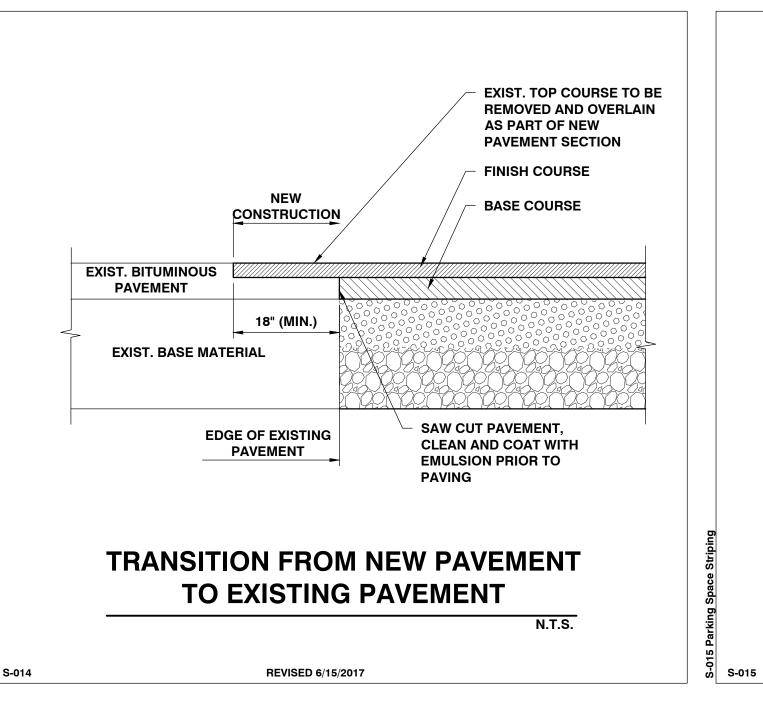
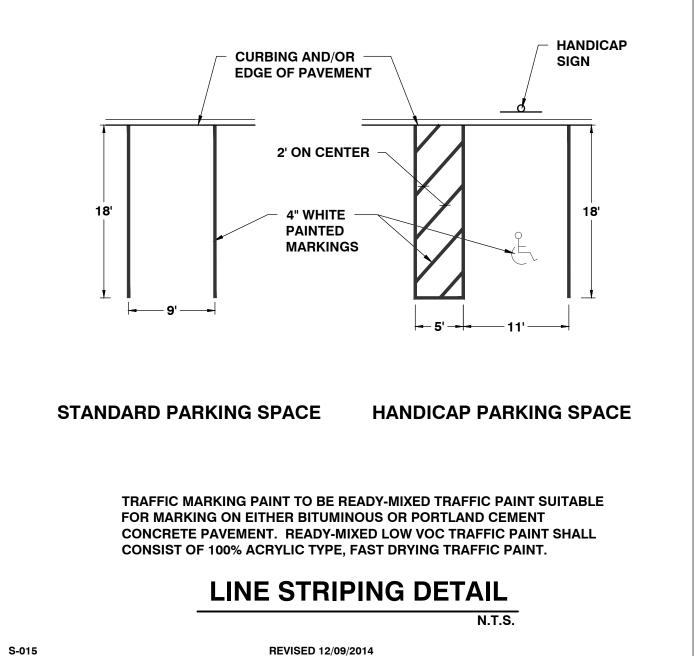


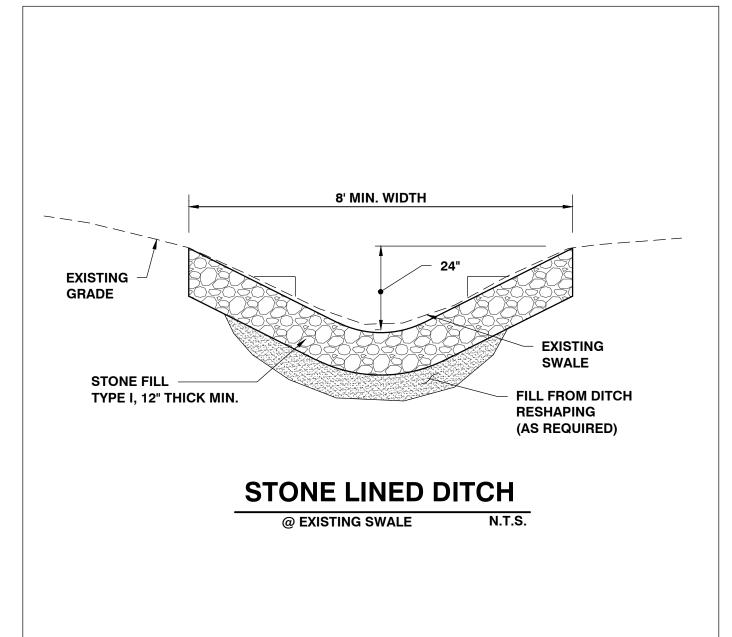
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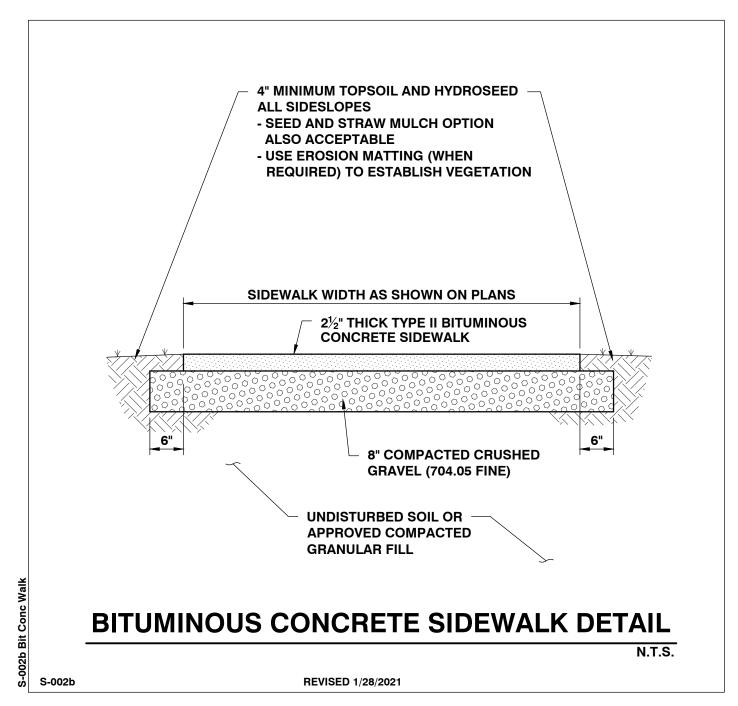
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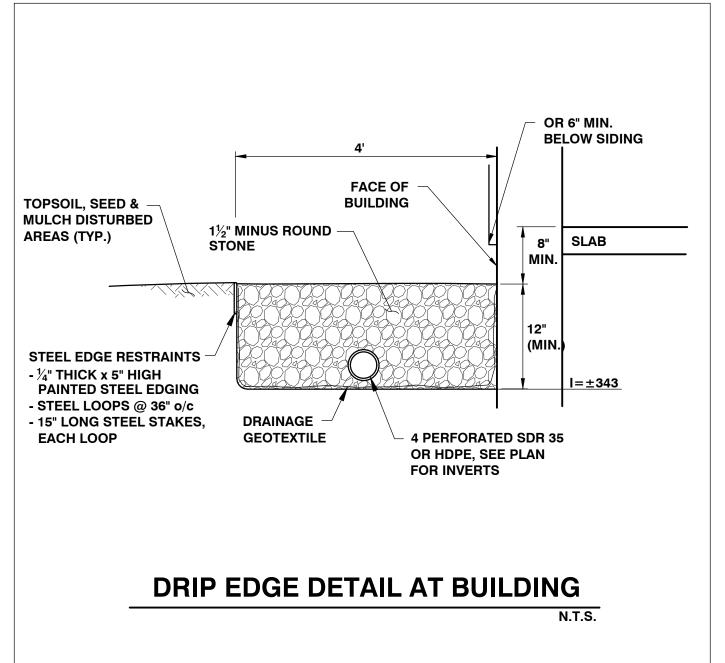
April 24, 2020 #Date Revision 1 1/29/21 REVISED PAVING LIMITS & PAVEMENT MARKINGS, ADD DRIP EDGE

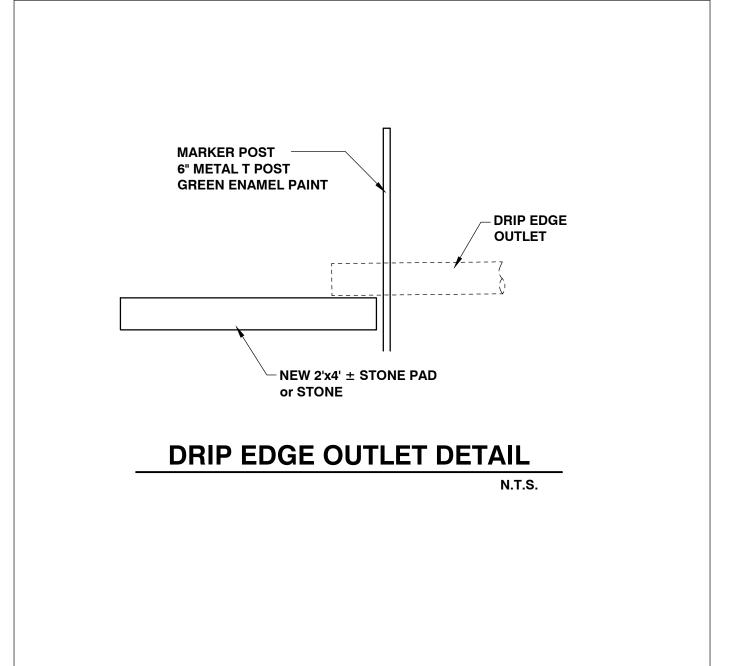












COLIN P. LINDBERCALLA.
A.I.A.

208 FLYNN AVENUE, SUITE 2B
SURLINGTON, VT 05401

CIATES, INC. 20

IVIL ENGINEER:

VIL ENGINEERING AS

DETAIL:

FOAD, SHELBURNE, VI 03462

FE CENTRAL SCHOOL

IMPROVEMENTS

ROAD, CHARLOTTE, VT 05445

CHAMPLAIN VALLEY SCI
5420 SHELBURNE ROAD, SHELE
ject: CHARLOTTE CENTRA
SITTE IMPROVEN

Scale

AS NOTED

Date
April 24, 2020

Date Revision
1 1/29/21 ADD DETAIL, REVISED
PAVING LIMITS &
PAVEMENT MARKINGS

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

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 **Purpose:** 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

Demarcate Limits of Disturbance 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

You must physically mark the limits of construction activity using one of the methods described

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 Many construction sites require storage of chemicals and materials that have detrimental effects if

• Maximum drainage area is 1/4 acre for 100 feet of silt fence and erosion control berm.

prevention and clean up plan are required to mitigate these risks. 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.

. Minimize the exposure of the following to precipitation and to stormwater: building materials, Silt Fence Installation: 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

• Join fencing by rolling the end stakes together stormwater will not result in a discharge of pollutants, or where exposure of a specific material

• Drive stakes in against downhill side of trench or product poses little risk of stormwater contamination (such as final products and materials

• Drive stakes until 16 inches of fabric is in trench intended for outdoor use).

3. Limit Concurrent Earth Disturbance

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

potential on the site.

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.

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.

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 Shall provide for storage and removal of sediment and be sized appropriately for the drainage natting protect the soil surface while grass is establishing. Areas of earth disturbance may also be area, while allowing stormwater to filter through. These may be used if installed and maintained in implementing one or more of the practices described below. stabilized with stone, such as rip-rap or gravel, or other impervious surfaces such as pavement and accordance with the manufacturer's specifications.

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.

As required by the authorization, temporary stabilization for areas of earth disturbance shall be

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.)

completed utilizing one or more of the methods below:

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.

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

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

Stabilized Construction Access

A stabilized construction access helps remove mud and sediment from vehicles and equipment to Width: Dams should span the width of the channel and extend up the sides of the banks prevent tracking onto streets.

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

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

Redress with clean stone or scarify to open voids as required to keep sediment from tracking onto • Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other payed 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 solely to slope angle; however, 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

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.

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.

Diversion Berm installation:

Construct berm to the minimum specification above.

channel with 4 inch stone if the channel slope is greater than 20%.

2. Average slope of the disturbed area is 20% or steeper.*

- 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
- 5. Ensure the berm drains to an outlet stabilized with ripra p. Ensure that there is no erosion 6. The diversion berm shall remain in place until the disturbed areas are completely

7. Install Perimeter Controls

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.

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 Implement Rolled Erosion Control Products (i.e. matting) over the areas of earth disturbance. 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. released into our waterways. A storage plan for these potential pollution sources as well as a spill • 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

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.

 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
- Push fabric into trench; spread along bottom Fill trench with soil and pack down
- tree roots do not allow for trenching. (A secondary perimeter control can be effective in these disturbed soil must be stabilized prior to any runoff producing event. 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

practice and not bypass the in let entirely.

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

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

Inlet Protection Installation Proprietary Inlet Protection:

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.

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.

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

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

10. Slow Down Channelized Runoff

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.

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

the interior of the check dam and the large stone should be placed in an armoring layer on the 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.

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.

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

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 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

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.

Install per manufacturer's instructions. **12.** Winter Construction Requirements: October 15 - April 15

'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

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:

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

Requirements for Winter Construction

If construction activities involving earth disturbance continue into the winter construction period, 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 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

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

4. Drainage structures must be kept open and tree of snow and ice dams. 5. Silt fence and other practices requiring earth disturbance must be installed ahead of frozen 6. Mulch used for temporary stabilization must be applied at a minimum of 2 inches with an

80-90% cover. • Gravel can be used to create ground contact with filter fabric when bedrock, ledge, or nearby 7. To ensure cover of disturbed soil in advance of a precipitation or melt event, areas of

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. 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 To minimize and prevent discharges of sediment as a result of dewatering activities.

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

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

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.

Concrete wash water often contains a slurry of heavy metals, can be caustic, and has a high pH. E-002 As a result, concrete washwater is not a permitted discharge.

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

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

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.

specifications.

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.*

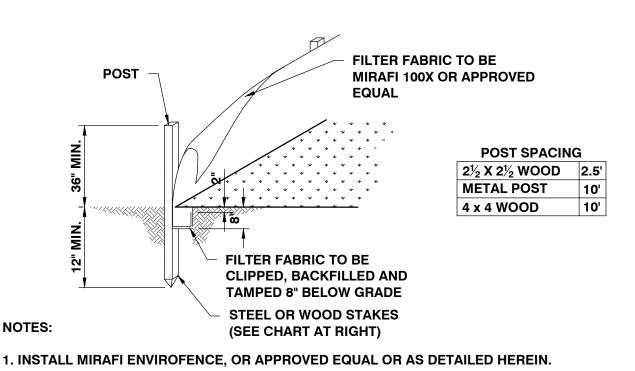
Permanent Stormwater Treatment Practices (STPs) include infiltration and filtering practices as well as detention ponds and treatment wetlands. It is critical that infiltration practices do not receive runoff until the site area has reached final stabilization.

smaller stone helps to filter the channelized runoff. The small stone should be placed primarily in 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

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

continues, the permittee is required to notify DEC within 24 hours.

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



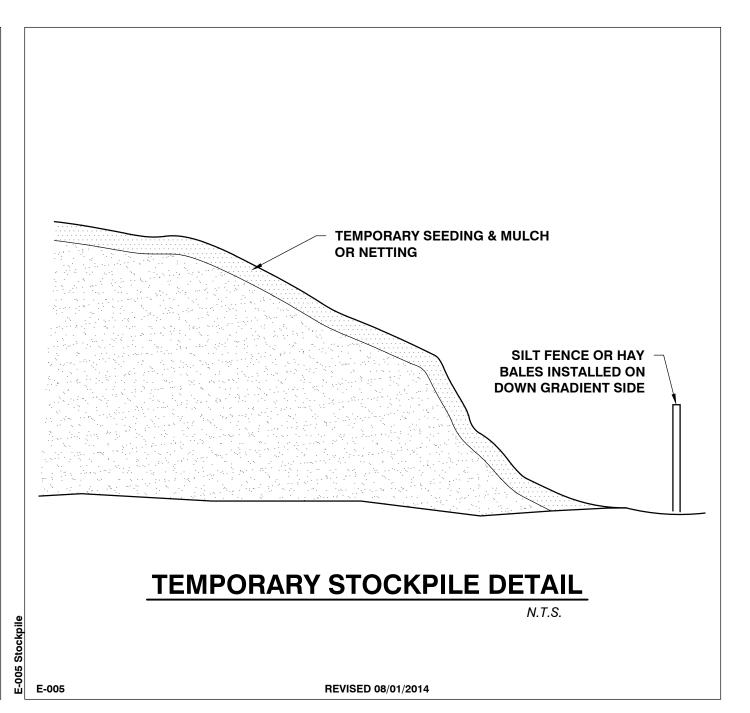
1. INSTALL MIRAFI ENVIROFENCE, OR APPROVED EQUAL OR AS DETAILED HEREIN.

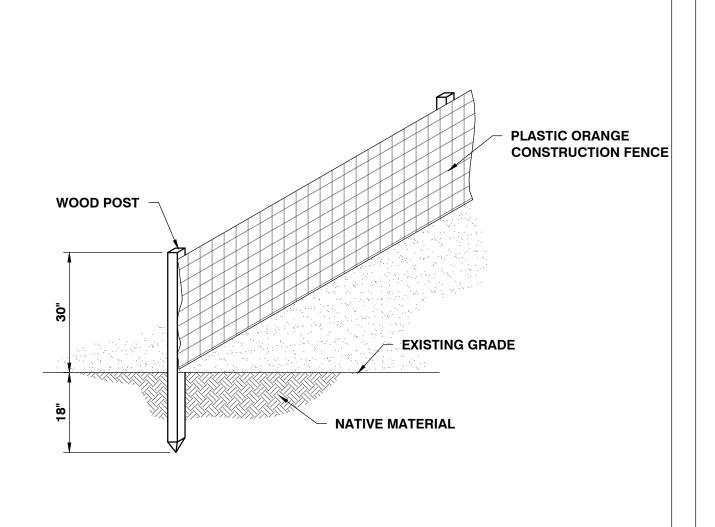
2. INSTALL SILT FENCES AT TOES OF ALL UNPROTECTED SLOPES AND AS PARALLEL TO CONTOURS AS POSSIBLE. THIS INCLUDES ALL FILLED OR UNPROTECTED SLOPES CREATED DURING CONSTRUCTION, NOT NECESSARILY REFLECTED ON THE FINAL PLANS. CURVE THE ENDS OF THE FENCE UP INTO THE SLOPE. REMOVE SEDIMENT WHEN ACCUMULATED TO 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

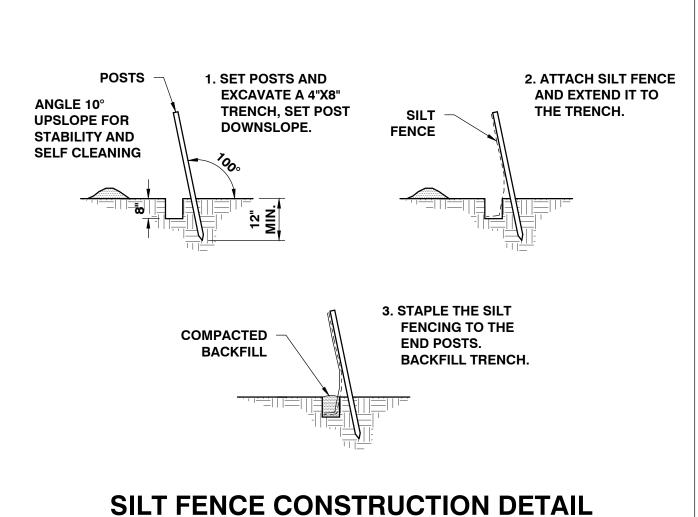
REVISED 08/01/2014



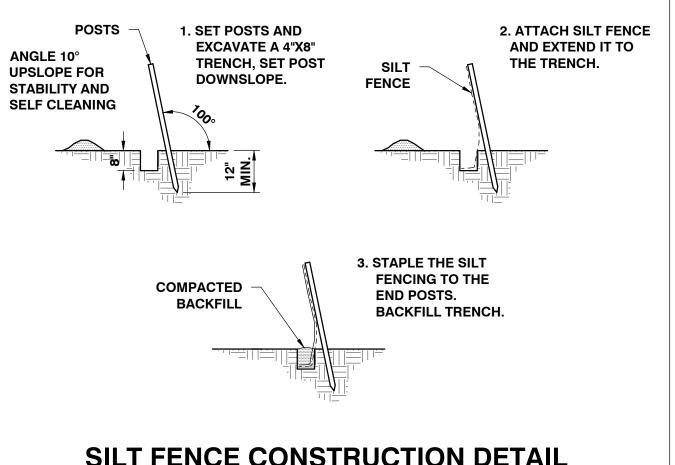


CONSTRUCTION FENCE DETAIL

REVISED 08/01/2014



REVISED 08/01/2014

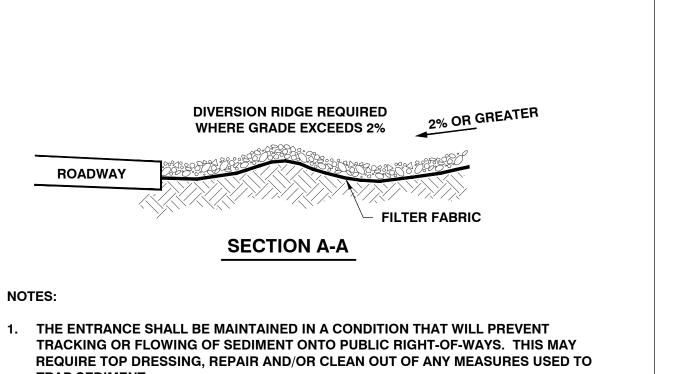


MULCH FOR PURPOSES OTHER THAN HYDROSEEDING WILL BE CLEAN STRAW, FREE FROM WEEDS. HAY MULCH WILL NOT BE ALLOWED TO AVOID THE SPREAD OF NON-NATIVE SPECIES SUCH AS WILD PARSNIP.

LIND

Ω.

MULCH NOTE:



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

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

STABILIZED CONSTRUCTION ENTRANCE

to reduce costly repairs and minimize the risk to water quality from construction stormwater

BMPs, a discharge of visibly discolored stormwater from the construction site to surface waters

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 **L E-004** 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

SPILLWAY SANDBAGS OR **CONTINUOUS BERM OF USE SANDBAGS OR OTHER EQUIVALENT HEIGHT APPROVED METHODS TO CHANNELIZE RUNOFF TO SUPPLY WATER TO WASH BASIN AS REQUIRED** WHEELS IF NECESSARY 2"-3" (50-75mm) COURSE AGGREGATE MIN. 8" (150mm) THICK **DIVERSION RIDGE PLAN VIEW**

ROADWAY

AS NOTED

April 24, 2020

1 1/29/21 REVISED PAVING LIMITS

PAVEMENT MARKINGS

#|Date| Revision

AS NOTED

MULCH NOTE:

HYDROSEEDING WILL BE CLEAN

STRAW, FREE FROM WEEDS. HAY

MULCH WILL NOT BE ALLOWED TO

SPECIES SUCH AS WILD PARSNIP.

AVOID THE SPREAD OF NON-NATIVE

15cm TO 45cm

(0.5 TO 1.5 ft.)

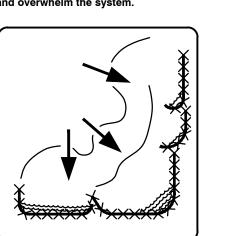
DIFFERENCE

MULCH FOR PURPOSES OTHER THAN

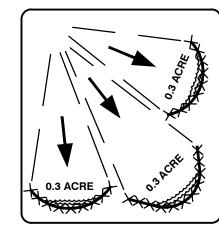
April 24, 2020

#Date Revision 1 1/29/21 REVISED PAVING LIMITS C PAVEMENT MARKINGS

Incorrect - Do Not layout "perimeter control" silt fences along property lines. All sediment laden runoff will concentrate and overwhelm the system.



Ĺ E-010

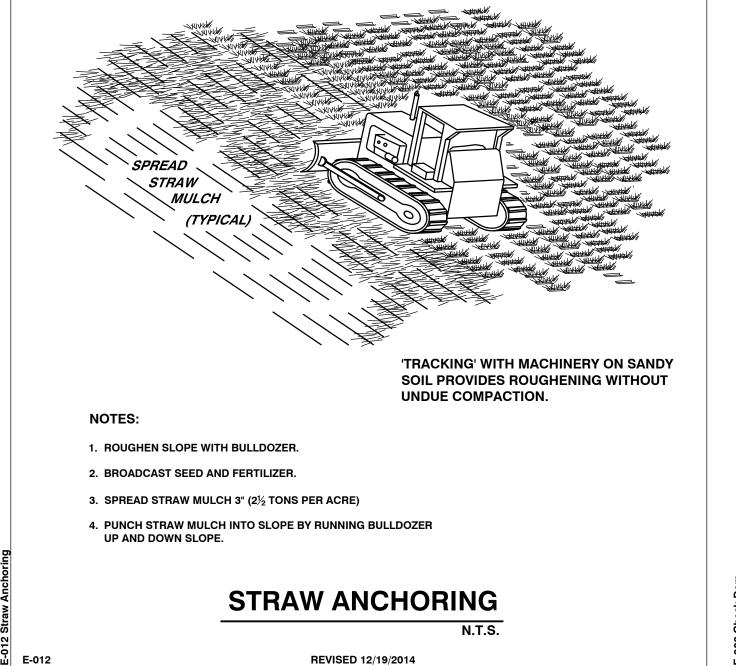


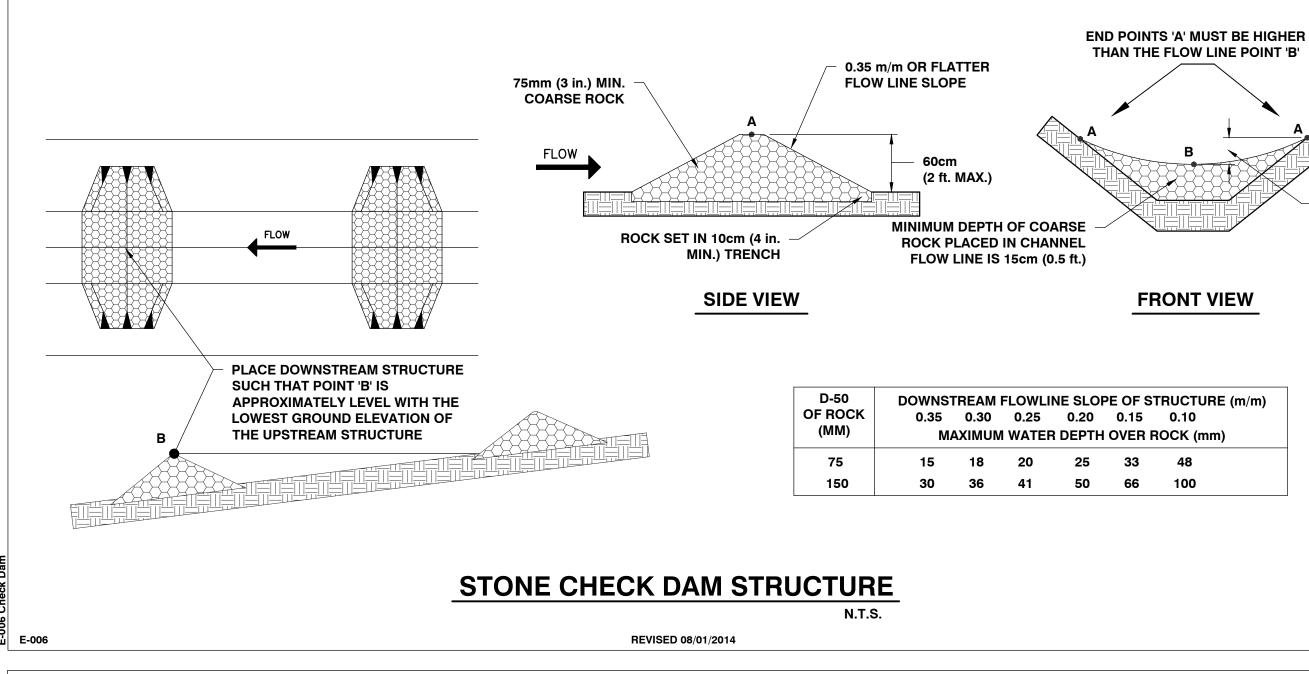
Correct - Install J-hooks

installed with J-hooks or `smiles' will be much more effective.

SILT FENCE PLACEMENT FOR PERIMETER CONTROL

REVISED 12/19/2014





PART 2 - PRODUCTS

<u>Kind of Seed</u>

Birdsfoot Trefoil

Annual Ryegrass

Tall Fescue

2.3 FERTILIZER

2.4 MULCHES

PART 3 - EXECUTION

by planting operations.

the immediate future.

amounts should be applied:

2. Nitrogen (N): 50 lbs./acre.

3. Phosphate: 100 lbs./acre. 4. Potash: 100 lbs./acre.

and hydromulching overspray.

3.1 PREPARATION

A. Conservation Seed Mix:

Creeping Red Fescue

2.2 INORGANIC SOIL AMENDMENTS

Purity 98%

98%

95%

A. Lime: ASTM C 602, agricultural limestone containing a

1. Class: T, with a minimum of 99 percent passing

passing through No. 60 sieve.

phosphorus, and potassium.

straw of wheat, rye, oats, or barley.

through No. 8 sieve and a minimum of 75 percent

A. Commercial Fertilizer: Commercial—grade complete fertilizer

urea formaldehyde, phosphorous, and potassium.

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

A. Mulch: Provide air-dry, clean, mildew- and seed-free,

B. Compost Mulch: Well-composted, stable, and weed-free

substances toxic to plantings; and as follows:

to 55 percent by weight; 100 percent passing through

1. Organic Matter Content: 50 to 60 percent of dry

A. Protect structures, utilities, sidewalks, pavements, and other

facilities, trees, shrubs, and plantings from damage caused

1. Protect adjacent and adjoining areas from hydroseeding

2. Protect grade stakes set by others until directed to

displacement of soils and discharge of soil—bearing water

C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 2 inches in

1. Apply fertilizer directly to subgrade before loosening.

b. Mix lime with dry soil before mixing fertilizer.

D. Finish Grading: Grade planting areas to a smooth, uniform

surface plane with loose, uniformly fine texture. Grade to

within plus or minus 1 inch of finish elevation. Roll and

grades. Limit finish grading to areas that can be planted in

thoroughly and allow surface to dry before planting. Do not

a. This is the equivalent of 500 lbs./acre of 10-20-20

rake, remove ridges, and fill depressions to meet finish

E. Moisten prepared areas before planting if soil is dry. Water

F. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

A. When a soil test is not available, the following minimum

a. Delay mixing fertilizer with planting soil if planting will

any dimension and sticks, roots, rubbish, and other

not proceed within a few days.

runoff or airborne dust to adjacent properties and walkways.

B. Provide erosion—control measures to prevent erosion or

organic matter, pH range of 5.5 to 8; moisture content 35

1-inch sieve; soluble salt content of 2 to 5 decisiemens/m;

not exceeding 0.5 percent inert contaminants and free of

of neutral character, consisting of fast— and slow—release

nitrogen, 50 percent derived from natural organic sources of

minimum of 85 percent calcium carbonate equivalent and as

<u>Germination</u>

85%

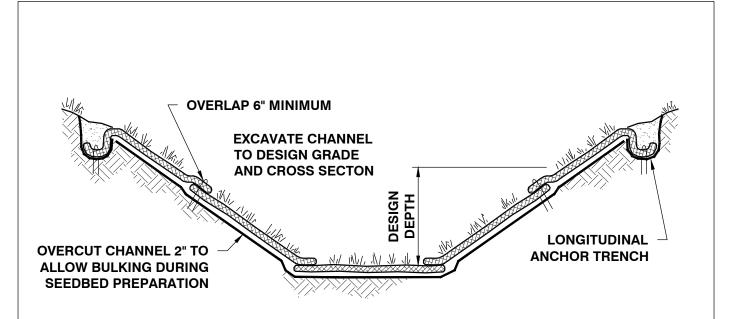
95%

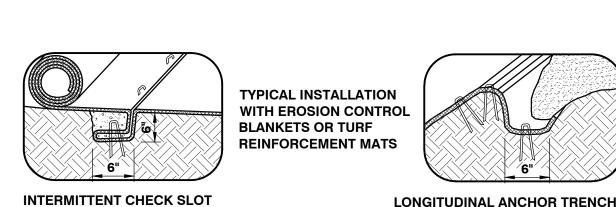
85%

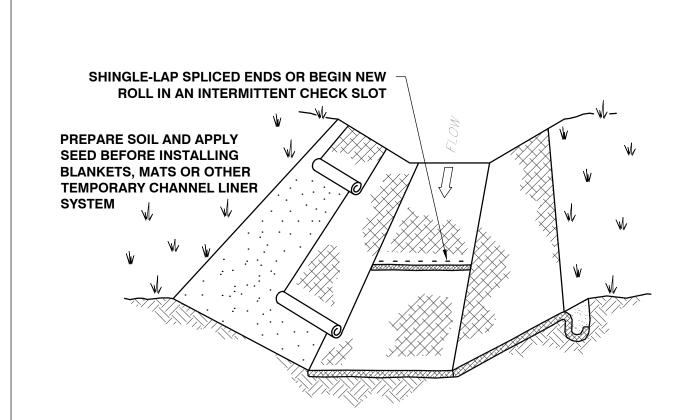
85%

TOTAL =

2.1 SEED



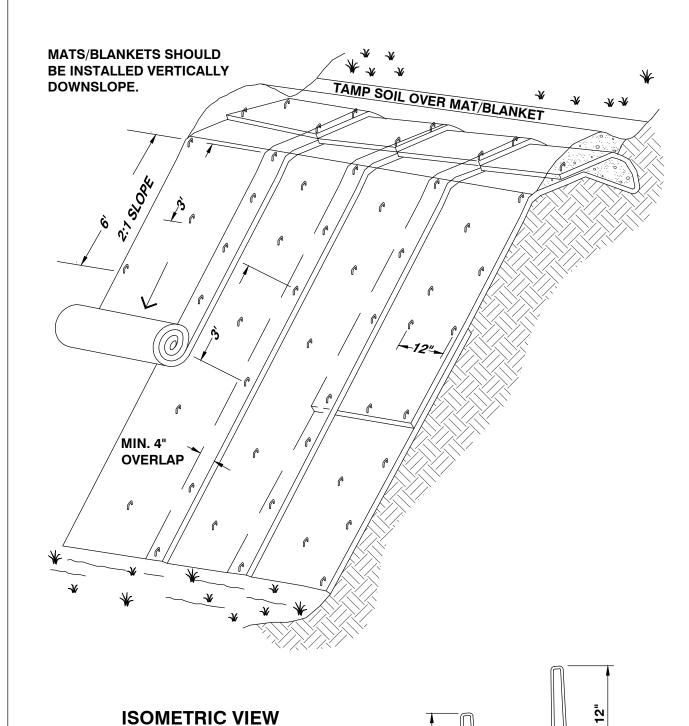




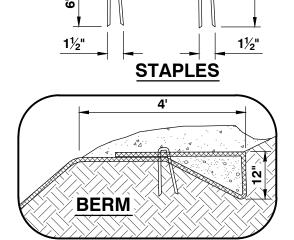
1. DESIGN VELOCITIES EXCEEDING 2 FT./SEC/ REQUIRE TEMPORARY BLANKETS, MATS OR

2. GRASS-LINED CHANNELS WITH DESIGN VELOCITIES EXCEEDING 6 FT./SEC. SHOULD

GRASS-LINED CHANNEL TYPICAL INSTALLATION



TYPICAL SLOPE **SOIL STABILIZATION**



NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL

2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.

3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION BLANKETS & TURF REINFORCEMENT MATS **SLOPE INSTALLATION**

1.1 Section Includes: A. Seeding.

2. Except where otherwise shown or specified, the shown on the drawings and all areas where existing

operations.

1.3 PROJECT CONDITIONS

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

PART 1 - GENERAL

LANDSCAPE GRADING

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, and 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 $1 \frac{1}{4}$ 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 replaced by the Contractor with acceptable material.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

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

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

3.03 PLACING TOPSOIL

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

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

C. Topsoil shall be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The depth stated in the contract to which the topsoil is to be placed is that required after final rolling of the material has taken place. All stones, roots and debris over 1½ 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.

<u>SEEDING</u>

PART 1 - GENERAL

1. Furnish all labor, materials and equipment to complete all seeding work as shown on the drawings and specified

Contractor shall seed all areas where new contours are ground cover has been disturbed by the Contractor's

3. Hydroseeding is the preferred method of seeding.

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

3.3 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

to outside edge of planting saucer.

water with fine spray.

manufacturer's written instructions. D. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding

A. Hydroseeding: Mix specified seed fertilizer, and fiber mulch application. Continue mixing until uniformly blended into

2. Apply slurry uniformly to all areas to be seeded in a one—step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre

weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch installation the same as those used in the original

than the specified seed—sowing rate.

required to prevent displacement. 2. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established,

before end of planting season, or if seeding is not fully established, continue maintenance during next planting season.

by Engineer/Owner:

1. Satisfactory Seeded Area: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish area that do not areas are satisfactory.

3.7 CLEANUP AND PROTECTION

A. Promptly remove soil and debris, created by work. Clean wheels of vehicles before leaving site to avoid tracking soil

required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

C. Remove nondegradable erosion—control measures after grass

1. Do not use wet seed or seed that is moldy or otherwise

2. Do not seed against existing trees. Limit extent of seed

B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and

C. Protect seeded areas with slopes exceeding 1:3 with erosion—control blankets installed and stapled according to

operations. Soak areas, scatter mulch uniformly to a depth of 3/16 inch, and roll surface smooth.

3.4 HYDROSEEDING

in water, using equipment specifically designed for hydroseed homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended

dry weight, and seed component is deposited at not less

3.5 MAINTENANCE

A. Maintain and establish seeding by watering, fertilizing, to produce a uniformly smooth lawn. Provide materials and

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as

but for not less than the following periods: a. Seeded Areas: 90 days from date of Substantial

b. When initial maintenance period has not elapsed

3.6 SATISFACTORY CONDITIONS

A. Installations shall meet the following criteria as determined

comply with requirements and continue maintenance until

onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as

establishment period.

SIMILAR LINERS TO PROTECT SEED AND SOIL UNTIL VEGETATION BECOMES ESTABLISHED.

INCLUDE TURF REINFORCEMENT MATS.

REVISED 12/19/2014

E-009

REVISED 08/01/2014

3.2 APPLICATION RATES

fertilizer or 1,000 lbs./acre of 5-10-10. 5. Straw mulch: 2 tons/acre.

1. Agricultural limestone: 2 tons/acre.

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.
- Locate and protect control points before starting work on the site.
- Preserve permanent reference points during progress of the Work.
- Establish a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
- 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

- All excavation (unless covered in other sections of these specifications), removal and stockpile of topsoil, stabilization fabric, and other miscellaneous and
- 2. Site filling.

A. Section includes:

3. Roadway structural sections.

appurtenant works.

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:

	Percent by Weight
<u>Sieve Designation</u>	<u>Passing Square Mesh Sieve</u>
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:

	Percent by Weight
Sieve Designation	<u>Passing Square Mesh Sieve</u>
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:

Percent by Weight

<u>eve Designation</u>	Passing Square Mesh Sieve
3"	100
3/4"	75 — 100
No. 4	20 - 100
No. 100	0 - 20
No. 200	0 - 6

2.04 DRAINAGE COURSE (AOT SPEC. 704.16)

A. 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:

	Percent by Weight
<u>Sieve Designation</u>	Passing Square Mesh Siev
1"	100
3/4"	90 - 100
3/8"	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:

<u>Sieve Designation</u>	<u>Percent Finer by Weight</u>
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

- 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:

	Percent by Weight
Sieve Designation	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
<i>1</i> ₂ "	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:
- Survivability: Class 3; AASHTO M 288.
 Grab Tensile Strength: 120 lbf; ASTM D 4632.
- Grab Tensile Strength: 120 lbf; ASTM D 4632.
 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;
- 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.
- 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
- 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

ASTM D 4355.

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

discontinue affected work in area until notified to resume

- from draining into excavation.

 D. Notify engineer of unexpected subsurface conditions and
- E. Correct areas over—excavated by error as directed by the

3.05 DITCHES

Engineer.

- 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
- 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:

	maximum)	to	attain	the	required	densities	as	follows:	
1 4:-	-							Proctor	
<u>Locatio</u>	<u>n</u>					<u>AS</u>	<u> </u>	<u>D-1557</u>	

Location ASTM D-1557

Subarade and Gravel for 95%

General Embankments 90%

PART 1 — GENERAL

Roads and Parking Lots

1.01 SUMMARY

A. Section includes:

UTILITY TRENCHING AND BACKFILLING

- 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
- 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

PART 2 - PRODUCTS

jurisdiction.

2.01 SOIL MATERIALS

A. Fill and backfill materials:

- 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
- 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.
- B. Protection of persons and property:

instructions.

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

2. Operate warning lights during hours from dusk to dawn

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.

OLIN P. LINDBE ...I.A.
FLYNN AVENUE, SUITE 2B

COLINGES, INC. 208 FLYNN BURLINGTO 802-864-495

ENGINEERING ASSOCIASTELD VIEW LANE, SOUTH BURLING

SPECIFICATIONS

ALLEY SCHOOL DISTRICT
NE ROAD, SHELBURNE, VT 05482

OTTE CENTRAL SCHOOL
TE IMPROVEMENTS

RG ROAD, CHARLOTTE, VT 05445

CHAMPLAIN
5420 SHELE
ject: CHAF

Date
April 24, 2020

Date Revision
1 1/29/21 REVISED PAVING LIMITS
PAVEMENT MARKINGS

AS NOTED

C4.0

- 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:
- 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.
- 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.
- 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

40 Degrees or below

50 Degrees or below

Pavement
Compacted Depth

1 1/4" or Greater
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
- 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

to rolling equipment.

- 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
- 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.

<u>DRAINAGE</u>

PART 1 — GENERAL

1.01 SUMMARY

- A. Section includes:
- 1. Culvert pipe and appurtenances.
- 2. Stone fill.
- 3. Drainage Structures
- A Vermont

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 1 The longest dimension of the stone shall vary from 1 inch to 12 inches, and at least 50 percent of the volume of the stone in place shall have a dimension of 4 inches.
- 2. Type II The longest dimension of the stone shall vary from 2 inches to 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches.

- 3. Type III The longest dimension of the stone shall vary from 3 inches to 48 inches and at least 50 percent of the volume of the stone in place shall have a least dimension of 16 inches.
- 4. Type IV The longest dimension of the stone shall vary from 3 inches to 60 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 20 inches.

PART 3 - EXECUTION

3.01 INSPECTION

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

3.02 GENERAL

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

3.03 PREPARATION

- A. Hand trim excavation (where necessary) to required elevations. Correct over—excavations with fill material.
- B. The slopes shall be graded to match the grade as shown on the plans. Where required, end sections shall be placed and backfilled to prevent undermining.
- C. Remove large stones or other hard matter which could damage drainage structures or impede consistent backfilling or compaction.
- 3.04 INSTALLATION OF PIPE
- A. All pipe and fittings shall be carefully examined for defects and no pipe or fittings shall be laid which are known to be defective. If any defective piece is discovered after laying, it shall be removed and replaced at the Contractor's expense. All pipes and fittings shall be cleaned before they are laid and shall be kept clean until accepted in the completed work.
- B. The pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.
- C. Unless otherwise permitted by the Engineer, the Contractor shall provide for the temporary diversion of water to permit the installation of the pipe in a reasonably dry trench.
- D. Where the pipe is to be laid below the existing ground line, a trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe and compaction of the bedding and backfill material under and around the pipe.
- E. The completed trench bottom shall be firm for its full length and width.
- F. If indicated on the plans or directed by the Engineer, unsuitable foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with Granular Backfill, or other specified or approved material.
- G. The Contractor shall take all necessary precautions to prevent floatation of the pipe in the trench.
- H. When pipe laying is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe is

3.05 MANHOLES

eliminated.

- A. Precast concrete structures:
- 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.

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