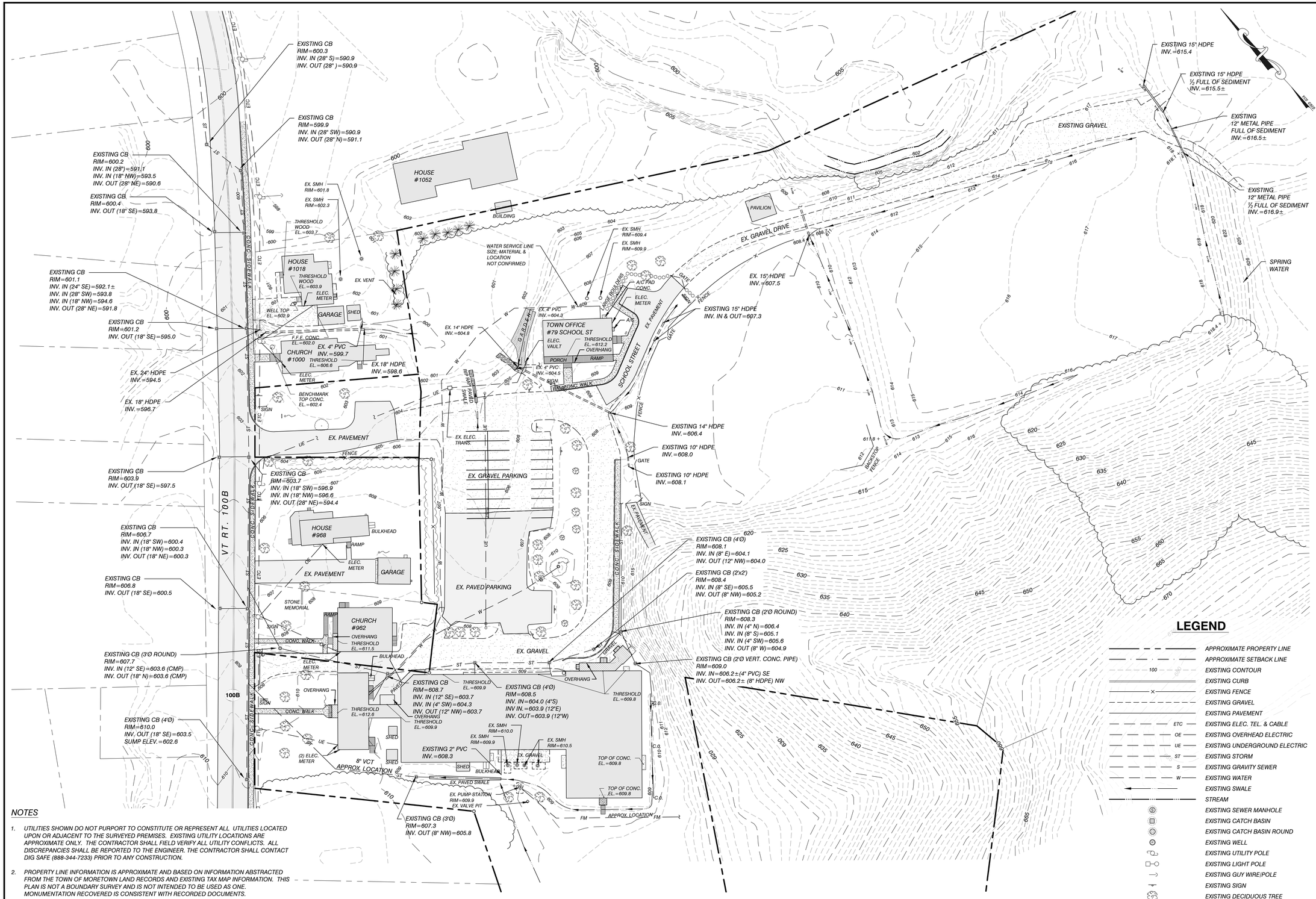


NOTES

1. *UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.*
2. *PROPERTY LINE INFORMATION IS APPROXIMATE AND BASED ON INFORMATION ABSTRACTED FROM THE TOWN OF MORETOWN LAND RECORDS AND EXISTING TAX MAP INFORMATION. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE. MONUMENTATION RECOVERED IS CONSISTENT WITH RECORDED DOCUMENTS.*
3. *SITE INFORMATION IS BASED ON A FIELD SURVEY PERFORMED BY CIVIL ENGINEERING ASSOCIATES, INC AUGUST 2020. CIVIL ENGINEERING ASSOCIATES, INC. SURVEY ORIENTATION IS "GRID NORTH", VERMONT COORDINATE SYSTEM OF 1983 (HORIZONTAL) AND NAVD88 (VERTICAL) ESTABLISHED FROM GPS OBSERVATIONS ON SITE.*
4. *SUPPLEMENTAL CONTOUR INFORMATION IS BASED UPON 2013 STATIONING OBTAINED FROM VERMONT CENTER OF GEOGRAPHIC INFORMATION. HORIZONTAL AND VERTICAL DATUM BASED ON VCS NAD 83 AND NAVD 88. SITE INFORMATION AROUND THE PERIMETER OF THE PROJECT AREA IS BASED UPON ORTHOMETRIC PHOTOGRAPHY.*

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- EXISTING ELEC. TEL. & CABLE
- EXISTING OVERHEAD ELECTRIC
- EXISTING UNDERGROUND ELECTRIC
- EXISTING STORM
- EXISTING GRAVITY SEWER
- EXISTING WATER
- EXISTING SWALE
- STREAM
- EXISTING SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING CATCH BASIN ROUND
- EXISTING WELL
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND

SITE ENGINEER:

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

STORMWATER CONSULTANT

WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

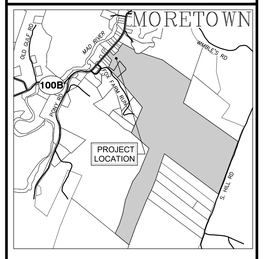
CLIENT:

CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:

MORETOWN ELEMENTARY SCHOOL

940 VT ROUTE 100B
MORETOWN, VT



LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

EXISTING CONDITIONS PLAN

100% SUBMITTAL

DATE 09/30/2021
SCALE 1" = 40'
PROJ. NO. 20147

DRAWING NUMBER C1.0

PROPOSED GRAVEL WETLAND
SEE SHEET C2.1

PROPOSED SAND FILTER SEE SHEET C2.3

PROPOSED STORMWATER AND
PARKING LOT IMPROVEMENTS
SEE SHEETS C2.1

PROPOSED STORMWATER IMPROVEMENTS
SEE SHEETS C2.2

BIT CONC. PAVED SWALE
S=0.012
PER DETAIL SHEET C4.0

HOUSE #1052
HOUSE #1018
GARAGE
SHED
CHURCH #1000
GRAVEL WETLAND #2
GRAVEL WETLAND #1
TOWN OFFICE #79 SCHOOL ST
OVERHANG
PORCH
RAMP
BUILDING
PAVILION
A/C PAD CONC.
LARGE BOULDERS
GATE
FENCE
SCHOOL STREET
HOUSE #968
BULKHEAD
CHURCH #962
VT RT. 100B
100B
UE
ETC
ST
FM
BRACKTOP FENCE

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

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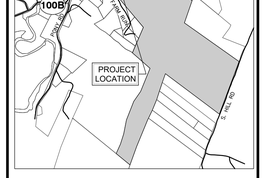
940 VT ROUTE 100B
MORETOWN, VT



LOCATION MAP
1" = 2000'

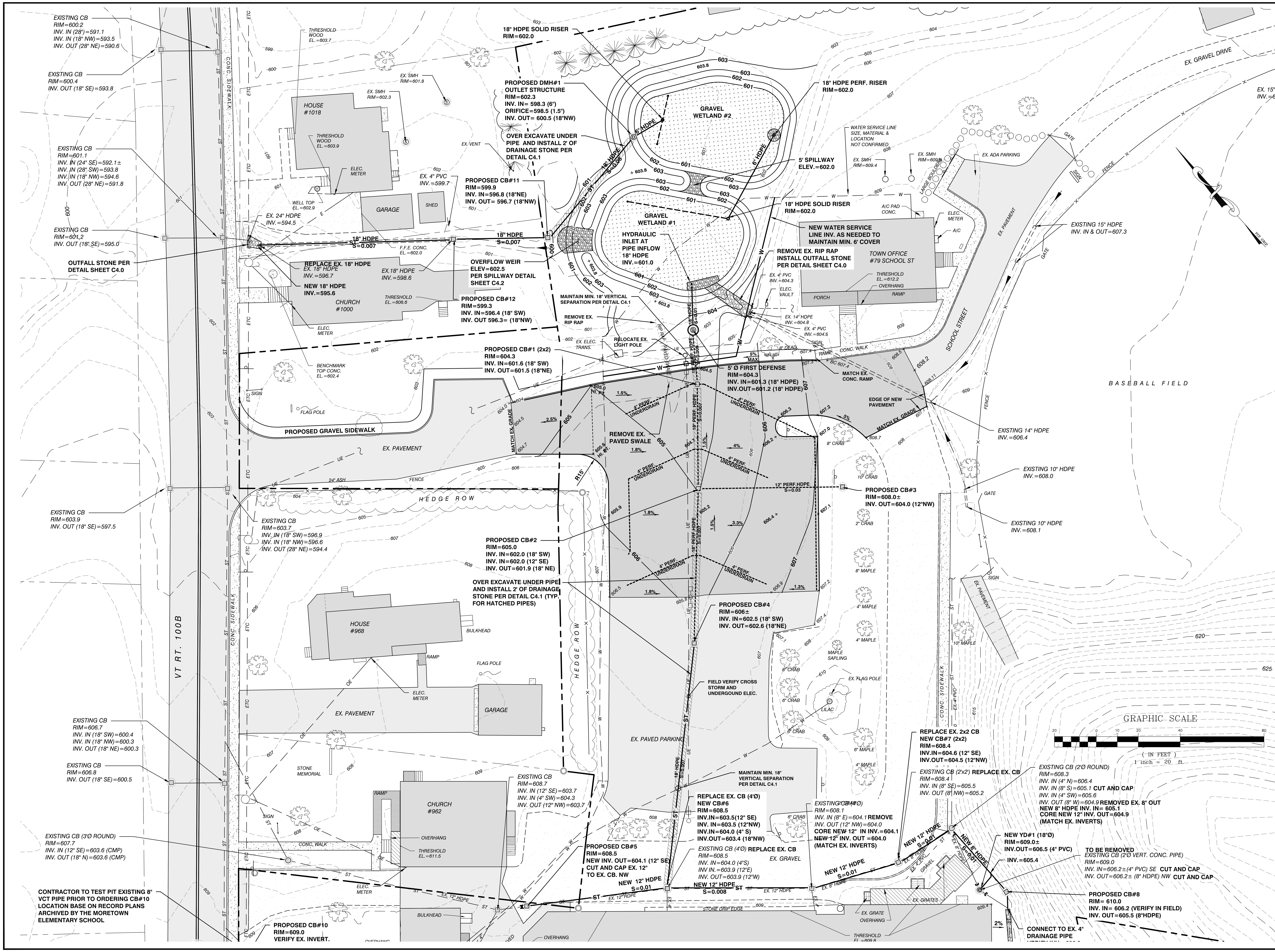
DATE	CHECKED	REVISION

PROPOSED CONDITIONS PLAN

100% SUBMITTAL

DATE 09/30/2021
SCALE 1" = 40'
PROJ. NO. 20147

DRAWING NUMBER C2.0



EXISTING CB
RIM=600.2
INV. IN (28")=591.1
INV. IN (18" NW)=593.5
INV. OUT (28" NE)=590.6
EXISTING CB
RIM=600.4
INV. OUT (18" SE)=593.8
EXISTING CB
RIM=601.1
INV. IN (24" SE)=592.1±
INV. IN (28" SW)=593.8
INV. IN (18" NW)=594.6
INV. OUT (28" NE)=591.8
EXISTING CB
RIM=601.2
INV. OUT (18" SE)=595.0
OUTFALL STONE PER
DETAIL SHEET C4.0
EXISTING CB
RIM=603.9
INV. OUT (18" SE)=597.5
EXISTING CB
RIM=603.7
INV. IN (18" SW)=596.9
INV. IN (18" NW)=596.6
INV. OUT (28" NE)=594.4
EXISTING CB
RIM=606.7
INV. IN (18" SW)=600.4
INV. IN (18" NW)=600.3
INV. OUT (18" NE)=600.3
EXISTING CB
RIM=606.8
INV. OUT (18" SE)=600.5
EXISTING CB (3'Ø ROUND)
RIM=607.7
INV. IN (12" SE)=603.6 (CMP)
INV. OUT (18" N)=603.6 (CMP)
CONTRACTOR TO TEST PIT EXISTING 8" VCT PIPE PRIOR TO ORDERING CB#10 LOCATION BASE ON RECORD PLANS ARCHIVED BY THE MORETOWN ELEMENTARY SCHOOL
PROPOSED CB#10
RIM=609.0
VERIFY EX. INVERT.
VT RT. 100B
HOUSE #1018
GARAGE
SHED
CHURCH #1000
HOUSE #968
GARAGE
CHURCH #962
EX. 24" HDPE
INV.=594.5
18" HDPE
S=0.007
REPLACE EX. 18" HDPE
EX. 18" HDPE
INV.=596.7
NEW 18" HDPE
INV.=595.6
EX.18" HDPE
INV.=598.6
18" HDPE SOLID RISER
RIM=602.0
PROPOSED DMH#1
OUTLET STRUCTURE
RIM=602.3
INV. IN= 598.3 (6")
ORIFICE=598.5 (1.5")
INV. OUT= 600.5 (18"NW)
OVER EXCAVATE UNDER PIPE AND INSTALL 2' OF DRAINAGE STONE PER DETAIL C4.1
PROPOSED CB#11
RIM=599.9
INV. IN=596.8 (18"NE)
INV. OUT= 596.7 (18"NW)
OVERFLOW WEIR
ELEV=602.5
PER SPILLWAY DETAIL SHEET C4.2
PROPOSED CB#12
RIM=599.3
INV. IN=596.4 (18" SW)
INV. OUT 596.3= (18"NW)
GRAVEL WETLAND #2
GRAVEL WETLAND #1
18" HDPE PERF. RISER
RIM=602.0
5' SPILLWAY
ELEV.=602.0
18" HDPE SOLID RISER
RIM=602.0
HYDRAULIC INLET AT PIPE INFLOW
18" HDPE
INV.=601.0
NEW WATER SERVICE LINE INV. AS NEEDED TO MAINTAIN MIN. 6' COVER
REMOVE EX. RIP RAP
INSTALL OUTFALL STONE PER DETAIL SHEET C4.0
TOWN OFFICE #79 SCHOOL ST
MAINTAIN MIN. 18" VERTICAL SEPARATION PER DETAIL C4.1
REMOVE EX. RIP RAP
RELOCATE EX. LIGHT POLE
PROPOSED CB#1 (2x2)
RIM=604.3
INV. IN=601.6 (18" SW)
INV. OUT=601.5 (18"NE)
5' Ø FIRST DEFENSE
RIM=604.3
INV. IN=601.3 (18" HDPE)
INV.OUT=601.2 (18" HDPE)
PROPOSED GRAVEL SIDEWALK
EX. PAVEMENT
REMOVE EX. PAVED SWALE
HEDGE ROW
PROPOSED CB#2
RIM=605.0
INV. IN=602.0 (18" SW)
INV. IN=602.0 (12" SE)
INV. OUT=601.9 (18" NE)
OVER EXCAVATE UNDER PIPE AND INSTALL 2' OF DRAINAGE STONE PER DETAIL C4.1 (TYP. FOR HATCHED PIPES)
PROPOSED CB#3
RIM=608.0±
INV. OUT=604.0 (12"NW)
PROPOSED CB#4
RIM=606±
INV. IN=602.5 (18" SW)
INV. OUT=602.6 (18"NE)
FIELD VERIFY CROSS STORM AND UNDERGOUND ELEC.
EX. PAVED PARKING
MAINTAIN MIN. 18" VERTICAL SEPARATION PER DETAIL C4.1
BASEBALL FIELD
SCHOOL STREET
EXISTING 15" HDPE
INV. IN & OUT=607.3
EXISTING 14" HDPE
INV.=606.4
EXISTING 10" HDPE
INV.=608.0
EXISTING 10" HDPE
INV.=608.1
EX. GRAVEL DRIVE
PROPOSED CB#5
RIM=608.5
NEW INV. OUT=604.1 (12" SE)
CUT AND CAP EX. 12"
TO EX. CB. NW
NEW 12" HDPE
S=0.01
REPLACE EX. CB (4'Ø)
NEW CB#6
RIM=608.5
INV.IN=603.5(12" SE)
INV. IN=603.5 (12"NW)
INV.IN=604.0 (4" S)
INV.OUT=603.4 (18"NW)
EXISTING CB (4'Ø) REPLACE EX. CB
RIM=608.5
INV. IN=604.0 (4"S)
INV. IN=603.9 (12"E)
INV. OUT=603.9 (12"W)
NEW 12" HDPE
S=0.008
EXISTING CB (4'Ø)
RIM=608.1
INV. IN (8" E)=604.1 REMOVE
INV. OUT (12" NW)=604.0
CORE NEW 12" IN INV.=604.1
NEW 12" INV. OUT =604.0
(MATCH EX. INVERTS)
REPLACE EX. 2x2 CB
NEW CB#7 (2x2)
RIM=608.4
INV.IN=604.6 (12" SE)
INV.OUT=604.5 (12"NW)
EXISTING CB (2'X2') REPLACE EX. CB
RIM=608.4
INV. IN (8" SE)=605.5
INV. OUT (8" NW)=605.2
NEW 12" HDPE
S=0.01
EXISTING CB (2'Ø ROUND)
RIM=608.3
INV. IN (4" N)=606.4
INV. IN (8" S)=605.1 CUT AND CAP
INV. IN (4" SW)=605.6
INV. OUT (8" W)=604.9 REMOVED EX. 8" OUT
NEW 8" HDPE INV. IN= 605.1
CORE NEW 12" INV. OUT=604.9
(MATCH EX. INVERTS)
NEW YD#1 (18"Ø)
RIM=609.0±
INV.OUT=606.5 (4" PVC)
INV.=605.4
TO BE REMOVED
EXISTING CB (2'Ø VERT. CONC. PIPE)
RIM=609.0
INV. IN=606.2± (4" PVC) SE CUT AND CAP
INV. OUT=606.2± (8" HDPE) NW CUT AND CAP
NEW 8" HDPE
S=0.01
PROPOSED CB#8
RIM= 610.0
INV. IN= 606.2 (VERIFY IN FIELD)
INV. OUT=605.5 (8"HDPE)
CONNECT TO EX. 4" DRAINAGE PIPE
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

SITE ENGINEER:

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

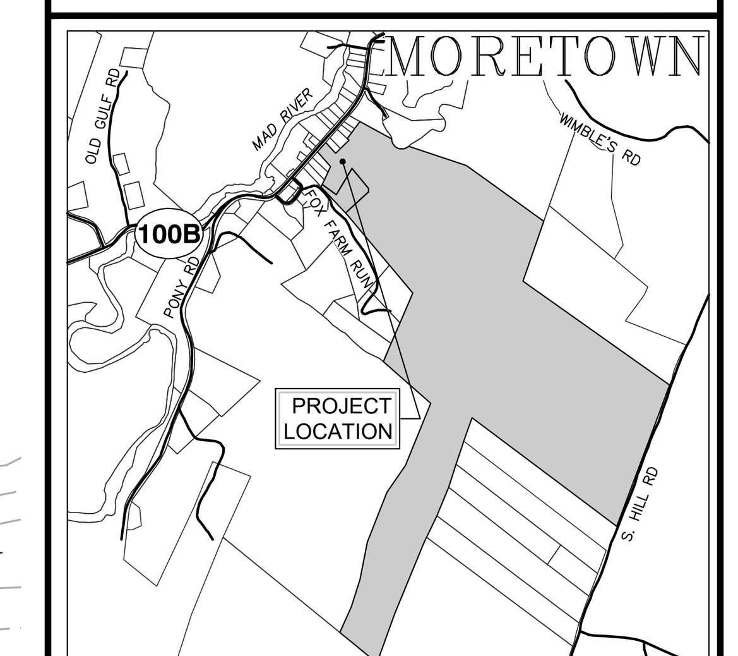
STORMWATER CONSULTANT

WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT



LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

GRAVEL WETLAND PLAN

100% SUBMITTAL

DATE 09/30/2021
SCALE 1" = 20'
PROJ. NO. 20147
DRAWING NUMBER C2.1

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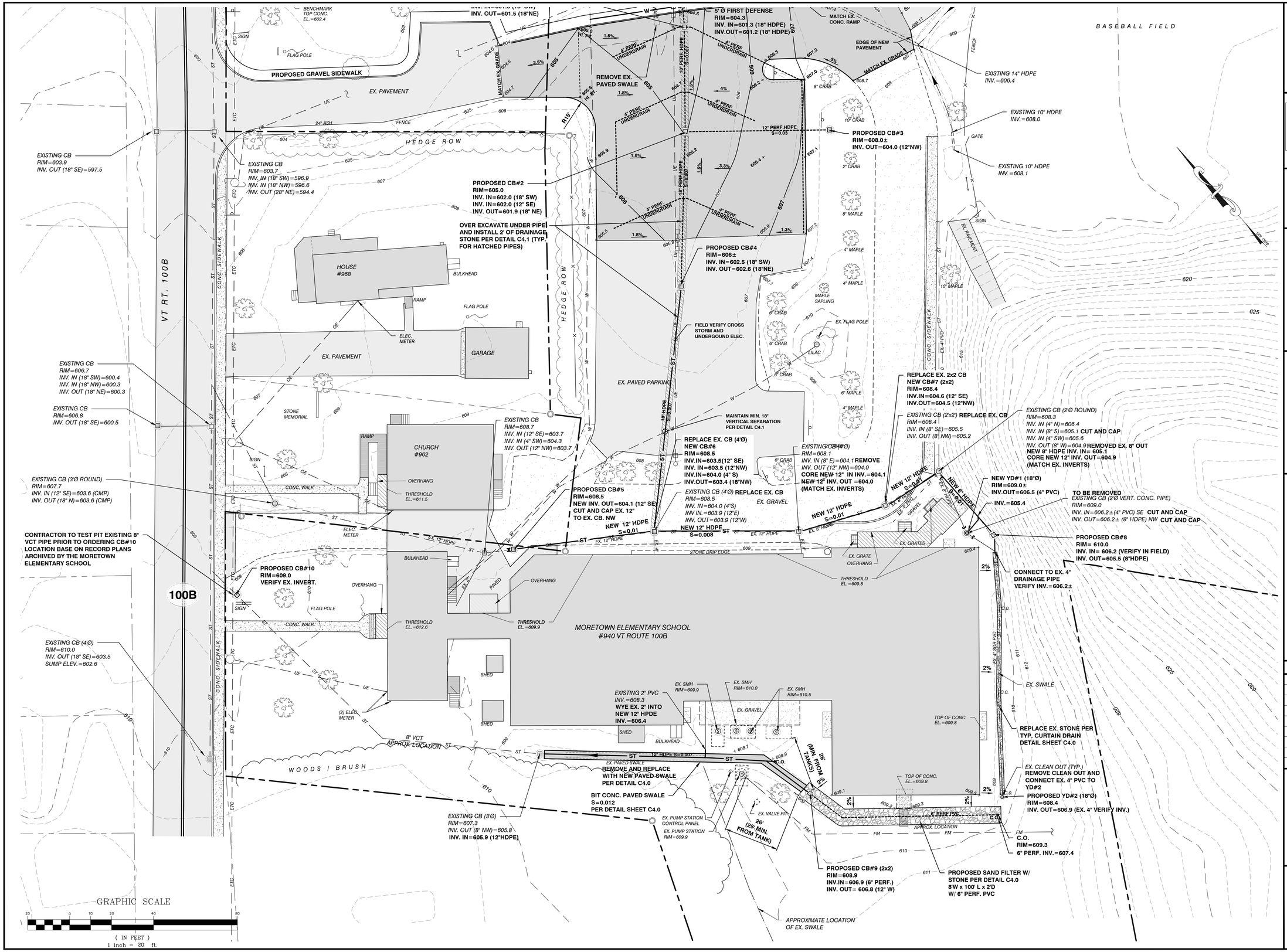

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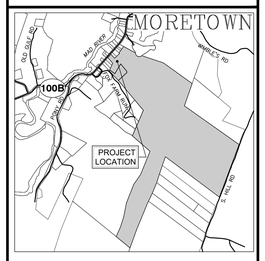
DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT



LOCATION MAP
1" = 2000'

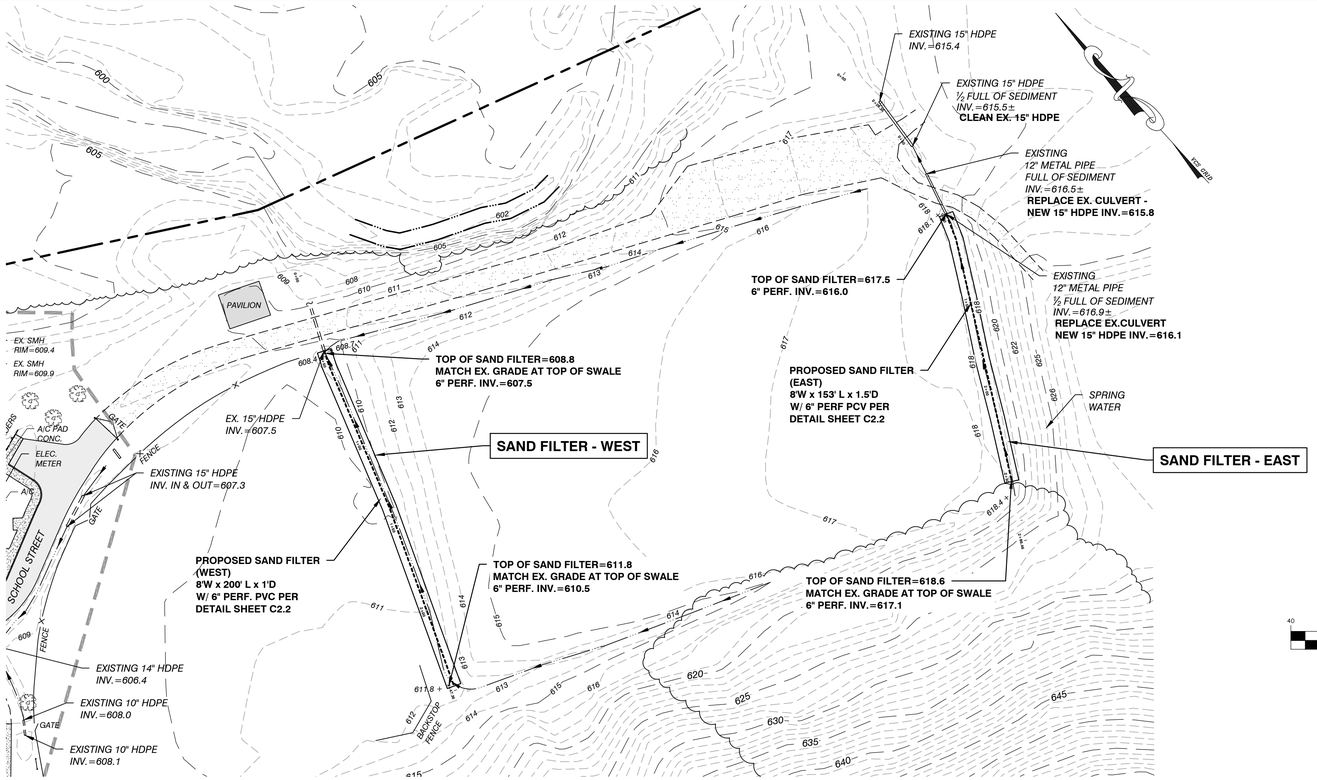
DATE	CHECKED	REVISION

GRAVEL WETLAND PLAN

100% SUBMITTAL

DATE 09/30/2021
SCALE 1" = 20'
PROJ. NO. 20147

DRAWING NUMBER C2.2



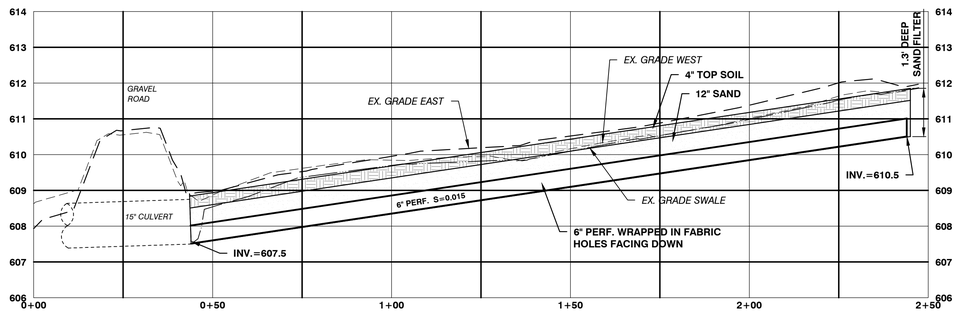
SAND FILTER - PLAYING FIELDS SITE PLAN

SCALE: 1"=40'

GRAPHIC SCALE

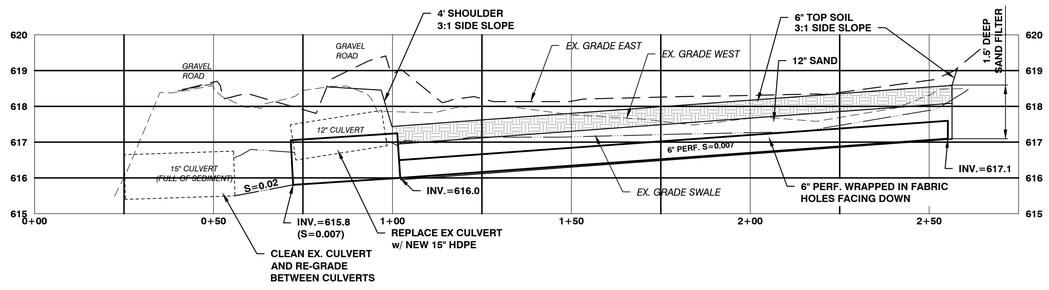
40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



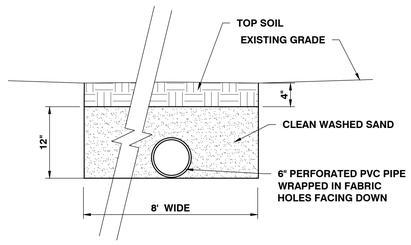
SAND FILTER - WEST @ PLAYING FIELDS

SCALE: HORTZ. 1"=20'
VERT. 1"=2'



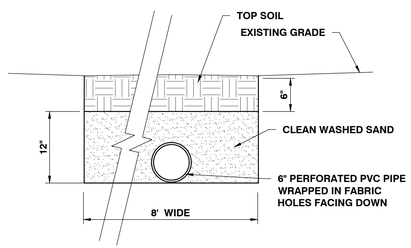
SAND FILTER - EAST @ PLAYING FIELDS

SCALE: HORTZ. 1"=20'
VERT. 1"=2'



SAND FILTER - WEST @ PLAYING FIELDS

N.T.S.



SAND FILTER - EAST @ PLAYING FIELDS

N.T.S.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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DRAWN MAB
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MORETOWN ELEMENTARY SCHOOL

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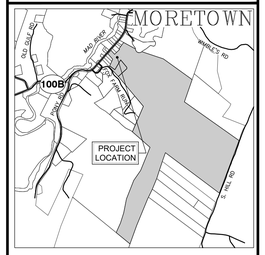

LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

PROPOSED PLAYING FIELD IMPROVEMENTS

100% SUBMITTAL

DATE 09/30/2021
SCALE AS SHOWN
PROJ. NO. 20147

DRAWING NUMBER C2.3

EROSION CONTROL LEGEND

- SILT FENCE
- CONSTRUCTION FLAGGING
- INLET PROTECTION
- EROSION CONTROL MATTING
- STABILIZED CONSTRUCTION ENTRANCE
- TREE PROTECTION

NOTES:

1. LOAM, SEED AND MULCH ALL DISTURBED AREAS (TYP.)
2. INSTALL TEMPORARY STABILIZATION OF DISTURBED SOILS THROUGH THE INSTALLATION OF 1" OF HAY MULCH NO MORE THAN 7 DAYS AFTER WORK HAS CEASED IN A PARTICULAR AREA.
3. SLOPES >3:1 SHALL RECEIVE EROSION CONTROL MATTING.
4. MAXIMUM AMOUNT OF DISTURBED SOILS TO BE LIMITED TO NO MORE THAN 2 ACRES.
5. SILT FENCE CONTRIBUTORY AREA TO BE LIMITED TO ¼ ACRE / 100 L.F.

PLACE 4" LOAM, SEED AND EROSION CONTROL MATTING ALL DISTURBED AREAS. (TYP.)

INSTALL SILT FENCE DOWN GRADIENT OF ALL DISTURBED AREAS (TYP.)

INSTALL TEMPORARY CONSTRUCTION ENTRANCE

INSTALL TEMPORARY CONSTRUCTION TAPE ALONG CONSTRUCTION LIMITS (TYP.)

INSTALL INLET PROTECTION (TYP.)

EXISTING TREES TO BE PROTECTED

INSTALL SILT FENCE DOWN GRADIENT OF ALL DISTURBED AREAS (TYP.)

EXISTING TREES TO BE PROTECTED

VT RT. 100B

SCHOOL STREET

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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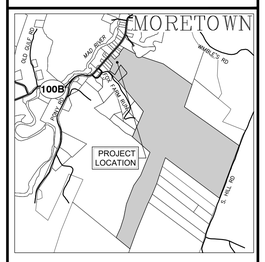


LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

EPSC SITE PLAN

100% SUBMITTAL

DATE 09/30/2021
SCALE 1" = 40'
PROJ. NO. 20147

DRAWING NUMBER C3.0

Introduction
This project is subject to the terms and conditions of the authorization from the State of Vermont to discharge construction related storm water runoff.

Coverage under the State Construction General Permit 3-9020 is required for 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.

This project has been deemed to qualify as a Low Risk Site which is subject to the erosion prevention and sediment control (EPSC) standards set for in the State of Vermont's **Low Risk Site Handbook for Erosion Prevention and Sediment Control**

The following narrative and implementation requirements represent the minimum standard for which this site is required to be maintained as regulated by the State of Vermont.

Any best management practices (BMP's) depicted on the project's EPSC Site plan which go beyond the Handbook requirements are considered to be integral to the management of the site and represent components of the municipal EPSC approval for the project which shall be implemented.

The EPSC plan depicts one snap shot in time of the site. All construction sites are fluid in their day to day exposures and risks as it relates to minimizing sediment loss from the site. **It is the responsibility of the Contractor to implement the necessary BMP's to comply with the Low Risk Handbook standards outlined on this sheet based on the interim site disturbance conditions which may or may not be shown on the EPSC Site Plan.**

Specific BMP's which are critical to allowing the project to be considered a Low Risk site include the items checked below:

- Limit the amount of disturbed earth to two acres or less at any one time.
- There shall be a maximum of 7 consecutive days of disturbed earth exposure in any location before temporary or final stabilization is implemented.

1. Demarcate Limits of Disturbance
Purpose:
Delineating the site will help to: limit the area of disturbance to only what is necessary for construction, prevent unauthorized disturbance, preserve existing vegetation, and limit erosion potential on the site.

Requirement:
You must physically mark the limits of construction activity using one of the methods described below.

How to comply:
Before initiating any earth disturbing activities, install a perimeter fence, orange barrier tape, or flagging on stakes or trees to physically demarcate the approved limits of earth disturbance.

2. Pollution Prevention
Purpose:
Many construction sites require storage of chemicals and materials that have detrimental effects if released into our waterways. A storage plan for these potential pollution sources as well as a spill prevention and clean up plan are required to mitigate these risks.

Requirement:
Design, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained in accordance with the following requirements.

How to comply:
1. Minimize the exposure of the following to precipitation and to stormwater: building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site.

2. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

3. Limit Concurrent Earth Disturbance
Purpose:
Limit the amount of soil exposed at one time to reduce the potential erosion on the construction site.

Requirement:
The maximum area of concurrent earth disturbance is specified on the site's written authorization to discharge. Earth disturbance at any one time cannot exceed the maximum concurrent disturbance identified in the authorization. Areas that are at final stabilization ornthat have been temporarily stabilized in accordance with Section 4 of this handbook, are not counted toward the maximum concurrent disturbance area.

How to comply:
Plan ahead and phase the construction activities to ensure that no more than the permitted maximum concurrent acreage is disturbed and unstabilized at one time. Be sure to properly stabilize exposed soil using one of the methods introduced in Section 4 of this handbook before beginning work in a new section of the site.

4. Site Stabilization
Purpose:
Seeding and mulching, applying erosion control matting, and hydroseeding are all methods to temporarily stabilize exposed soil and prevent soil erosion prior to vegetative growth. Mulches and matting protect the soil surface while grass is establishing. Areas of earth disturbance may also be stabilized with stone, such as rip-rap or gravel, or other impervious surfaces such as pavement and concrete.

Requirements for Temporary Stabilization:
All areas of earth disturbance must have temporary or final stabilization within 14 days of initial disturbance, as stated in the project authorization. After this time, disturbed areas must be temporarily stabilized or permanently stabilized in advance of any runoff producing event. A runoff producing event is an event that produces runoff from the construction site.

The following exception applies:
Temporary 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), provided any dewatering, if necessary, is conducted in accordance with Part 13.

How to comply:
As required by the authorization, temporary stabilization for areas of earth disturbance shall be completed utilizing one or more of the methods below:

Straw Mulch
Mulching Rates
April 16 - Oct. 14 -- Straw: 1 inch deep (1-2 bales/1,000 s.f.)
Oct. 15 - April 15 -- Straw: 2 inch deep (2-4 bales/1,000 s.f.)
*seed may also be incorporated

Wood Chip Mulch or Stump Grindings
Cover entire area with 2-7 inches or more of wood chip mulch or stump grindings.

Hydroseed
As per manufacturer's instructions. Must include mulch component. Not acceptable stabilization for winter construction period.

Requirements for Dust Control:
Construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing during dry periods where off-site damage may occur if dust is not controlled shall be sprayed with water to prevent dust mobilization. Chemical applications, including the use of chloride, shall not be applied without written approval from the VT DEC.

Requirements for Final Stabilization:
All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade. 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. Prepare bare soil for seeding by grading the top 4 to 6 inches of soil and removing any large rocks or debris, and apply seed per suppliers specifications.

5. Stabilized Construction Access
Purpose:
A stabilized construction access helps remove mud and sediment from vehicles and equipment to prevent tracking onto streets.

Requirements:
If there will be any vehicle or equipment traffic off of the construction site, you must install a stabilized construction access at the start of construction.

How to install:
Rock Size: Use a mix of 1 to 4 inch stone
Depth: 8 inches minimum
Width: 12 feet minimum, flared at road for vehicle turning
Length: 40 feet minimum (or length of driveway for residential projects, if shorter)
Geotextile: Place filter cloth under entire stone bed

Maintenance:
Redress with clean stone or scarify to open voids as required to keep sediment from tracking onto the street.
- Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day.
- Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal.
- You are prohibited from hosing or sweeping tracked out sediment into any stormwater conveyance, storm drain inlet, or water of the state.

6. Divert Upland Runoff
Purpose:
Diversion berms intercept stormwater runoff contributing from above the construction site and direct it around the disturbed area. This prevents offsite runoff from entering the construction site, thus reducing the potential for erosion and reducing the drainage area contributing to the site.

Requirements:
If stormwater runoff contributes to the construction site from upslope areas and the site meets the following two conditions, you are required to first install a diversion berm and stabilized swale before disturbing any additional soil.
1. One or more acres of soil will be disturbed at any one time.
2. Average slope of the disturbed area is 20% or steeper.*

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

7. Install Perimeter Controls
Purpose:
Silt Fence and Erosion Control Berms intercept runoff and allow suspended sediment to settle or filter out. Filter Socks and Straw Wattles also filter construction runoff and are acceptable for use in specific situations. Silt Fence, Erosion Control Berms, Filter Socks and Straw Wattles are all acceptable perimeter controls based on site specific conditions. Permittee(s) must ensure the right practice is selected for erosion prevention and sediment control.

Requirements:
Perimeter controls must be installed:
- On the downhill side of the construction activities
- Between any ditch, swale, storm drain, or surface water and the disturbed soil
- Perimeter controls not labeled as biodegradable shall be removed once the drainage area has reached final stabilization

How to Comply:
Select and install a perimeter control from the following options: Silt Fence, Erosion Control Berms, Filter Socks, or Straw Wattles.

Where to place:
- Place perimeter controls on the downhill side of disturbed soil. If space is available, place perimeter control 10 ft from the bottom of the slope, otherwise place along the contour at the bottom of the slope.
- Ensure the perimeter control catches all runoff from distrubed soil.
- Maximum drainage area is¼ acre for 100 feet of silt fence and erosion control berm.
- Install perimeter controls across the slope (not up and down slope)
- Install multiplerows of perimeter control on long slopes to intercept flow.
- Do not install perimeter controls across ditches, channels, or streams.
- Maximum slope length (in feet) above a filter sock or straw wattle

Silt Fence
A temporary barrier of geotextile fabric installed on the contours across a project site to intercept sediment laden runoff from small drainage areas of disturbed soil.

Silt Fence Installation:
- 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
- Gravel can be used to create ground contact with filter fabric when bedrock, ledge, or nearby tree roots do not allow for trenching. (A secondary perimeter control can be effective in these locations as well.)

Silt Fence Maintenance:
Remove accumulated sediment before it is halfway up the fence. Ensure that silt fence is trenched in ground and there are no gaps. Replace any silt fence that is torn, ripped, or otherwise damaged that

8. Storm Inlet Protection
Purpose:
Existing or new storm inlets on construction sites constitute a site perimeter and must be protected from sediment laden runoff. The practices below allow stormwater to settle and filter through the practice and not bypass the in let entirely.

Requirements:
Stormwater inlets shall be 4 inches above grade or an acceptable inlet control/protection should be installed.

Inlet Protection Installation:
Proprietary Inlet Protection:
Shall provide for storage and removal of sediment and be sized appropriately for the drainage area, while allowing stormwater to filter through. These may be used if installed and maintained in accordance with the manufacturer's specifications.

Stone and Block Inlet Protection:
Concrete blocks placed around an inlet with a circle of filtering stone sloped against the blocks.
Filter Fabric and Stone Inlet Protection:
Vertical filter fabric installed around drop inlet with stone around fabric for stormwater filtering and creating ground contact with filter fabric. Alternatively, fabric may be buried below ground.

9. Water Bars
Purpose:
Some sites may benefit from the use of water bars on the construction site. When installed these may capture and redirect runoff to a stable low gradient location. Water bars limit the erosive velocity of water by diverting surface runoff at pre-designed intervals.

Requirements:
These can be constructed per the following detail, with side slopes no steeper than 4:1 where vehicles cross with a minimum design height of 12 inches, measured from channel bottom to ridge top.

Water Bar installation:
Water bars should have stable outlets, either natural or constructed. The spacing should follow Table 1:

Table 1. Water Bar Spacing

Slope (%)	Distance between structures (ft)
< 5	125
5 - 10	100
10 - 20	75
20 - 35	50
> 35	25

10. 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 are required to install stone check dams. Hay bales and silt fence must not be used as check dams.

Check Dam installation:
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.63 for slope calculation)
Stone size: Use a mixture of 2 to 9 inch stone, the larger stone should act as armoring, while the smaller stone helps to filter the channelized runoff. The small stone should be placed primarily in the interior of the check dam and the large stone should be placed in an armoring layer on the outside.
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.

Check Dam Maintenance:
Correct all observed damage immediately after every ru naff event.
Remove all sediment accumulated behind the check dams and dispose of in an upland location.
If significant erosion is observed between check dams, the channel shall be stone lined.

Rock Outlet Protection:
Waterways or outlets with concentrated stormwater runoff shall be stabilized with riprap, proprietary stabilization product or permanent material. This additional stabilization is applicable in areas where the channel slope and velocity or soil type require additional stabilization. All outlets from concentrated stormwater flows will require a stabilized bed. Stone shall be sized so it is not mobilized during high flows.

11. Slope Stabilization
Purpose:
Surface covering designed to protect and stabilize an area prone to erosion where seeding and mulching may be inadequate, generally slopes 3:1 or greater. The erosion potential may be due solely to slope angle; however,
a more gradual slope and poor soil structure can also require additional stabilization.

Requirements for Temporary Stabilization:
Use of one of the listed slope protection practices below on slopes 3:1 and greater or as needed on flatter slopes based on soil type.

Riprap: A layer of stone designed to protect and stabilize areas subject to erosion.Rolled Erosion Control Product:

A preformed protective blanket of straw or other plant residue, formed into a mat, with a supporting mesh framework on one or both sides. This mesh cannot be made of a material with welded joints.

Erosion Control Matting:
Install per manufacturer's instructions.

12. Winter Construction Requirements: October 15 - April 15
Purpose:
'Winter construction' as discussed here, describes the period from October 15 through April 15, when erosion prevention and sediment control is significantly more difficult. There are specific requirements for sites that conduct earth disturbance during the defined Winter Construction Period and for sites where disturbed areas have not reached final stabilization by October 15.

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. A construction site can be managed to anticipate these conditions to prevent erosion and thus minimize the risk to water quality during this time period.

Requirements for Winter Shutdown:
For projects or areas of a site that will have completed earth disturbance activities prior to the winter construction period (October 15 through April 15), the following requirements must be adhered to:

1. For areas to be stabilized for the winter through the establishment of vegetation, seeding and mulching shall be completed no later than September 15 to ensure adequate growth and cover before the start of the winter period.

2. If seeding is not completed by September 15, additional non-vegetative protection must be used to stabilize the site for the winter period. Areas of disturbance not seeded and mulched by September 15 are required to temporarily stabilize by one of the following methods:

Implement Rolled Erosion Control Products (i.e. matting) over the areas of earth disturbance.

Apply a 2" mulch layer to areas of earth disturbance, equivalent to double the standard rate. Mulch should be tracked in open areas vulnerable to wind.

Seeding with winter rye is recommended to allow for early germination during wet spring conditions.

Requirements for Winter Construction
If construction activities involving earth disturbance continue into the winter construction period, the following requirements apply:

1. Enlarged access points, stabilized to provide for snow stockpiling.
2. Snow shall be managed 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.
3. For areas of disturbance within 100 ft of a waterbody, the following must be installed across the slope, down gradient of the earth disturbance: a combination of one practice from group A placed in front of a practice from group B, or two group B practices, or a single row of Reinforced Silt Fence

Group A	Group B
Filter Socks	Silt Fence
Straw Wattles	Erosion Control Berms

4. Drainage structures must be kept open and free of snow and ice dams.
5. Silt fence and other practices requiring earth disturbance must be installed ahead of frozen ground.
6. Mulch used for temporary stabilization must be applied at a minimum of 2 inches with an 80-90% cover.
7. To ensure cover of disturbed soil in advance of a precipitation or melt event, areas of disturbed soil must be stabilized prior to any runoff producing event.

Stabilization is not required if the work is occuring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches), provided any dewatering, if necessary, is conducted in accordance with Part 13.

8. Prior to stabilization, snow or ice must be removed to the extent practicable.
9. Use stone to stabilize areas such as the perimeter of buildings under construction or where construction vehicle traffic is anticipated. Stone paths should be sufficient width to accommodate vehicle or equipment traffic.

13. Dewatering Activities
Purpose:
To minimize and prevent discharges of sediment as a result of dewatering activities.

Requirements:
Stormwater and groundwater from dewatering activities shall be uncontaminated and shall be filtered or passed through a sediment trapping device, or both, and routed in a manner that does not result in visually turbid discharges to waters. Pump intake for dewatering must be at or near the surface of the ponding area to prevent disturbance of the settled material. Visually turbid water must not be pumped directly to storm drains or other conveyance that leads to waters without implementing one or more of the practices described below.

How to comply:
Implement one or more of the following practices when dewatering:
Implement sock filters or sediment filter bags on dewatering pump discharge hoses or pipes.
Route dewatering pump into silt fence enclosures or into staked hay bale enclosures lined with fabric.
Route dewatering pump to vegetated area at least 50 feet from surface waters and at a slope no greater than 5%. Remove accumulated sediment after the water has dispersed or infiltrated and stabilize the area with seed and mulch as necessary. A sufficient area of vegetation greatly improves the efficacy of filtering/settling of turbid water discharged from a dewatering enclosure.

14. Concrete Washout
Purpose:
Concrete wash water often contains a slurry of heavy metals, can be caustic, and has a high pH. As a result, concrete washwater is not a permitted discharge.

Requirements:
Concrete washwater and excess washout concrete should go in a lined washout. This washout should be accessible to the cement truck and at least 50 feet away from stormwater inlets and surface water.

Concrete Washout Installation:
If cement washout is going to occur on site, a lined concrete washout as shown below shall be used onsite. Care should be given to assure that the washout does not overtop during a storm event. Proprietary lined and
contained concrete washout basins may also be utilized in accordance with manufacturer's specifications.

Concrete Washout Maintenance:
Concrete washout shall be pumped to a concrete truck as necessary, for disposal or reuse at a batch plant. Washout may also be allowed to evaporate/harden for disposal in accordance with all applicable local, state, and federal regulations.

15. Permanent Controls
Permanent stormwater treatment practices are constructed to maintain water quality, preserve existing water table elevations, prevent downstream flooding, and are often required for a project under a Vermont operational stormwater discharge permit applicable to the construction or redevelopment of impervious surfaces.*

Permanent Stormwater Treatment Practices (STPs) include infiltration and filtering practices as well as detention ponds and treatment wetlands. It is critical that infiltration practices do not receive runoff until the site area has reached final stabilization.

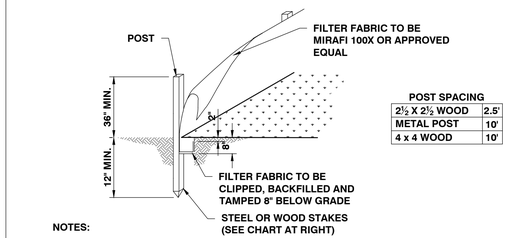
The outlet of permanent controls that are used as temporary storage and sediment basins during construction constitutes a potential discharge point and therefore must be managed to minimize and prevent sediment laden stormwater discharges. These practices will often need to be reshaped to meet the operational design criteria for volumes, grades and geometry once final grading and stabilization has occurred.

16. Inspection, Maintenance, and Discharge Reporting
Site inspections are required to ensure that all erosion prevention and sediment control practices are sufficient and functioning properly. Regular inspections and maintenance of practices will help to reduce costly repairs and minimize the risk to water quality from construction stormwater discharges.

Requirements:
Inspect the site at least once every 7 days and after every rainfall or snowmelt that results in stormwater runoff. Perform maintenance to ensure that practices are functioning according to the specifications outlined in this handbook. In the event of a visibly turbid discharge from the construction site, you must take immediate action to inspect and maintain existing erosion prevention and sediment control practices. Additional erosion prevention and sediment control measures must be installed as necessary, including temporary stabilization, to minimize and prevent the discharge of sediment laden stormwater runoff. If after maintaining and supplementing BMPs, a discharge of visibly discolored stormwater from the construction site to surface waters continues, the permittee is required to notify DEC within 24 hours.

While documentation of a routine inspection is not required, example inspection forms and forms for required discharge reporting are available at the Stormwater Program website. Permittees shall review Construction General Permit 3-9020 for all discharge reporting requirements. A copy of the Low Risk Site Handbook shall be kept on-site. Daily inspections are required from October 15 through April 15.

E-001 EC Sheet



POST SPACING	
2½ X 2½ WOOD	2.5'
METAL POST	10'
4 x 4 WOOD	10'

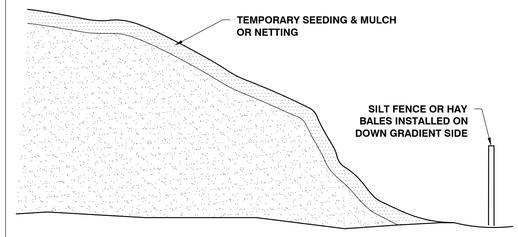
NOTES:

1. INSTALL MIRAFI ENVIROFENCE, OR APPROVED EQUAL OR AS DETAILED HEREIN.
2. INSTALL SILT FENCES AT TOES OF ALL UNPROTECTED SLOPES AND AS PARALLEL TO CONTOURS AS POSSIBLE. THIS INCLUDES ALL FILLED OR UNPROTECTED SLOPES CREATED DURING CONSTRUCTION, NOT NECESSARILY REFLECTED ON THE FINAL PLANS. CURVE THE ENDS OF THE FENCE UP INTO THE SLOPE. REMOVE SEDIMENT WHEN ACCUMULATED TO HALF THE HEIGHT OF THE FENCE. SILT FENCES ARE TO BE MAINTAINED UNTIL SLOPES ARE STABILIZED.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6", FOLDED AND STAPLED.

SILT FENCE DETAIL
N.T.S.

E-003 Silt Fence

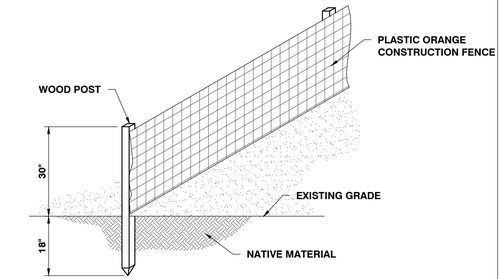
E-003 REVISED 08/01/2014



TEMPORARY STOCKPILE DETAIL
N.T.S.

E-005 Stockpile

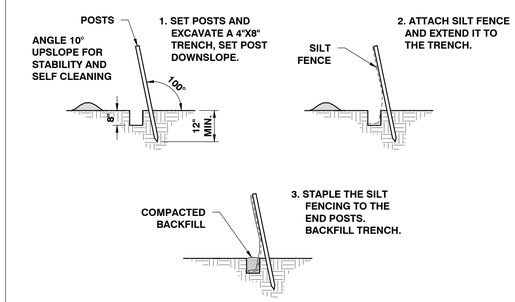
E-005 REVISED 08/01/2014



CONSTRUCTION FENCE DETAIL
N.T.S.

E-002 Constr Fence

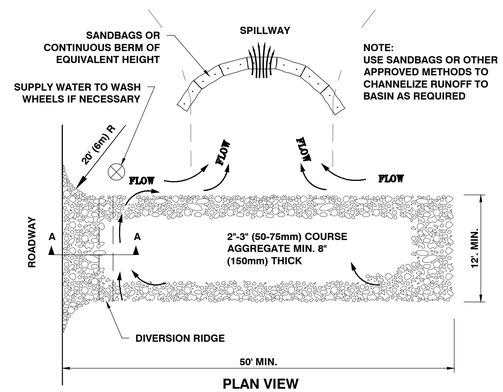
E-002 REVISED 08/01/2014



SILT FENCE CONSTRUCTION DETAIL
N.T.S.

E-007 Infill Sect

E-007 REVISED 08/01/2014



PLAN VIEW

SECTION A-A

STABILIZED CONSTRUCTION ENTRANCE
N.T.S.

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

E-004 Constr. Ent

E-004 REVISED 08/01/2014

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

STORMWATER CONSULTANT
WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT

MULCH NOTE:
MULCH FOR PURPOSES OTHER THAN HYDROSEEDING WILL BE CLEAN STRAW, FREE FROM WEEDS. HAY MULCH WILL NOT BE ALLOWED TO AVOID THE SPREAD OF NON-NATIVE SPECIES SUCH AS WILD PARSNIP.

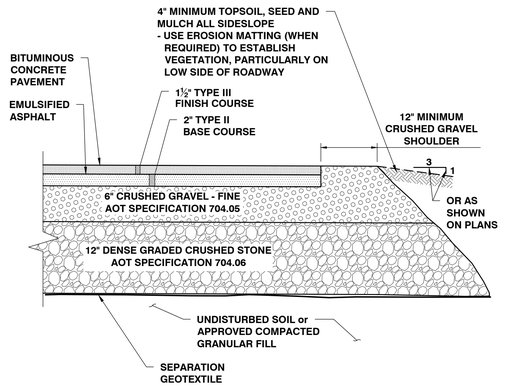
DATE	CHECKED	REVISION

EPSC DETAILS AND SPECIFICATIONS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C3.1

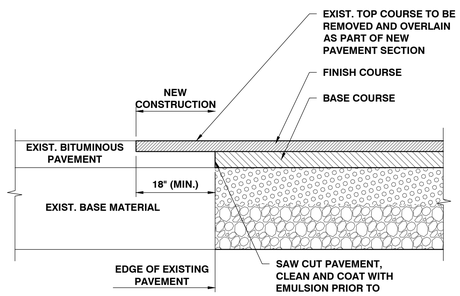


TYPICAL PAVEMENT SECTION

(FULL DEPTH CONSTRUCTION SECTION) N.T.S.

S-003 Pave Sec-Shoulder

S-003 REVISED 12/03/2020

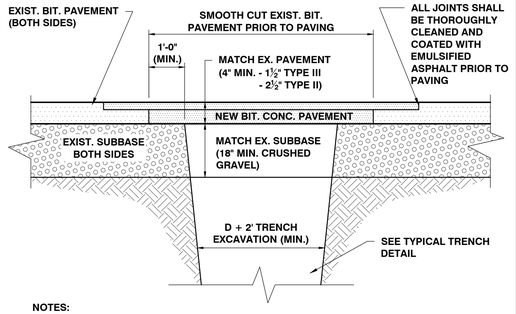


TRANSITION FROM NEW PAVEMENT TO EXISTING PAVEMENT

N.T.S.

S-014 Pavement Transition

S-014 REVISED 6/15/2017



NOTES:

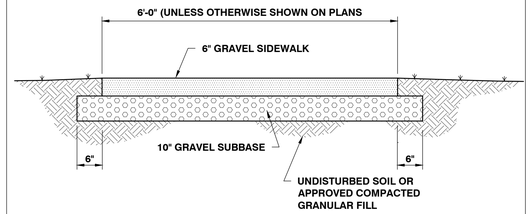
1. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE-WAY TRAFFIC AT ALL TIMES DURING WORK WITHIN THE R.O.W.
2. MAINTENANCE AND PROTECTION OF TRAFFIC DURING WORK WITHIN THE HIGHWAY R.O.W. SHALL BE PROVIDED IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL NOT WORK WITHIN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

REPLACEMENT OF EXISTING PAVEMENT

N.T.S.

S-005 Replace Ex. Pav

S-005 REVISED 09/29/2014

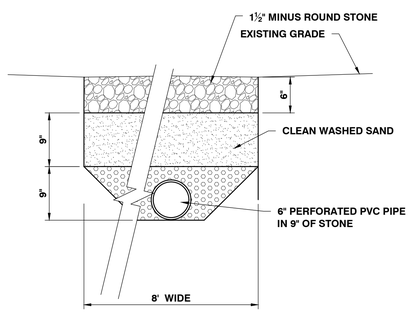


GRAVEL SIDEWALK DETAIL

N.T.S.

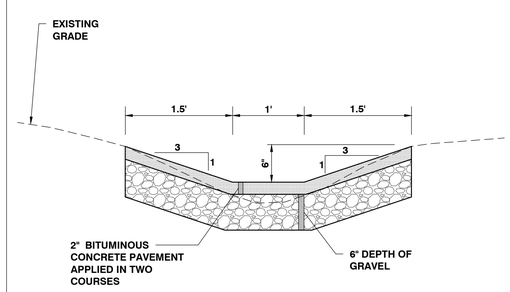
S-010 Gravel Sidewalk

S-010 REVISED 08/01/2014



SAND FILTER @ SOUTH SIDE OF BUILDING

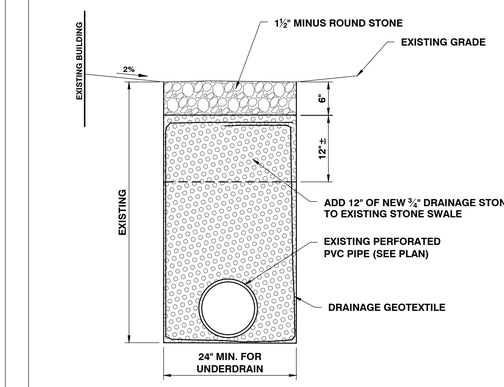
N.T.S.



PAVED SWALE

@ EXISTING SWALE N.T.S.

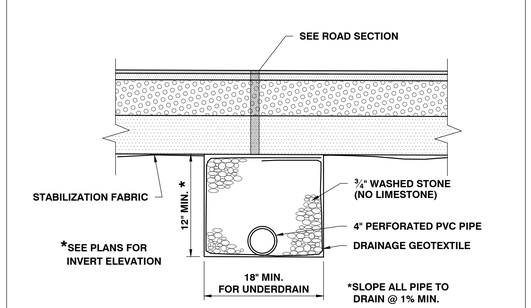
ST-026 Curtain Drain



TYPICAL CURTAIN DRAIN SECTION @ EAST SIDE OF BUILDING

N.T.S.

ST-026 REVISED 1/28/2015

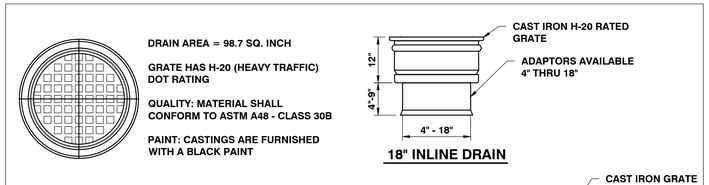


TYPICAL UNDERDRAIN SECTION

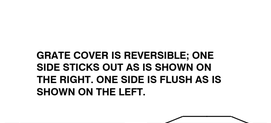
N.T.S.

ST-009 Underdrain

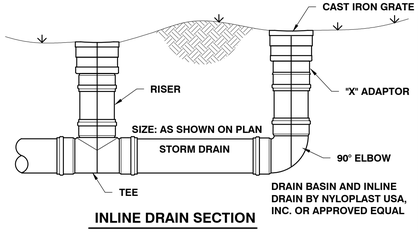
ST-009 REVISED 12/16/2014



18" INLINE DRAIN



18" CAST IRON GRATE



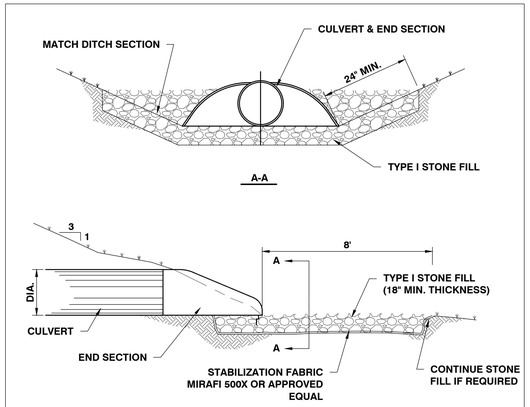
INLINE DRAIN SECTION

YARD DRAIN DETAILS

N.T.S.

ST-008 Yard Drain

ST-008 REVISED 08/01/2014

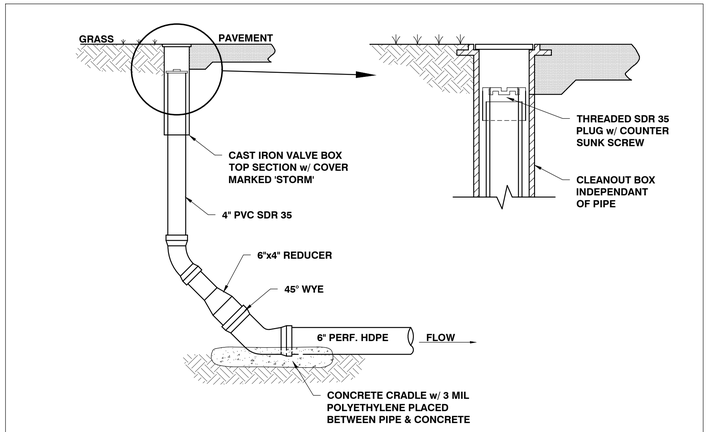


END SECTION DETAIL

N.T.S.

ST-011 End Section

ST-011 REVISED 01/14/2015



UNDERDRAIN CLEANOUT DETAIL

N.T.S.

ST-010 UD CO

ST-010 REVISED 08/01/2014

SITE ENGINEER:

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

STORMWATER CONSULTANT

WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:

CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:

MORETOWN ELEMENTARY SCHOOL

940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

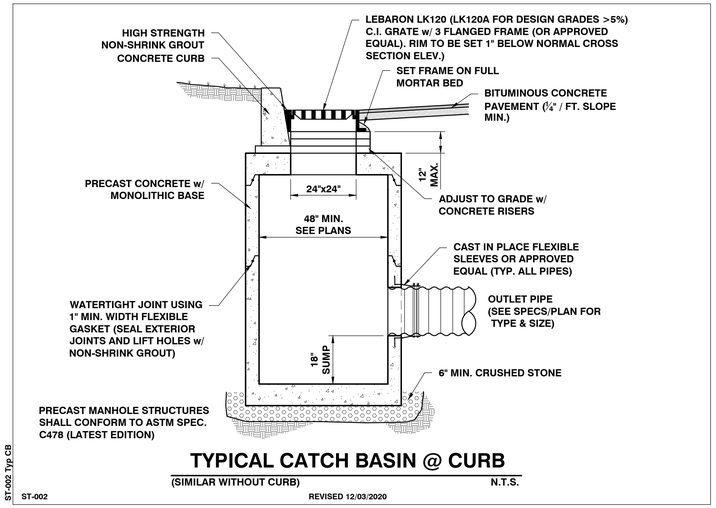
DETAILS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C4.0

P:\AutoCADD Projects\2020\20147\1-CADD Files-Moretown Elementary School\dwg\20147 details.dwg, 9/30/2021 11:07:36 AM, DWG To PDF.pc3

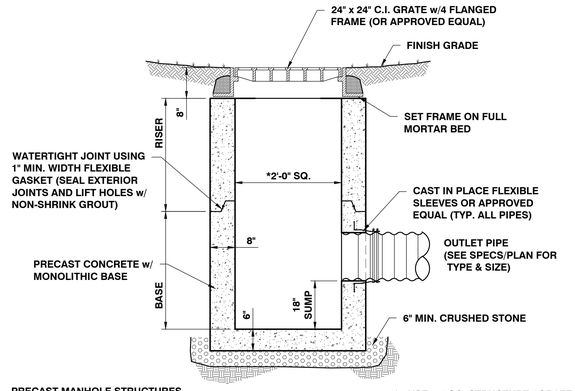


TYPICAL CATCH BASIN @ CURB

(SIMILAR WITHOUT CURB) N.T.S.

ST-002 Typ CB

ST-002 REVISED 12/03/2020

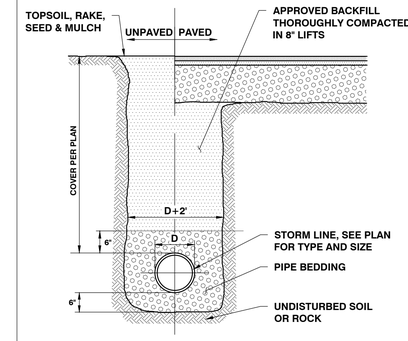


2x2 CATCH BASIN

N.T.S.

ST-002b Typ 2x2 CB

ST-002b REVISED 12/03/2020



NOTES:

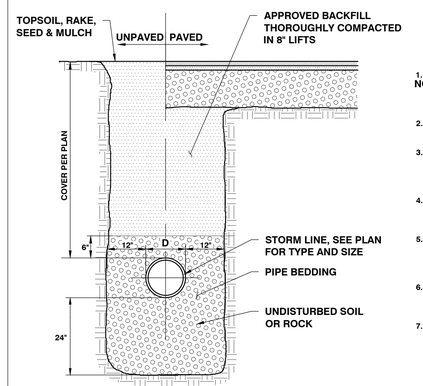
1. COMPACTION OF BACKFILL AND BEDDING SHALL BE A MINIMUM OF 90% (95% UNDER ROADWAY SURFACES) OF MAXIMUM DRY DENSITY DETERMINED IN THE STANDARD PROCTOR TEST (ASTM D698).
2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
3. APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2"" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
4. TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
5. IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
7. BEDDING MATERIAL SHALL CONSIST OF CRUSHED STONE, GRAVEL, OR SAND WITH A MAXIMUM SIZE OF ¾". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.

TYPICAL STORM TRENCH

N.T.S.

ST-003 Storm Trench

ST-003 REVISED 12/08/2016



NOTES:

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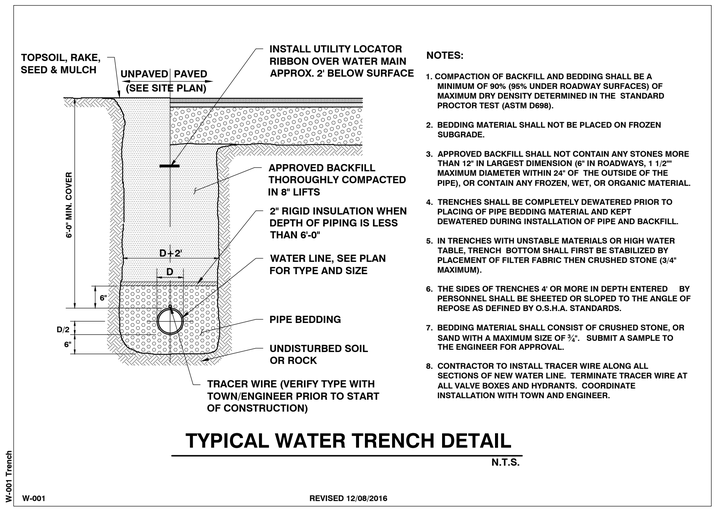
2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
3. APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2"" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
4. TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
5. IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
7. BEDDING MATERIAL SHALL CONSIST OF CRUSHED STONE, GRAVEL, OR SAND WITH A MAXIMUM SIZE OF ¾". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.

TYPICAL OVER EXCAVATION STORM TRENCH

N.T.S.



NOTES:

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2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
3. APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2"" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
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6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
7. BEDDING MATERIAL SHALL CONSIST OF CRUSHED STONE, OR SAND WITH A MAXIMUM SIZE OF ¾". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.
8. CONTRACTOR TO INSTALL TRACER WIRE ALONG ALL SECTIONS OF NEW WATER LINE. TERMINATE TRACER WIRE AT ALL VALVE BOXES AND HYDRANTS. COORDINATE INSTALLATION WITH TOWN AND ENGINEER.

TYPICAL WATER TRENCH DETAIL

N.T.S.

W-001 Trench

W-001 REVISED 12/08/2016

PLAN VIEW

HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS AS REQUIRED

SECTION A-A

PRODUCT SPECIFICATION:

1. Peak Hydraulic Flow: 20.0 cfs (566 l/s)
2. Min Sediment Storage Capacity: 1.1 cu. yd. (0.8 cu. m.)
3. Oil Storage Capacity: 300 gal. (1135 liters)
4. Maximum Inlet/Outlet Pipe Diameters: 24 in. (600 mm)
5. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
6. For more product information including regulatory acceptances, please visit https://hydro-int.com/en/products/first-defense

GENERAL NOTES:

1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 24".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plan.s)
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	60	1500	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)

PROJECTION

IF IN DOUBT ASK

COMMENTS:

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.
3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA, AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

DATE:	SCALE:
10/7/2019	1:30

DRAWN BY:	CHECKED BY:	APPROVED BY
ER	MRJ	

TITLE:
5-ft DIAMETER
FIRST DEFENSE HIGH CAPACITY
GENERAL ARRANGEMENT

Hydro International
hydro-int.com
HYDRO INTERNATIONAL

DO NOT SCALE DRAWING
STEEL FABRICATION TOLERANCES
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES.

LINEAR	ANGULAR
000 - 012in = ±0.04in	000 - 120in = ±1°
012 - 024in = ±0.06in	120 - 240in = ±0.5°
024 - 048in = ±0.09in	240in >>>> = ±0.25°
048 - 120in = ±0.13in	
120in >>>> = ±0.20in	

WEIGHT:	MATERIAL:
N/A	

STOCK NUMBER:
-

DRAWING NO.:
FDHC GA-5

SHEET SIZE:	SHEET:	Rev:
B	1 OF 1	-

NOTES:

1. AT CROSSINGS, ONE FULL LENGTH OF WATER/STORM PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE WATER/STORM AS POSSIBLE.
2. IF THE STORM MAIN IS OVER THE WATER MAIN, THE FIRST STORM PIPE JOINTS ON EACH SIDE OF THE WATER MAIN MUST BE CONCRETE ENCASED. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND STORM PIPES MAY BE REQUIRED.
3. WHERE IT IS IMPOSSIBLE TO MAINTAIN THE 18" SEPARATION, THE STORM MATERIALS SHALL BE WATER MAIN PIPE OR EQUIVALENT AND SHALL BE PRESSURE TESTED TO WATER MAIN STANDARDS.
4. WATER MAINS AND STORM LINES OR MANHOLES SHALL HAVE AT LEAST 5' HORIZONTAL SEPARATION. THIS DISTANCE SHALL BE MEASURED EDGE TO EDGE.

WATER/STORM CROSSING

N.T.S.

W-007A Water-Storm Crossing

W-007A REVISED 12/23/2014

GRASS LINED DITCH

N.T.S.

ST-014 Grass Ditch

ST-014 REVISED 10/07/2015

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

STORMWATER CONSULTANT
WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT

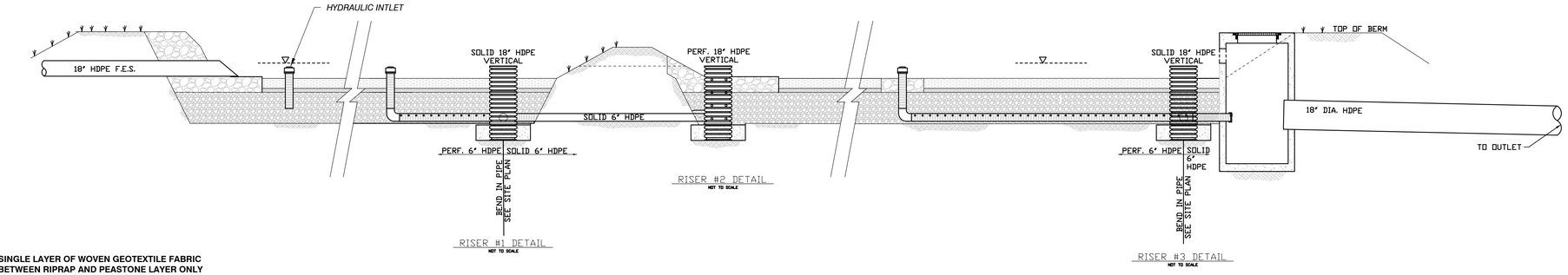
DATE	CHECKED	REVISION

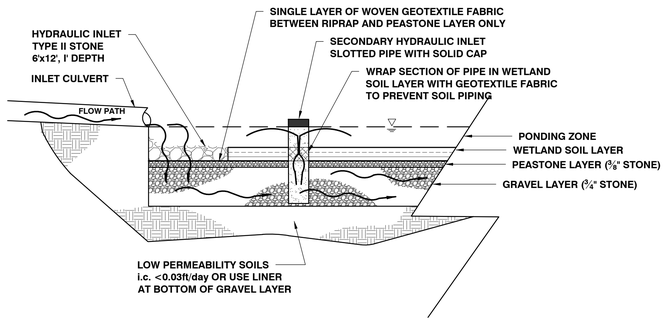
DETAILS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

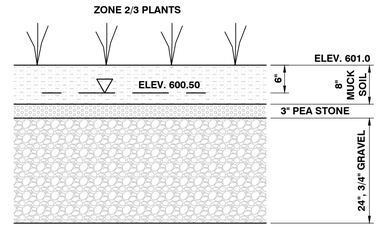
DRAWING NUMBER C4.1





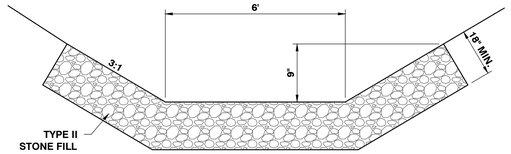
HYDRAULIC INLET DETAIL

N.T.S.



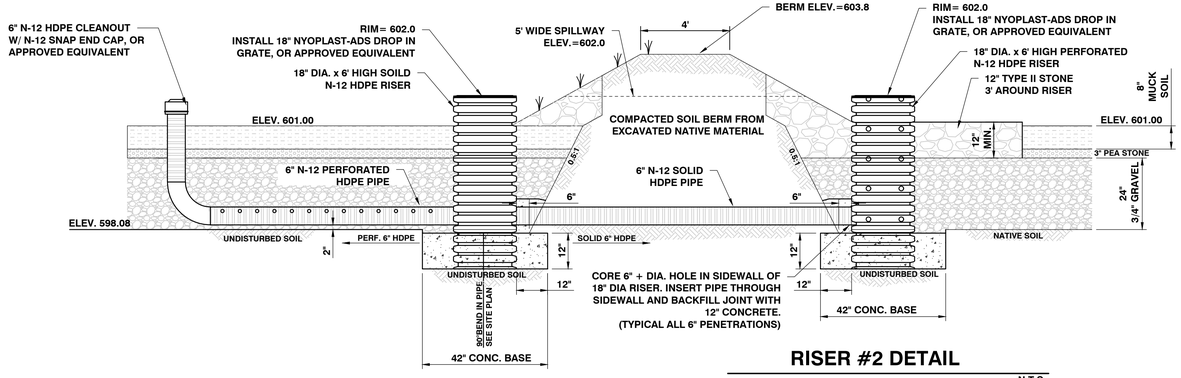
GRAVEL WETLAND DETAIL

N.T.S.



EMERGENCY SPILLWAY

N.T.S.

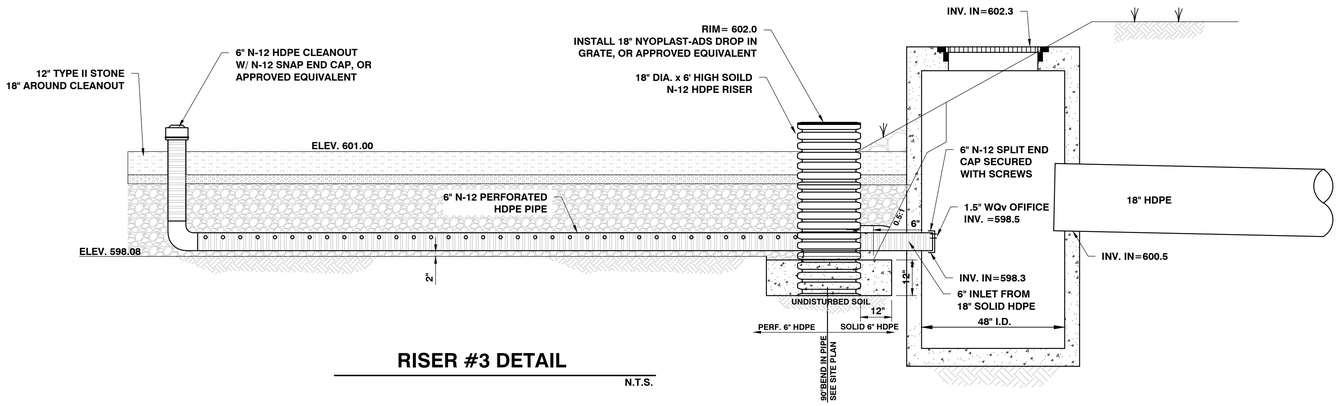


RISER #1 DETAIL

N.T.S.

RISER #2 DETAIL

N.T.S.



RISER #3 DETAIL

N.T.S.

Gravel Wetland Soil Specifications – Updated 9-21-2021

1. Wetland soil be a uniform low-phosphorus mix of compost, sand, and fine soil and have a minimum thickness of 8 inches.
2. The Mehlich-3 Phosphorus Saturation Ratio (PSR) for the Wetland Soil shall be no more than 10%.
3. Wetland soil shall have a pH of 6.0-7.0.
4. Wetland soil shall have a low hydraulic conductivity between 0.1-0.01 ft/day.
5. The organic portion of the Wetland Soil shall constitute 10-15% of the Total Wetland soil mixture. The organic portion shall be comprised of well pulverized and composted leaf mulch. Animal or poultry manure shall not be accepted.
   a. The organic portion of the Wetland Soil shall be adjusted if soil testing demonstrates a PSR greater than 10%.
6. Granular soil shall constitute 80-85% of total Wetland Soil mixture and meet the following gradation:

US Standard Sieve Size in/mm	% Passing by Weight
0.5/12.5	90-100%
#10/2.00	70-95%
#100/0.15	35-55%
#200/0.075	20-55%

7. No materials or substances shall be mixed or dumped within the gravel wetland media harmful to plant growth or impede maintenance. Wetland soil that is stockpiled on site shall be stored away from potential sources of contamination and protected from precipitation.
8. Wetland soil shall be free of noxious weeds.
9. Contractor shall submit the following:
   a. An analytical test showing compliance with the above requirements. A minimum of (1) Mehlich-3 test and a subsequent PSR test of the Mehlich-3 extraction for soil phosphorus. All tests shall be performed by the same testing facility.
   b. Hydraulic conductivity test showing compliance with the above requirements.
10. Onsite native soils may be utilized to formulate the wetland muck mix with some deviation from the specifications above subject to Engineer approval.

SITE ENGINEER:

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

STORMWATER CONSULTANT

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DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:

CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:

MORETOWN ELEMENTARY SCHOOL

940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

GRAVEL WETLAND DETAILS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C4.2

PROJECT COORDINATION

PART 1 – GENERAL

1.01 MEETINGS & PROJECT ACCESS

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

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

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

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

1.02 LABOR

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

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

1.03 PROTECTION OF PERSONS AND PROPERTY

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

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

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

1.04 CORRECTION OF WORK

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

1.05 WEATHER CONDITIONS

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

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

1.06 DISPOSAL OF DEBRIS

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

1.07 PROJECT LAYOUT

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

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

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

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

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

1.08 TESTING

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

SITE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Remove surface debris.

2. Clear site of plant life and grass.

3. Remove trees and shrubs.

4. Remove root system of trees and shrubs.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 PROTECTION

A. Protect utilities that remain from damage.

B. Protect trees, plant growth, and features designated to remain as final landscaping.

C. Protect bench marks and existing structures from damage or displacement.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

E. Maintain access to the site at all times.

3.02 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove trees and shrubs within marked areas. Remove stumps, roots and tap roots and other projections 1" or greater in diameter to 2'–0" below the excavated surfaces in cut areas and 2'–0" below the exposed subgrade in fill areas.

3.03 REMOVAL

A. Remove debris, rock, and extracted plant life from site unless otherwise noted on plans.

3.04 UTILITIES

A. Coordinate with utility companies and agencies as required.

SITE EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

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

2. Site filling.

3. Roadway structural sections.

1.02 PROTECTION

A. Protect bench marks and existing structures.

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

1.03 SUBMITTALS

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

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

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

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

PART 2 – PRODUCTS

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

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

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

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

2.02 CRUSHED GRAVEL (AOT SPEC. 704.05, COARSE)

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

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

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

2.03 COMPACTED FILL/GRANULAR BORROW

A. All materials shall be secured from approved sources. This material shall be free of shale, clay, friable material, debris, and organic matter. This material shall meet the following grading requirements:

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

2.04 DRAINAGE COURSE (AOT SPEC. 704.16)

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

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1"	100
¼"	90 – 100
⅜"	20 – 55
No. 4	0 – 10
No. 8	0 – 10

2.05 DENSE GRADED CRUSHED STONE (AOT SPEC. 704.06)

A. All materials shall be secured from approved sources. Dense Graded Crushed Stone shall consist of clean, hard, uniformly graded, crushed stone. It shall be sufficiently free from dirt, deleterious material, and pieces that are structurally weak. This material shall meet the following grading requirements:

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

Source: This material shall be obtained from crushed quarried rock sources. The area from which this material is obtained shall be stripped and cleaned before blasting.

Not more than 30% by mass (weight) of the material coarser than the No. 4 sieve shall consist of thin and/or elongated pieces.

2.06 RECYCLED ASPHALT PAVEMENT (RAP) 1½" MINUS CRUSHED ASPHALT

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

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

2.07 SAND BORROW AND CUSHION (AOT SPEC. 703.03)

A. All materials shall be secured from approved sources. Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. This material shall meet the following grading requirements:

Sieve Designation	Percent Finer by Weight
2"	100
1½"	90 – 100
½"	70 – 100
No. 4	60 – 100
No. 100	0 – 20
No. 200	0 – 8

2.08 GEOTEXTILE

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

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 120 lbf; ASTM D 4632.
3. Tear Strength: 50 lbf; ASTM D 4533.
4. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
5. Permittivity: 1.7 per second, minimum; ASTM D 4491.
6. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.

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

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 200 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 75 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
9. Weight: 4.0 oz/yd² minimum.

PART 3 – EXECUTION

3.01 PREPARATION

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

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

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

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

3.02 EROSION CONTROL

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

3.03 TOPSOIL EXCAVATION

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

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

1. Maintain stockpile free from debris and trash.

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

3.04 SUBSOIL EXCAVATION

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

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

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

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

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

3.05 DITCHES

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

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

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

3.06 ROADWAY EMBANKMENTS AND BERMS

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

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

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

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

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

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

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

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

3.07 COMPACTION REQUIREMENTS

A. All backfills and fills shall be compacted in even lifts (8" maximum) to attain the required densities as follows:

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

UTILITY TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

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

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

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

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

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. Fill and backfill materials:

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

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

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

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

PART 3 – EXECUTION

3.01 PROCEDURES

A. Existing Utilities:

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

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

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

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

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

B. Protection of persons and property:

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

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

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

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

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

E. Maintain access to adjacent areas at all time.

3.02 TRENCHING

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

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

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

STORMWATER CONSULTANT
WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

SPECIFICATIONS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C5.0

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

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

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

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

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

G. Excavating for appurtenances:

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

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

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

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

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

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

3.03 BEDDING

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

3.04 BACKFILLING

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

B. Unless otherwise specified or indicated on the plans, material used for backfilling trenches above the bedding area shall be suitable material which was removed during excavation or obtained from borrow and when compacted shall make a dense stable fill. The material shall not contain vegetation, porous matter, masses of roots, individual roots more than 18 inches long or ½ inch thick, or stones greater than 50 pounds or larger than six inches in the widest dimension.

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

D. Backfill material shall be evenly spread and compacted in lifts not more than 8 inches thick or as approved by the Engineer. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction.

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

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

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

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

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

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

2. All other areas – 90%.

BITUMINOUS CONCRETE PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Base Courses

2. Leveling Courses

3. Finish Course

B. General: This work shall consist of one or more courses of bituminous mixture, constructed on a prepared foundation in accordance with these Specifications and the type of surface being placed, and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. All materials and installation shall be in accordance with The Asphalt Institute Manual (MS-4) and the VAOT Standard Specifications, (Latest Edition).

C. Mixing Plant: Conform to State of Vermont Standards.

D. Obtain materials from same source throughout.

1.03 PROJECT CONDITIONS

A. Bituminous concrete shall not be placed between November 1 and May 1. Material shall not be placed when the granular subbase is wet or when the air temperature at the paving site in the shade and away from artificial heat is as follows:

Air Temperature Degrees Fahrenheit	Pavement Compacted Depth
40 Degrees or below	1 1/4" or Greater
50 Degrees or below	Less than 1 1/4"

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials shall be combined and graded to meet the criteria as defined in the VAOT Standard Specifications, Division 700 for bituminous concrete.

B. Gradation: Materials shall be combined and graded to meet composition limits specified in VAOT Standard Specification, Section 406.03, for the base course and finish course. Unless specifically shown on the Plans, all

1. Bituminous concrete pavement shall be designed in conformance with the design criteria for heavy duty bituminous concrete pavement. (75 blows/side) Superpave 65 gyration mix is also acceptable.

2. All Asphalt Cement used in the bituminous concrete pavement shall be PG 58-28 (or VTrans approved mix) unless otherwise noted. Superpave 65 gyration mix with 58-28 asphalt cement is also acceptable.

C. Thickness of paving for drives and parking lots shall be as shown on the plans, consisting of base course and finish course.

D. For pavement reconstruction areas due to trenching, the depth of each course shall be increased by 1/2". Pavement reconstruction caused by trench reopening due to improper placement or non-approved placement shall be performed at no additional cost to the Owner.

PART 3 – EXECUTION

3.01 INSTALLATION

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

3.02 EXAMINATION

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

B. Verify gradients and elevations of base are correct.

3.03 PREPARATION

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

3.04 PREPARATION – TACK COAT

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

B. Also apply to contact surfaces of curbs.

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

3.05 PLACING ASPHALT PAVEMENT

A. Place to compacted thickness identified on the plans.

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

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

3.06 JOINTS

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

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

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

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

3.07 TOLERANCES

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

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

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

3.08 FIELD QUALITY CONTROL

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

3.09 REPAIR OF SUBSIDENCE

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

ROCK AND BOULDER EXCAVATION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

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

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

1.2 SUBMITTALS

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

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

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

1.3 QUALITY ASSURANCE

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

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

2. Seismographic monitoring during blasting operations.

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

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

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

2. Seismographic monitoring during blasting operations.

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

1.4 SCHEDULING

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

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

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

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Pre-Blast Survey and Site Examination:

1. Conduct a pre-blast survey on all adjacent buildings and individual water systems within a distance of 1,500 feet. The survey shall include pictures and notes of all signs of distress in the buildings and verification of quality and quantity of water in all individual water systems.

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

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

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

3.2 PREPARATION

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

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

3.3 EXPLOSIVES

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

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

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

3.4 EXCAVATION, GENERAL

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

3.5 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavations under construction.

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

DRAINAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Culvert pipe and appurtenances.

2. Stone fill.

3. Drainage Structures

1.02 REFERENCES

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

1.03 SUBMITTALS

A. Manufacturer's technical data for:

1. Pipe and appurtenances.

2. Structures.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

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

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

2.02 DRAINAGE PIPE & PERFORATED PIPE

A. Culvert / Drainage Pipe

1. Corrugated Polypropylene pipe and fittings (smooth interior) meeting the requirements of ASTM F2881, Section 5 and AASHTO M330, Section 6.1.

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

2.03 CONCRETE STRUCTURES

A. ASTM C478, sized as indicated.

2.04 METAL ACCESSORIES

A. Manhole frames and covers:

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

2.05 STONE FILL

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

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

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

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

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

PART 3 – EXECUTION

3.01 INSPECTION

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

3.02 GENERAL

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

3.03 PREPARATION

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

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

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

3.04 INSTALLATION OF PIPE

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

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

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

D. Where the pipe is to be laid below the existing ground line, a trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe and compaction of the bedding and backfill material under and around the pipe.

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

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

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

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

3.05 MANHOLES

A. Precast concrete structures:

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

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

3. Provide rubber joint gasket complying with ASTM C443.

WATER SUPPLY SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Pipe Materials

2. Hydrants

3. Valves

4. Fittings

5. All other appurtenances necessary to complete the water main system as shown on the Contract Plans.

B. Related Sections:

1. Utility Trenching and Backfilling

1.02 SUBMITTALS

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

STORMWATER CONSULTANT
WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

SPECIFICATIONS

100% SUBMITTAL

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A. Product Data: Submit published data from manufacturers of products and accessories specified, indicating compliance with requirements to the Engineer and local municipality.

1.03 QUALITY ASSURANCE

A. All materials and the installation procedure shall be in accordance with the Department of Environmental Conservation, Vermont Drinking Water and Groundwater Protection Division and the applicable construction ordinances of the local municipality.

PART 2 – PRODUCTS

2.01 GENERAL

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

B. All wetted components shall be NSF 61 certified and comply with VT Act 198 (VT Lead Law)

2.02 WATER MAIN MATERIAL

C–900 PVC WATER MAIN

A. Pipe shall be C–900 (DR–14 200 psi) PVC (sizes as shown on the plans) conforming to current AWWA C–900, latest revision and shall be UL and FM approved. Larger size mains will be required if necessary to allow withdrawal of the required fire flow while maintaining the minimum pressure specified in the Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21, 8.1.1. Any proposed departure from minimum requirements shall be justified by hydraulic analysis and future water use assessment, and will be considered only in special circumstances (Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21 8.1.4). Push–on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.

B. When a pipe material is specifically noted on the contract drawings,the contractor/developer shall not have the option of utilizing any other pipe material. Galvanized pipe or fittings shall not be used in any water system owned or maintained by the Town. The Town Water Department requires the use of polyethylene pipe sleeve encasements and/or alternate pipe materials in known or suspected corrosive soil conditions. Any changes to the approved design will require approval by the Vermont Water Supply Division.

DUCTILE IRON WATER PIPE

A. Pipe shall be Tyton Ductile Iron Class 52 (sizes as shown on the plans) conforming to current ANSI/AWWA C151/A21.51 latest revision. Push–on joint pipe shall be minimum thickness Class 52. Push–on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.

B. Pipe shall be cement mortar lined on the inside in accordance with ANSI Specification A21.4 except that the cement lining thickness shall not be less than 1/8 inch. A plus tolerance of 1/8 inch will be permitted.

C. Pipe shall be given an exterior petroleum asphaltic coating in accordance with ANSI/AWWA Specification C151/ASNI A21.51.

D. Pipe shall be poly wrapped with a minimum thickness of 4 mil poly in accordance with AWWA Specification C105 / ANSI A21.5, unless approved otherwise.

2.03 FITTINGS

A. Ductile iron fittings shall conform to ANSI/AWWA C110/A21.10, 350 PSI working pressure. Ductile iron fittings larger than twelve inches (12") shall have a standard body length equal to Class 250 Cast Iron fittings. Cast Iron Class 250 fittings will be allowed in lieu of ductile iron fittings larger than twelve inches (12"). Ductile iron fittings shall be rated for 250 p.s.i. However, twelve inch (12") and smaller may be rated for 350 p.s.i. with the use of special gaskets. All ductile iron compact fittings shall conforming to AWWA/ANSI C153/A21,53 standards.

B. Anchor tees shall be standard mechanical joint tees except that the branch is plain Class 250 cast iron or Class 350 ductile iron, cement lined, conforming to ANSI/AWWA C110/A21.10, C111/A21,11, and C104/A21.4. Anchor tees shall be Clow F–1217, U.S. Pipe US–92 or equal.

C. Mechanical Joint restraints shall be incorporated into the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron, and have a minimum working pressure of 350 psi. Twist off nuts (i.e. mega–lug) or equal shall be used to ensure proper actuating of the restraining devices. Contractors may also use approved grip ring (or equal) retainer glands.

D. Bolts shall conform to ANSI Specification A21.10.

E. Pipeline couplings shall conform to AWWA Standards C110 and ANSI A21.10. Mechanical joint connecting pieces of proper diameter shall be installed in accordance with the manufacturer recommendations and at locations directed by the plans or the Town Water Department.

F. All fittings shall be restrained; double poly wrapped and have concrete thrust blocks poured in place as defined herein.

2.04 TAPPING SLEEVES AND VALVES

A. The Town Water Department shall be notified whenever a proposed tap is to be made on any transmission main within the municipal system.

B. Only approved tapping companies shall be allowed to perform wet taps on any Town Water Department water mains.

C. All materials used when tapping for a branch connection or interconnection from any Town Water Department water transmission or distribution pipelines shall be specified below

2.05 TAPPING SLEEVES

For use on existing asbestos cement, gray cast iron, ductile iron or PVC C–900 pipe:

A. Tapping sleeves shall be of the split sleeve design, constructed with two solid half–sleeves bolted together. Sleeves shall be constructed of ductile iron, shall have a working pressure of at least 250 psi, and shall have mechanical joint ends with end and side gasket seals.

B. All iron body tapping sleeves shall be provided with a 3/4" NPT test plug, or other provisions must be made for air testing the valve and sleeve at maximum working pressure, prior to tapping.

C. All bolts and nuts for mechanical joints of tapping sleeves shall be of high–strength cast iron or high–strength, low–alloy steel conforming to ANSI/AWWA C111/A21.11.

D. All bolts and nuts for flanged joints of tapping sleeves shall be of high–strength, low carbon steel conforming to ANSI/AWWA C110/A21.10.

E. All bolts and nuts shall be sound, clean, and coated with a rust–resistant lubricant; their surfaces shall be free of objectionable protrusions that would interfere with their fit in the made–up mechanical or flanged joint.

2.06 TAPPING VALVES

A. Tapping valves shall conform to ANSI/AWWA C509 Standard for Resilient–Seated Gate Valves for Water and Sewage Systems, except as modified herein. Valves shall open counterclockwise and shall have a minimum working pressure of 200 psi. Inlet flanges shall be Class 125 conforming to ANSI Specification B16.1 or ANSI/AWWA C110/A21.10, and outlet connection shall be Standardized Mechanical Joint unless specified otherwise on the drawings for the type of pipe required for the branch or lateral pipeline.

B. Tapping valves over sixteen inches (16") diameter shall be installed with their stems horizontal, shall be equipped with rollers, tracks and scrapers, and shall be provided with bypass valves unless otherwise specified.

C. Buried tapping valves shall be provided with a two inch (2") square wrench nut and shall be installed with a cast iron valve box as required to allow positive access to the valve operating nut at all times. In installations where the depth from grade to top of valve operating nut is greater than 5'0", a valve stem riser shall be provided and installed such that the depth from valve stem riser nut to grade is from four feet to five feet (4'–5'), (minimum length of valve stem riser is two feet (2')). Valve stem riser shall be of high strength steel and of welded construction.

D. All contractors (or others) who apply for water line tapping permits shall submit complete specifications of the tapping material they intend to use at the time the tapping permit application is submitted on 8 1/2" x 11" shop drawing sheets

E. All bolts and nuts used with all pipe sleeves shall, upon final tightening and testing, be brush coated heavily with bitumastic cold–applied material to thoroughly cover all exposed surfaces of the bolts and nuts.

2.07 GATE VALVES–RESILIENT SEAT

A. Valves shall be manufactured to meet all requirements of AWWA Specification C509, latest edition. Valves twelve inches (12") and smaller shall be bubble tight, zero leakage at 200 psi working pressure. Valves shall have non–rising stems, open counter clockwise, and provide a two inch (2") square operating nut with arrow cast in the metal indicating direction of opening. Each valve shall have maker's name, pressure rating and year in which manufactured cast on the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. Gate valves shall be Mueller, Kennedy, AFC, or approved equal.

B. Buried valves shall be installed with a gate valve box.

C. Gate valves shall normally be placed a maximum of five hundred feet (500') apart. Tee intersections shall have a minimum of three (3) gate valves. Cross sections (four way intersections) shall have a minimum of four (4) valves.

D. The Town Water Department may require all bolts, studs and nuts be made from a corrosion resistant–material stainless steel.

2.08 VALVE BOXES

A. Valve boxes shall be of the three–piece Cast iron slide–type with a minimum inside shaft diameter of five and one quarter inches (5 1/4") and a six foot (6') trench depth. Valve boxes shall not transfer loads onto the valve.

B. Valve boxes shall have a cast iron cover, marked "WATER". The boxes shall be dirt tight with the top of the cover flush with the top of the box rim.countersunk brass pentagon plug for paved or concrete areas, and standard two holes for grass areas. Curb box couplings and extensions will be the same material as the curb box. Both cover and upper section of the box shall be able to be located with an aqua type metal locator.

C. All service connections shall be installed to the curb stop for all building lots before the street is paved.

D. Valve boxes located in roadways shall have one non–adjusting paving riser of a height ranging from one and a half inches (1.5") to six inches (6") as needed to be brought to final pavement grade.

2.09 BACKFLOW PREVENTION DEVICES

A. No water service connection shall be approved or maintained by the Town Water Department unless the water supply is protected as required by State laws, regulations and ordinances. The type of protective device shall depend on the degree of hazard that exists. In general, backflow devices designed to protect potable water supplies in accordance with national plumbing codes for non–health hazard cross connections and continuous pressure applications shall be used, i.e. Watts Series 007 or approved equal. Watts Series 709 Double Check Valve Assembly or approved equal shall be installed on all sprinkler systems. A shop drawing detail assembly showing backflow devices and meter placements shall be required by the Town Water Department.

2.10 PIPE BEDDING

A. Water lines shall be laid and maintained on lines and grades established by the plans for the project. Pipeline trenches shall be excavated to the width and depths shown on the plan typicals. Pipeline trenches in which pipe is to be laid directly on the trench bottom shall not be excavated entirely by machinery, but shall be finally excavated by hand tools such that the trench shall have a bottom shaped to support the pipe throughout its entire length by firm and undisturbed material. Pipeline trenches, for which bedding is required, may be excavated to the required depths using machinery. No pipe shall be laid directly on ledge, hard shale or a very compact glacial till. When an unstable trench bottom is encountered and the Town Water Department determines that it cannot support the pipe adequately, an additional depth shall be excavated and refilled to the pipe invert with approved material at the contractor's expense. Pipeline trenches shall be dry during the laying of pipe. Wood supports under pipe shall be removed prior to backfilling. Pipeline installation procedures can be found in AWWA Standard C600.

B. Bedding material shall consist of crushed or natural stone conforming to ASTM D2321.

Sieve	Percent Passing
1" Screen	100%
¾" Screen	100%
½" Screen	90 – 100%
⅜" Screen	40 – 70%
No. 4 Sieve	0 – 15%

C. Bedding and blanket material shall be Class II material (ASTM D2321) consisting of clean, granular material (sand), particle size limits described as follows:

Sieve	Percent Passing
No. 4	100%
No. 100	30%
No. 200	12%

2.11 PIPELINE INSULATION

A. Approved waterlines with less than six feet (6'–0") of cover over the crown, that cross a storm sewer, or where indicated on the plans, shall be protected against freezing by the installation of two inch (2") thick highest available density extruded polystyrene insulating sheets or equivalent. Sheets shall be the the lesser of 3' or 2 x diameter of the pipe. The sheets shall be placed six inches (6") above the crown after placement of four to six inches (4" – 6") of clean medium or coarse sand below the pipe bottom and four to six inches (4" – 6") above the crown. Joints shall be overlapped so there is no gap that will allow frost to penetrate. Care shall be exercised during backfill and compaction over the polystyrene sheets to prevent damage to the sheets. The polystyrene sheets shall meet the comprehensive strength requirements of ASTM D1621–73. In no cases shall the waterline have less than four feet (4') of cover over the top of the pipe.When water line passes within 5 feet of a catch basin install 2" min. rigid insulation, polystyrene sheets, between water line and cb.

2.12 POLYETHYLENE PIPE ENCASEMENT

A. Polyethylene pipe encasement may be required in areas of corrosive soils and shall conform to current ANSI/AWWA C105/A21.5 Specifications. Minimum material requirements for the polyethylene film shall be high density, cross laminated virgin polyethylene 4 mil film. The Town Water Department reserves the right to specify Polyethylene pipe, C–900, in areas of corrosive soils.

B. The polyethylene encasement shall prevent contact between the pipe or fittings and the surrounding backfill and bedding material and shall be installed as outlined in Section 4.1 of the above ANSI/AWWA standard.

2.13 CONCRETE FOR THRUST BLOCKS

A. Concrete shall be Portland Cement concrete of 3,000 psi minimum 28 day compressive strength. ASTM C–94 specification for transit mixed concrete shall control the concrete quality. A maximum water cement ratio of 6 gallons per sack and a maximum slump of four inches (4") will be allowed.

2.14 FIRE HYDRANTS AND HYDRANT BRANCHES

A. Fire hydrants shall be Mueller Super Centurion 250, Figure A–423, Kennedy K–81 D, or Waterous Pacer Hydrant and shall conform to AWWA C502 with the following specifications:

1. Main Valve Opening: 5 1/4 inches
2. Nozzle Arrangement: Two 2 1/2 inch Hose Nozzles with National Standard Thread (NST)
3. One 4 1/2 inch Pumper Nozzle with National Standard Thread (NST)
4. Inlet Connection: 6 inch Mechanical Joint, "Mega–Lug" or equivalent retaining gland and concrete thrust block
5. Operating Nut: Standard 1 1/2 inch Pentagon
6. Direction of Opening: Counterclockwise
7. Depth of Bury: Six–foot cover. The hydrant shall have at least 15 inches and no more than 21 inches between the bottom of the steamer cap and the ground.
8. Drain: The hydrant shall be non–draining or have the drains permanently plugged.
9. Color: Red enamel
10. Other: Hydrants shall be compression type closing with the pressure. Hose and pumper nozzles shall be 1/4 turn type secured by stainless steel or corrosion resistant pins or screws. Pressure seals behind the nozzle flanges shall be "O" rings. A breakable coupling retained in place by stainless steel or corrosion resistant pins shall make the union between the upper and lower stems. The two–piece traffic flange shall be held in place by nuts and bolts. The upper barrel shall be able to rotate 360 degrees without removing any bolts. Hydrant flags shall be required and supplied for each hydrant. Wherever a traffic hazard appears to exist, curbing and/or bollards shall protect the hydrant.

B. For single–family house subdivisions, there will be at least one hydrant at each intersection and a maximum of five hundred feet (500') between hydrants with a minimum water flow of 500 gallons per minute (gpm) at the flow hydrant with a 20–psi residual pressure at the residual hydrant. Hydrants should be located immediately adjacent to street property lines. A 20' x 20' easement will be required around all hydrants. No structures or plantings are to be placed within a 20' x 20' area of any hydrant.

C. Where dead–end mains occur, they shall be provided with a fire hydrant if flow and pressure meet minimum requirements. If flows and pressure are not sufficient, then an approved flushing hydrant or blow off shall be installed for flushing purposes. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. The open end of a blow off must be capped and terminate at least eighteen inches (18") above grade.

D. When set in lawn space between the curb and sidewalk, no portion of the hydrant or nozzle cap will be less than one foot off the gutter face of the curb or edge of the sidewalk. Hydrants shall be a minimum of four feet (4') and a maximum of six feet (6') from the edge of the sidewalk to the closest point on the hydrant when placed behind the sidewalk. In the absence of a curb or sidewalk, no hydrant shall be placed more than six feet (6') from the edge of pavement. Hydrants shall be located so as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

2.15 HYDRANT ASSEMBLIES

A. Hydrant assemblies shall consist of an anchor tee, a six inch (6") mechanical joint gate valve conforming to the above specifications, the appropriate length of six inch (6") Ductile Iron Cement Lined, Class 52 pipe, all necessary anchor couplings and approved restraining glands, the fire hydrant and appropriate thrust block.

B. Care shall be taken to prevent damage to hydrants and appurtenances during handling and installation. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of the hydrant bowl; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. All hydrants shall be carefully incorporated in the water main and supported in their respective positions free from distortion and strain. Hydrants shall be set plumb. All hydrants shall be oriented to most efficiently allow fire truck access and connection for emergency purposes. They shall be installed away from the curb line at sufficient distance to avoid damage from or to vehicles. Traffic model hydrants shall be installed so the breakaway flange is not less than two inches (2"), nor more than six inches (6") above the established grade, according to manufacturer recommendations. Hydrant locations are subject to the approval of the Town Water Department and the appropriate municipality's fire department. Installation for fire hydrants can be found in AWWA Standard C600.

2.16 SERVICE CONNECTIONS

A. Service lines shall be installed so as to run perpendicular, in a straight line from the water main to the curb stop.

B. Each service shall consist of a corporation, curb stop, copper tubing and a curb box with a cast iron or stainless steel service rod. Service lines from three–quarter to two inch (3/4" to 2") shall be copper tubing from the corporation stop to the curb stop. Copper tubing shall be type "K", soft temper, conforming to ASTM B88. The name or trademark of the manufacturer and type shall be stamped at regular intervals along the pipe. Copper service pipe shall be one piece from the corporation to the curb stop. The minimum service for a single–family residence shall be three–quarter inch (3/4"). The minimum service for a duplex shall be one inch (1").

C. Corporations shall be AY McDonald or Cambridge Brass Low–Lead and manufactured in accordance with AWWA C800. Corporations shall have threads per AWWA C800 Table 7 / Figure 2, at the inlet and a compression type fitting at the outlet. Both inlet and outlet shall be the same size. Three–quarter inch and one–inch corporations shall be directly tapped into ductile iron pipe six inches (6") and larger in diameter. Larger size corporations up to two inches (2") shall use a tapping saddle. Pipe less than six inches (6") shall require the use of a tapping saddle and corporation. Corporations shall be used for all taps up to two inches (2"). In no instance, except when a tapping sleeve and valve are used, shall a tap be made without a corporation. Corporations shall be Mueller 110 (3/4" – 1"), or Mueller H 15013 (1 1/2" – 2"). A connection made to a pipe that requires a tapping saddle or is not ductile iron will have a body with a suitable outlet, seal, and suitable means for attachment to the main. The body shall be made to conform to the outside configuration of the main. The service saddle shall be designed to provide a drip tight connection. The body shall be Teflon or Epoxy coated with stainless steel strap(s), bolts, nuts, and mechanism for attaching to the pipe barrel.

D. Curb stops shall be a ball valve type with a minimum allowable pressure rating of 300 psi and be manufactured in accordance with AWWA C800. The curb stop shall open left, have a positive stop, be full port, provide drip–tight shutoff in the closed position and be of the tee design or flat design. No curb stop shall have the ability to drain the service line. Both the inlet and outlet of the curb stop shall have compression type fittings. The tee head of the curb stop shall have the provision for the connection of a service rod. Curb stops shall be AY McDonald or Cambridge Brass Low–Lead, or approved equal. The curb stop shall rest on a four inch by eight inch by sixteen–inch (4" x 8" x 16") concrete block for support. Curb stops shall be installed just inside the municipality R.O.W.

E. Curb boxes shall be of sliding adjustable type capable of adjusting from five feet to six feet (5' – 6') (Erie Style). The base of the box shall be arch type so as to prevent the box from resting on the curb stop. The adjustable upper section shall be one inch (1") diameter for use with 3/4" and 1" curb stops. For larger curb stops, the upper section shall be 1 1/4" in diameter. Stationary rods affixed to the key of the curb stop with a brass pin shall be thirty inches (30") in length for 3/4" and 1" curb stops and twenty–four inches (24") for large curb stops. Curb box rods may be cast iron or stainless steel, as determined by the Town Water Department. The word "WATER" shall be inscribed on the cover of the box.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Contractors shall notify the Town Water Department and Dig Safe at least seven days prior to any work on the water system.

B. Skilled workers experienced in such work shall install all items. Tools shall be adequate for the work and in good condition so as to produce good, clean cut threads of the correct size, pitch, and taper.

C. Installation of all water lines shall be in accordance with the latest version of AWWA C600 or AWWA C605 , as applicable, current edition.

D. Connection to an existing water main shall be done under the supervision of and with the approval of the Town Water Department. It is the applicant's, developer's, or owner of record's responsibility to secure ALL necessary connection permits and pay ALL applicable fees to make the connection, and to coordinate all parties involved in the process. The engineer and the Town Water Department shall be notified at least two working days in advance of the intended connection time. No existing valves, hydrants, curb stops, etc. shall be operated without prior approval of the Town Water Department. The Town Water Department shall operate all valves initially to ensure the integrity of the valve. The Town Water Department may then allow the contractor to operate those valves. Any damage occurring after the use of any valve operated by the contractor shall be the contractor's responsibility.

E. Care shall be taken to prevent damage to valves and other appurtenances during handling and installation. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign matter cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all other nuts and bolts checked for tightness. Valves and other equipment, which do not operate easily, or are otherwise defective, shall be replaced. All valves shall be carefully incorporated into the water main and supported in their respective positions free from all distortion and strain. Valves and valve boxes shall be set plumb. Valve boxes, besides being plumb, shall be centered directly over the valves.

F. All pipes showing cracks shall be rejected. If cracks occur in the pipe, the contractor may, at his own expense and after approval of the Town Water Department, cut off cracked portions at a point at least twice the pipe diameter from the visible limits of the crack and use the sound portion of the pipe.

G. All water mains shall have no less than six feet (6') of cover unless waived by the Town Water Department. The pipe shall be laid to conform to the lines and grades indicated on the plans. The Town Water Department may restrict work before November 15 and after April 1 during adverse weather conditions. The Town Water Department may not allow excavating for water mains during the winter months except by special permission for emergencies. Each pipe shall be laid so as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade. In no cases shall the waterline have less than four feet (4') of cover over the top of the pipe.

H. Temporary support, adequate protection, and maintenance of all underground structures, drains, sewers and other obstructions encountered in the progress of the work shall be provided at all times. If utility service is interrupted as a result of work for the project, the contractor shall immediately restore service by repairing the damaged utility at the contractor's expense.

I. At all times, when pipe laying is not actually in progress, the open ends of the pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed. During construction, the contractor shall conduct operations so as to prevent the accumulation of water, ice, and snow in the vicinity of excavations or in the vicinity of excavated areas, and to prevent water from interfering with the progress and quality of the work.

J. Under no conditions shall water be allowed to rise in open trenches after pipe has been laid.

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

L. Any deflection of joints in pipe up to twelve–inch (12") diameter shall be within the limits specified by the manufacturer, but not to exceed five degrees or nineteen inches (19") per eighteen feet (18') of pipe length.

M. Concrete thrust blocks shall be installed on all hydrants, plugs, tees, and bends deflecting 11 1/4 degrees or more. Concrete thrust blocks shall be used in conjunction with "Mega–Lug" restraining glands or equivalent. Care shall be taken to ensure that concrete will not come into contact with flanges, joints, or bolts. The required area of thrust blocks shall be indicated on plan typicals and approved by the Town Water Department. Concrete shall be placed against undisturbed soil. Wooden side forms or equal shall be provided for thrust blocks. No backfilling shall be allowed until concrete masonry has set sufficiently. Where directed by the Town Water Department or engineer, concrete encasement of

SITE ENGINEER:

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

STORMWATER CONSULTANT

WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:

CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:

MORETOWN ELEMENTARY SCHOOL

940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

SPECIFICATIONS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C5.2

the waterline may be made for stream crossings and similar purposes. Where required on the plans or as directed by the Town Water Department or engineer, a concrete cradle shall be used to bolster and strengthen the pipe. The Town Water Department or his designee shall inspect all thrust blocks prior to backfilling.

N. All trenching safety standards shall be in conformance with all applicable State and Federal guidelines. The contractor shall be solely responsible for any safety citations by State or Federal inspectors.

O. There shall be no physical connection between the distribution system and any pipes, pumps, hydrants, or tanks that are supplied with water that is, or may be, contaminated.

P. As necessary, temporary PVC markers shall be supplied at all gate valves, curb boxes, and at the end of water lines to a minimum of twelve inches (12") above finish grade until accepted by the Town Water Department.

Q. All surplus material and debris shall be removed as the project progresses, leaving all areas clean and presentable.

R. Unless otherwise required, all paving and sidewalks that may be damaged during construction shall be replaced with the same kind of material that previously existed.

S. The contractor shall be responsible for proper protection of persons and property on the project. The contractor shall barricade open holes and depressions occurring as part of the work, and post warning lights on adjacent property to or with public access.

T. Warning lights shall be operated during hours from dusk to dawn and as otherwise requested.

U. The contractor shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by construction operations.

V. No water lines shall be installed after November 15 or before April 1 without prior approval of the Town Water Department.

3.02 WATER/SEWER SEPARATION

A. Water mains crossing sewers shall be laid to provide minimum vertical distance of eighteen inches (18") between the outside of the water main and the outside of the sewer line. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of pipe shall be located so both joints will be as far from the sewer as possible. This vertical separation shall be maintained for that portion of the water main located within ten feet (10') horizontally of any sewer it crosses. Water mains must be laid at least five feet (5') horizontally from any existing or proposed storm sewer and ten feet (10') from any existing or proposed sanitary sewer.

B. When it is impossible to obtain horizontal and vertical separation shown on details in accordance with Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21, Appendix A, Section 8.6., coordinate with Engineer or Town Water Department. No water main shall pass through or come in contact with any part of a sewer manhole.

C. Distribution lines shall not be placed closer than fifty feet (50') horizontal distance from any septic tank or leach field unless approved by the Vermont Drinking Water and Groundwater Protection Division Rule Provisions under Chapter 21.8.6.4 or the Town Water Department.

D. Force main crossing shall be arranged so that at least one full length of sewer pipe is centered above or below the water line, with the sewer joints as far as possible from the water joints and encased in concrete. The new force main line shall be constructed to water main standards for a minimum of twenty feet (20') on either side of the crossing. The section constructed to water main standards shall be pressure tested to maintain 50 psi for fifteen (15) minutes without leakage prior to backfilling. In those areas that proper cover cannot be provided, proper insulation shall be installed.

E. Sewer and waterline separation shall conform to all Vermont Drinking Water and Groundwater Protection Division Rule requirements, and installed in accordance with the latest edition of the "Ten States Standards – Recommended Standards for Water."

3.03 TESTING AND DISINFECTION

A. All water mains shall be constructed, tested and disinfected in accordance with AWWA Standards C–600, C–605, C651 and The Vermont Drinking Water and Groundwater Protection Division Rule. All tests shall be conducted by and at the expense of the Contractor.

1. The Contractor shall furnish all gauges, testing plugs, caps and all other necessary equipment and labor to perform leakage and pressure tests in sections of an approved length. Each valved section, including hydrant laterals, or a maximum length of 1,000 feet of pipe shall be tested. The Contractor shall provide at his own expense any additional taps to the water line necessary to perform the pressure and leakage test between valves. All didinfection/testing shall be completed by an independent third party unless otherwise approved by the Engineer or local municipality.

2. All water required for testing shall be potable. All testing shall be conducted in the presence of the Engineer.

3. The Contractor shall make the necessary provisions to tap the pipe at the high point to release all air and shall plug same after completing the test. Hydrants or blowoffs located at high points may be used for air release in lieu of taps if approved by the Engineer.

4. For the pressure test, the Contractor shall develop and maintain for two hours, 150% of the working pressure, or 200 psi, whichever is greater. Failure to hold within 5 psi of the designated pressure for the two hour period constitutes a failure of the section tested.

5. No pipe installation shall be accepted if the leakage is greater than that determined by the following. Maximum allowable leakage will be:

$$L = \frac{SD\sqrt{P}}{148{,}000} \quad \text{or} \quad L = \frac{ND\sqrt{P}}{7{,}400}$$

whichever is less

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge).
N = Number of joints in the pipeline tested

All testing shall be conducted in accordance with AWWA C600 (latest edition)

6. Should any section of pipe fail either the pressure or leakage test, the Contractor shall do everything necessary to locate and repair or replace the defective pipe, fittings, or joints at no cost to the Owner.

7. Disinfection: Disinfection of the pipeline shall be directed by the Engineer and at the Contractor's expense. AWWA Standard C–651 shall be used as a basis for the disinfection process.

B. The Engineer or Town Water Department will require as minimum:

1. Complete flushing of the pipeline to wash out all dirt, debris, etc. which may have accumulated in the pipeline during construction. A reducing agent shall be used at the point of flushing to eliminate the free chlorine residual per the direction of the Town Water Department.

2. Following flushing to clean clear water, the Contractor will add chlorine through continuous feed to the entire pipeline volume of water such that the water will have not less than 25 mg/L free chlorine, and let the mixture set for at least 24 hours.

3. After the 24–hour duration, the water in the pipeline shall be tested for residual free chlorine and must contain a minimum of 10 mg/L chlorine. If less than 10 mg/L are found, then the disinfection procedure shall be repeated until at least 10 mg/L chlorine residual is indicated by test.

4. Upon successful completion of step 3 above, the pipeline shall be flushed again until the chlorine concentration in the pipeline is no higher than that prevailing in the supply system. A reducing agent shall be used to eliminate the free chlorine residual in the flushing process per the direction of the Town Water Department.

C. After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main, and submitted to the Vermont Health Department for analysis. At least one set of samples shall be collected from every 1,000 feet of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall show the absence of coliform organisms and, if required, the presence of a chlorine residual (AWWA C651–99). If the initial disinfection fails to produce samples which pass the V.S.H.D. requirements for potable drinking water, then the new main shall be reflushed and shall be resampled until satisfactory test results are obtained.

D. Upon satisfactory results by the Vermont State Health Department, the pipeline may be placed in service. All costs for water, materials, equipment and labor to perform the required testing disinfection, and flushing of the pipeline shall be paid by the Contractor.

3.04 SUBMITTAL OF TEST RESULTS

A. A. The Applicant or Project Engineer shall be responsible for submittal of test results to the Town Water Department. The Applicant or Project Engineer shall also provide a letter to the Town Water Department certifying that the water system has passed all tests, is constructed in accordance with the approved plans, except as may have been modified by approved Change Order, and is in condition to be placed in service. Submittal of all test results shall be required prior to the water main being placed into service.

3.05 FINAL INSPECTION

A. For one year from the date the new system is placed into service, the applicant's developer/contractor will be responsible for any necessary repairs or corrections as part of the project warranty. At the end of a one–year period, an inspection will be performed by the Town Water Department prior to the system owner assuming ownership of any of the lines and appurtenances. The contractor shall correct any punch list items accumulated during the inspection after receipt of this list. Incomplete work on the system shall not be included in the initial inspection, but shall be inspected as the project continues. The contractor shall repair, replace, or retest promptly as directed by the Town Water Department and without further charges, all work equipment, materials or parts, which may fail during the one year warranty period.

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

1. Valves, hydrants, and curb stops operating properly.

2. Valve boxes and covers set plumb and at proper elevations.

3. Proper hydrant nozzle height above grade.

4. Proper hydrant opening direction, nozzle thread, and barrel color.

5. Proper distance from the face of the curb of hydrant nozzles.

6. Hydrant flags meeting Town Water Department specifications installed on each fire hydrant at the time of installation.

7. Static and residual hydrant pressures and flow rates.

8. Curb boxes inside ROW, set to grade, containing operating rod, and plumb.

9. Tie information and record drawings complete and submitted.

10. Material testing results, lab reports, manufacturers' certificates, and leakage test results complete and on file.

11. General appearance and restoration.

12. Submittal of O&M manuals in hard copy and Adobe Acrobat Reader (.pdf) format.

13. Submittal of As–Builts in hard copy format and Auto–CAD.DWG Version 2000 format or newer within 14 days of completion.

3.06 GENERAL INFORMATION

A. All persons taking water must keep the fixtures and service pipe within their own premises in good repair and fully protected from frost, and must prevent unnecessary leakage of water. The Town Water Department shall not be liable for leakage of hydrants, pipes or fixtures upon the premises of any consumer, nor for obstructions therein by freezing or otherwise, nor for damages resulting from any of the forgoing causes. All leaks that are on the building side of the curb stop will be the owner's responsibility and repaired at the owner's expense.

B. Water rates shall be collected for all water used until the water is shut off at the curb stop by the Town Water Department. No abatement of water rates will be allowed by reason of disuse, diminished use, or vacancy of premises without proper notice to the Town Water Department.

C. The Town Water Department or system owner shall not be liable for any injury, loss or damage of whatever nature occasioned by the failure to maintain a constant or uniform pressure in the water mains, or for damages occasioned by or growing out of a stoppage of said water by frost or other cause, or for damage occasioned by or growing out of an insufficient supply of the same, or for accident or damage of any kind caused by or growing out of the use or failure of said water.

D. No person shall open any hydrant or draw water there from except the Town Water Department personnel or persons under their direction, or the officers or designees of the municipal fire department and members of the fire companies under their direction for fire purposes, or those individuals who have been granted approval on a hydrant use application by the Town Water Department, in which case, all such usage shall be metered. Fines for unauthorized use of any hydrant or connection may be incurred, according to the Rules and Regulations of the Town Water Department.

E. One curb stop and one water meter shall be installed for each individual dwelling unit, condominium unit, apartment unit, commercial or office occupancy. Exceptions may be permitted in cases where a condominium association signs a binding agreement to be responsible for all collection of water bills. In cases where condominiums are converted into separate apartments, separate curb stops and water meters shall be installed for each unit. Town Water Department employees shall install all water meters. Under no circumstances are plumbers or persons other than those authorized by the Town Water Department permitted to turn water on or off at the curb stop. The water will not in any instance be turned on to any premise for use until the Town Water Department has suitably attached a meter.

F. The owner of the premises shall be responsible for all water payments. A change of tenants or premises will not relieve the owners from payment of a back bill.

STORM WATER PONDS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Construction of storm water detention pond.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Compacted Fill/Granular Borrow: The material for the fill shall be obtained from the designated areas and shall conform to the requirements of the Site Earthwork Section. The material shall be free from stumps, wood, brush, roots, sod, rubbish, and other matter that may decay. It should be free of stones over 2 inches in diameter where compacted by hand or mechanical tampers, or over 6 inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill, nor shall the fill material be placed on a frozen foundation.

B. Stone Fill: Stone fill shall conform to the requirements of Type I Stone Fill as specified in the Drainage Section.

C. Riser and Drain Pipe: Riser and drain pipe shall conform to the requirements of the Drainage section.

PART 3 – EXECUTION

3.01 SITE PREPARATION

A. The area to be covered by the pond and embankments shall be cleared of all trees, brush, stumps, roots and other objectionable material. The area to be covered by the earth embankment and the surface of the borrow area shall be stripped of all grass, roots, organic materials, or other objectionable materials to a depth that will insure the removal of any materials which will prevent bond between the foundation and the fill. Material cleared shall be disposed of in accordance with the Site Clearing Section. Where the embankment will be on a hillside, the slope of the original ground on which the embankments are to be constructed shall be stepped and properly drained as the fill is constructed so that adverse movements of the slopes do not occur.

3.02 COMPACTED FILL/GRANULAR BORROW

A. Preparation of Foundation: Upon completion of the clearing operation and just prior to placing the fill material on any portion of the foundation, that portion shall be scarified, plowed, or disked to a depth of 3 inches. All objectionable material exposed by this operation shall be disposed of outside the limits of the fill.

B. Placing and Spreading Material: The placing and spreading of material shall be started at the lowest part of the section under construction and the fill constructed in layers of 6 inches. The layers shall slope slightly towards the reservoir to prevent puddles and provide for faster runoff in case of rain. Where possible, the layers shall extend over the entire area of the fill. The distribution and gradation of the materials throughout the fill shall be such that there be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The most porous borrow material shall be placed on the downstream portions of the embankment.

C. Compaction: All fill shall be compacted to 95% maximum density per ASTM D–698, Standard Proctor.

D. Limits: The embankment shall be constructed where located and as detailed in the Contract Plans. Side slope shall be 1 vertical to 3 horizontal.

E. Revisions to the proposed design of the detention pond may be necessary if, in the opinion of the Engineer, unsuitable material is found at the pond location.

3.03 SLOPE PROTECTION

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

3.04 LANDSCAPING

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

1. Seed mixture in all areas shall be urban mix conforming to the table below. For seeding between September 1 and October 1, winter rye shall be used at an application rate of 100 pounds per acre.

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

URBAN MIX GRASS SEED

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

LANDSCAPE GRADING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Finish grading; bring rough grade in areas to design elevations as shown on the drawings.

2. Topsoil: Work shall consist of furnishing, placing and shaping topsoil, or placing, spreading, and shaping topsoil form stockpiles or stripped areas.

PART 2 – PRODUCTS

2.01 TOPSOIL

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

PART 3 – EXECUTION

3.01 SUBGRADE PREPARATION

A. Clean subgrade of all stumps, stones, roots, trash or other materials which might hinder proper tillage or spreading.

B. All surfaces on which topsoil is to be placed shall be graded to a reasonably true surface and scarified by raking, discing or other approved means to a minimum depth of two inches before placing topsoil.

3.02 PLACING TOPSOIL

A. Minimum final depth of topsoil shall be 4 inches.

B. Place topsoil when seeding operations can closely follow spreading operations. Use topsoil in relatively dry state.

C. Topsoil shall be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The depth stated in the contract to which the topsoil is to be placed is that required after final rolling of the material has taken place. All stones, roots and debris over 1¼ inch in diameter along with any sodding weeds and other undesirable material shall be removed.

D. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.

E. It shall be the Contractor's responsibility to restore to the line, grade and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the work.

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

STORMWATER CONSULTANT
WATERSHED CONSULTING
208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN MAB
CHECKED DSM
APPROVED DSM

CLIENT:
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

PROJECT:
MORETOWN ELEMENTARY SCHOOL
940 VT ROUTE 100B
MORETOWN, VT

DATE	CHECKED	REVISION

SPECIFICATIONS

100% SUBMITTAL

DATE 09/30/2021
SCALE NTS
PROJ. NO. 20147

DRAWING NUMBER C5.3