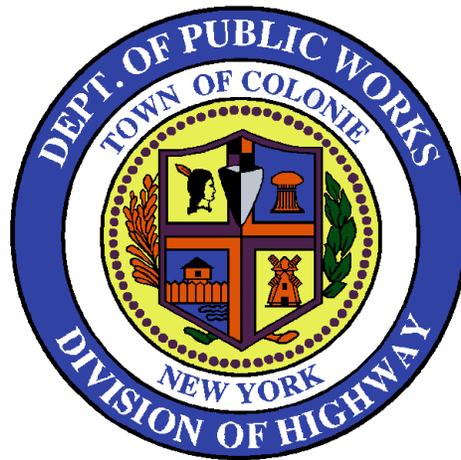


Department of Public Works Town of Colonie

Highway and Drainage Standards

Adopted 1982
Revised April 2023



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Abbreviations and Definitions

Note: Each professional standard or document listed in these standards is meant to represent the latest edition of the stated document unless a specific edition or revision is listed.

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
Blue Book	New York State Standard Specifications for Erosion and Sediment Control (2016)
CaCl₂	Calcium Chloride
CMP	Corrugated metal pipe
CO	Certificate of Occupancy
Code	Code of the Town of Colonie
DPW	Department of Public Works
Engineering	Bureau of Engineering
HCAP	Helical corrugated aluminum pipe
HDPE	High-Density Polyethylene
Highway or HWY	Division of Highway
Highway Law	Code of the Town of Colonie, Chapter 162 Streets and Sidewalks
ID	Inside diameter
MUTCD	Manual of Uniform Traffic Control Devices
No.	Number
NYSDOT	New York State Department of Transportation
NYSDOT SS	New York State Department of Transportation Standard Specifications
OCS	Outlet control structure
psi	Pounds per square inch
PVC	Polyvinyl chloride
RCP	Reinforced concrete pipe
ROW	Right-of-way
s.u.	standard unit
SDR	Standard dimension ratio
SMP	Stormwater management practice
Town	The Town of Colonie
White Book	New York State Stormwater Management Design Manual (2015)

End of Section

Section 1 - Storm Drain Pipe

1-1 General

- A. This standard specifies the materials and installation requirements for stormwater drain pipe to be installed within the Town’s right-of-way (ROW) or future roads to be dedicated to the Town.

1-2 Materials

Storm Drain Pipe

- A. The Commissioner of Public Works and/or the Public Works Operations Supervisor reserve(s) the right to approve any pipe material other than the types specified herein, provided that the proposed pipe can be documented as an approved “or equal”.
- B. The minimum pipe diameter for any storm drain shall be 12 inches.
- C. The Town accepts the storm drain pipe materials and sizes based on their application as outlined in Table 1-1.

Table 1-1 Storm Drain Pipe Summary Table

Material	Schedule	Diameter	Can Be Daylighted	Can Be In/Below Groundwater
CMP	See Table 1-2	12" to >48"	Yes	No
PVC	SDR 26/35	12" to 24"	No	Yes
HDPE	Double Wall	12" to 60"	Yes	Yes
Concrete	-	12" to 48"	Yes	No

Corrugated Metal Pipe

- A. Corrugated metal pipe (CMP) suitable for use as highway stormwater pipe includes polymer-coated aluminized steel, coated corrugated aluminum pipe, and helical corrugated aluminum pipe (HCAP).
- B. Aluminized steel pipe shall conform to *New York State Department of Transportation Standard Specifications (NYSDOT SS) §707-02 Corrugated Steel Pipe (January 1, 2023)*.
- C. Polymer-coated corrugated aluminum pipe and HCAP shall conform to *NYSDOT SS §707-13 Corrugated Aluminum Pipe*.
- D. All CMP shall be of the gauge listed in Table 1-2, except as otherwise noted on the plans or as required by the Commissioner of Public Works and/or the Public Works Operations Supervisor.
- E. CMP with an inside diameter (ID) of 48 inches or greater shall be factory elongated or strutted on the vertical axis not less than five percent (5%) of the pipe diameter.

Table 1-2 CMP Standard Gauges by Diameter

Diameters (inches)	Gauge
4, 6	18
12, 15, 18	14
21, 24	12
30, 36, 42	10
48 and Larger	8

Polyvinyl Chloride Pipe

- A. All polyvinyl chloride (PVC) pipe shall be standard dimension ratio (SDR) 35 Storm Sewer Pipe, SDR 26/35 Sewer Pipe, or SDR 26 Class 160 Water Pressure Pipe (PVC SDR 26 Cl. 160).
- B. All PVC pipe shall conform to the requirements of the following standards:
 - a. *ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings*
 - b. *ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals*
 - c. *ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe*
 - d. *ASTM F679 - Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.*
- C. All PVC pipe shall have a bell-and-spigot type joint with a rubber gasket inserted in the bell to form a watertight joint.

High-Density Polyethylene Pipe

- A. All high-density polyethylene (HDPE) pipe shall conform to the following standards:
 - a. *AASHTO M 252 Standard Specification for Corrugated Polyethylene Drainage Pipe*
 - b. *AASHTO M 294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter*
 - c. *ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*
 - d. *ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials*
- B. All HDPE pipe shall be double-walled “*HP Storm Pipe*” by ADS or an approved or equal.

Reinforced Concrete Pipe

- A. Reinforced concrete pipe (RCP) shall conform to the following standards:
 - a. *NYS DOT SS §706-02 Reinforced Concrete Pipe Classes II, III, IV, V (January 1, 2023)*

- b. *NYS DOT SS §706-03 Reinforced Concrete Elliptical Pipe Classes HE-II, HE-III, HE-IV, VE-IV, VE-V, and VE-VI (January 1, 2023)*

Backfill

- A. Storm drain pipe shall be backfilled with native soil only when the soil can meet 95% compaction.
- B. All pipe zone and trench zone backfill shall have a moisture content suitable for proper compaction.
- C. Aluminum or aluminum-coated pipe must not contain backfill with Portland cement unless the pipe is thoroughly coated with a zinc chromate primer per *NYS DOT SS §708-04 Zinc Chromate Primer (January 1, 2023)*.
- D. Corrugated aluminum pipe backfill must pass a two-inch (2") sieve.

1-3 Installation

Storm Drain Pipe

- A. All pipe shall be installed true to line and grade, without deflection, and shall have a full, firm, and even bearing. Pipe which is found not to be in true line or grade after placement shall be removed and reinstalled at no expense to the Town.
- B. Pipe installation shall commence from the down-grade end and progress up-grade.
- C. The necessary facilities shall be provided for lowering the pipe into the trench. At no time shall any pipe be thrown or dropped from the truck or into the trench.
- D. All pipe shall be handled and installed as per the manufacturer instructions and in accordance with the *Highway and Drainage Standard Details*. Any deviation must be shown on the project plans or approved by the Commissioner of Public Works and/or the Public Works Operations Supervisor.
- E. The Commissioner of Public Works and/or the Public Works Operations Supervisor reserve(s) the right to require a watertight pipe joint when existing field conditions warrant.
- F. Vertical alignment shall provide for a minimum depth of cover from the finished ground elevation to the top of pipe equal to two-and-one-half (2-½) feet.
- G. When pipe sizes of different diameters enter a drainage structure at a straight-through-grade condition, the pipe crown elevations shall be the same elevation.
- H. When more than one pipe enters a drainage structure, at no time will an elevation difference between inverts exceed three (3) feet. Underdrain pipe (excluding perforated storm drain pipe) shall be excluded from this requirement.
- I. Prior to street dedication, all pipe shall be cleaned and free of all deposits of sand, dirt, concrete or other foreign matter.

Corrugated Metal Pipe

- A. Install aluminum pipe with longitudinal seams located at the sides.
- B. Install circumferential seams with laps in the downstream direction.

- C. All pipe installations requiring strutting (pipe with an ID greater than 48 inches) shall be blocked or otherwise held in the out-of-round position during installation until backfilled. The strutting and blocking shall be removed only with the approval of the Commissioner of Public Works and/or the Public Works Operations Supervisor.
- D. For corrugated steel pipe coating repair instructions, see *NYS DOT SS §707-02 Corrugated Steel Pipe, Material Requirements, E. Coating Repair (January 1, 2023)*.

PVC

- A. Joints shall be bell-and-spigot with bells laid upstream.
- B. Where the spigot end of an existing pipe doesn't fit the bell end of a new pipe, construct a concrete collar.
- C. If the clearance is too great for use of a gasket, install jute caulking into the joint space and fill with mortar or a poured caulking compound.

HDPE

- A. HDPE field joints shall be factory-installed which meet the watertight requirements of *ASTM D3212*.
- B. Joint misalignment must not exceed a one-quarter (1/4) inch offset or a separation greater than one-half (1/2) inch between adjoining sections of pipe.

Concrete Pipe

- A. For round concrete pipe, use flexible water-tight elastomeric gaskets.
- B. For elliptical pipe, use concrete pipe joint sealing compound meeting the requirements of *NYS DOT SS §705-16 Concrete Pipe Joint Sealing Compound (January 1, 2023)*. Install all sealants when the pipe is laid to line and grade.

Backfill

- A. The pipe zone backfill material shall be deposited evenly on both sides of the pipe in compacted lifts not to exceed six (6) inches in depth until at least three-fourths (3/4) the depth of the pipe has been reached. The remaining backfill shall be installed in lifts not to exceed 12 inches in depth.
- B. Compaction shall be performed on each side of the pipe for a distance equal to the pipe manufacturer recommendations.
- C. The backfill layer thickness shall not exceed the capability of the compaction equipment.

End of Section

Section 2 – Culverts and End Sections

2-1 General

- A. All culverts shall be designed to discharge a 10-year peak flow without static head entrance and a 100-year peak flow utilizing available head at the entrance. Available head is defined as the flood stage elevation which will not cause highway flooding or endangerment to life or personal property.
- B. Culvert design shall include provisions for slope stability for the roadway embankment section, as well as the selection of appropriate inlet and outlet end section structures.

2-2 Materials

Culverts

- A. The minimum culvert diameter is 12 inches.
- B. Culverts shall be CMP, RCP, or HDPE.
- C. All CMP culvert pipe must conform to **Section 1-2 Materials, Corrugated Metal Pipe**.
- D. All RCP culvert pipe must conform to **Section 1-2 Materials, Reinforced Concrete Pipe**.
- E. HDPE culvert pipe must be double-walled, “*HD Storm Pipe*” by ADS or an approved or equal.

End Sections

- A. Flared end sections shall be galvanized steel, aluminum, reinforced concrete, or HDPE.
- B. Steel flared end sections shall be in accordance with *NYS DOT SS §707-10 Galvanized Steel End Sections (January 1, 2023)*.
- C. Aluminum end sections shall be in accordance with *NYS DOT SS §707-11 Aluminum End Sections (January 1, 2023)*.
- D. Concrete end sections shall be in accordance with *NYS DOT SS §706-07 Reinforced Concrete Pipe End Sections (January 1, 2023)*.
- E. HDPE flared end sections shall conform to the following standards:
 - a. *ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable*
 - b. *ASTM F667/F667M - Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings*

Corrugated Metal (Aluminum and Steel)

- A. CMP flared end sections shall conform to the requirements of *AASHTO M 196*.
- B. CMP flared end sections shall be manufactured from steel alloy sheet consisting of Alclad 3004-H32 or 3004-H34.

2-3 Installation

Culverts

- A. For installation of culverts, see **Section 1-3 Installation, Storm Drain Pipe.**
- B. Field join corrugated aluminum pipe with band couplers of the same base alloy of the pipe.

End Sections

- A. End sections shall be backfilled in accordance with the *Highway and Drainage Standard Details.*
- B. End section assemblies shall be joined to the pipe with a standard coupling band.

End of Section

Section 3 - Underdrain

3-1 General

- A. When the groundwater elevation and/or soil characterization are such that subsurface highway drainage becomes necessary, a perforated underdrain pipe shall be installed at low points along the highway profile, at every other crossing, and at intersections. This underdrain pipe shall connect directly into any drainage structure at the edge of pavement.

3-2 Materials

Piping

- A. The acceptable pipe diameter for underdrain pipe shall be six (6) or eight (8) inches.
- B. All HDPE pipe shall conform to **Section 1-2 Materials, High-Density Polyethylene Pipe**.
- C. The acceptable pipe material for underdrain pipe shall be perforated corrugated HDPE without fabric sock. The pipe shall be “*Single Wall Perforated Pipe*” by ADS or an approved or equal.
- D. Underdrain with fabric sock (see special conditions in **Section 3-3 Installation, H**) shall be “*Single Wall Perforated Pipe*” by ADS or an approved or equal.
- E. The underdrain pipe can be daylighted and can be installed in or below groundwater.

Filter Media

- A. Underdrain filter media shall meet the requirements of *NYSDOT SS §733-20 Underdrain Filter Material (January 1, 2023)*, Type 1 or Type 2 and the soundness requirements of *NYSDOT SS §703-02, Coarse Aggregate, Table 703-2 (January 1, 2023)*.
- B. The Commissioner of Public works and/or the Public Works Operations Supervisor have the right to approve other filter media materials.

Geotextile Filter Fabric

- A. The geotextile underdrain fabric shall be “*WINFAB 450N*” by WINFAB or an approved or equal. The material and manufacturer of an approved or equal must be listed in the *NYSDOT Approved Materials, Equipment, Methods and Procedures (July 14, 2022)*.

3-3 Installation

Piping

- A. All pipe shall be installed true to line and grade and shall have a full, firm, and even bearing. Pipe which is found not to be in true line or grade after placement shall be removed and reinstalled at no expense to the Town.
- B. Pipe installation shall commence from the down-grade end and progress up-grade. The upgrade end of the underdrain pipe shall be closed with a solid plastic cap.
- C. For all pipe installation, the necessary facilities shall be provided for lowering the pipe into the trench. At no time shall any pipe be thrown or dropped from the truck or into the trench.

- D. All pipe shall be handled and installed as per the manufacturer's instructions. Any deviation must be shown on the Plans or approved by the Commissioner of Public Works or the Public Works Operations Supervisor.
- E. Prior to street dedication, all pipe shall be cleaned and free of all deposits of sand, dirt, concrete or other foreign matter.
- F. All underdrain pipe shall be designed and installed in accordance with the *Highway and Drainage Standards*.
- G. The underdrain pipe shall be installed with the perforations down.
- H. Where groundwater is flowing through stone bedding and filter fabric can't be installed to envelope the trench (see **Section 3-3 Installation, Filter Media**), the underdrain pipe shall have a sock. All other design for undertrain with sock shall be approved by the Commissioner of Public Works and/or the Public Works Operations Supervisor.

Filter Media

- A. Install filter media loosely around and over the pipe in six-inch (6") lifts. Installation of the filter media shall precede the placement of adjacent backfill material.
- B. Compact the filter media and adjacent backfill simultaneously with two passes of a vibratory or drum type compactor, carefully as not to contaminate the filter media with the adjacent backfill material.

Geotextile Filter Fabric

- A. Install geotextile underdrain fabric to envelope the filter media.
- B. The geotextile underdrain fabric shall overlap the filter media a minimum of 12 inches at the top of the trench.

End of Section

Section 4 - Sump Laterals and Collectors

4-1 General

- A. All proposed buildings shall have sump pump laterals that exit the building and discharge into a stormwater structure in the roadway. If connection cannot be made to a catch basin or storm sewer manhole in the roadway, the laterals are run to a junction box. The junction box must contain a sump pump collector pipe that discharges to a stormwater structure in the roadway.

4-2 Materials

Piping

- A. The minimum pipe diameter and material for sump laterals shall be four-inch PVC SDR 35 Sewer Pipe.
- B. The minimum pipe diameter and material for sump collector pipe shall be eight-inch PVC SDR 35 Sewer Pipe.

4-3 Installation

General

- A. The placement of the sump pump lateral, collector pipe and stormwater structure shall be in accordance with the *Highway and Drainage Standard Details*.

Sump Laterals

- A. All sump pump lateral, collector pipe, and stormwater structures shall be in accordance with the *Highway and Drainage Standard Details*.
- B. All sump pump laterals shall be extended to or beyond the limits of the utility easement or to the edge of the ROW.
- C. Sump laterals and collectors shall all flow by gravity. A one-half percent (0.5%) minimum slope is mandatory for all sump laterals and collector pipes. Elevation of invert out of house/sump pit must be higher than the catch basin top of frame elevation it discharges to.
- D. All sump pump laterals shall have an end cap or plug installed at the end of the lateral.
- E. Where gravity footing drains are proposed, the elevation out of a sump must be two (2) feet higher than the frame and grate in the street.
- F. Where sump pump laterals are daylighted (back yards only), they shall have a critter cap installed at the exposed end.
- G. Prior to backfilling the sump pump lateral, the end of the pipe shall be marked with a two-inch by four-inch (2" x 4") marker that extends a minimum of two (2) feet above the proposed finished grade. The top one (1) foot of the marker shall be painted orange to clearly identify the end of the lateral.
- H. Prior to backfilling the sump pump lateral must be inspected and approved by the Town of Colonie Stormwater Management Office.

Sump Collectors

- A. The collector pipe shall have a minimum slope of one-half percent (0.5%), a minimum cover of two and one-half (2-1/2) feet, and shall be connected into the storm sewer system at a catch basin or storm sewer manhole.

End of Section

Section 5 - Structures

5-1 General

- A. The four (4) acceptable types of precast concrete storm sewer drainage structures are: catch basins, storm sewer manholes, drywells, and junction boxes.
- B. All precast concrete drainage structures shall be in accordance with the *Highway and Drainage Standard Details* and these Standards.
- C. All drainage structures shall have a manufacturer's shop drawing that has been reviewed, stamped and approved by the design professional.
- D. The minimum inside diameter (ID) for precast round concrete sections shall be four (4) feet with a minimum wall thickness of five (5) inches.
- E. Precast riser sections of variable heights shall be installed over the bottom section as required and all lower sections shall be continued to the surface.
- F. All pipes entering or exiting the drainage structure shall be in accordance with the *Highway and Drainage Standard Details*.
- G. Pipes entering and exiting the drainage structure shall be installed by "Kor-N-Seal[®]" boot connection by Trelleborg, or an approved or equal, for pipes up to 48 inches in diameter. For pipes larger than 48 inches in diameter, bricks, block, and non-shrink hydraulic cement shall be used.

Catch Basins

- A. Catch basins shall be installed at all intersections such that no storm water run-off shall accumulate in or pass through the intersection.
- B. Placement shall be such that stormwater runoff in an open gutter flow shall not exceed 300 linear feet. A shorter distance than this maximum limit may be necessary due to site specific conditions as determined by the Commissioner of Public Works or the Public Works Operations Supervisor.
- C. The thinnest riser shall be on the bottom for grade adjustment. The minimum risers possible must be used. The minimum grade adjustment shall be four (4) inches, and the maximum eight (8) inches, not inclusive of the five-inch (5") flat lid.
- D. The maximum height of a catch basin shall be four (4) feet as measured from the finished top of frame and grate (rim) elevation to the invert out elevation. When a catch basin exceeds four (4) feet in height, or when any of the entering or exiting pipe diameters exceed 15 inches, the type of storm sewer drainage structure must be changed from a catch basin to a storm sewer manhole.
- E. All catch basins are required to have a minimum 12-inch sump.

Storm Sewer Manholes

- A. Storm sewer manhole ID shall be a function of the storm sewer pipes that enter and exit the specific manhole.
- B. All storm sewer manholes are required to have a minimum 12-inch sump.
- C. All storm sewer manholes shall have a standard monolithic base, unless otherwise approved by the Commissioner of Public Works or the Public Works Operations Supervisor.

Junction Boxes

- A. Junction boxes shall not be used unless approved by the Commissioner of Public Works or the Public Works Operations Supervisor.
- B. Junction box placement shall be at the property line corners to provide a point of connection for the sump pump discharge line of each building into the storm sewer system, as required.
- C. Junction boxes shall have a four-inch (4") SDR 35 PVC sump pump lateral and a minimum eight-inch (8") SDR 35 PVC collector pipe.
- D. Piping into the junction box shall penetrate the inside of the box by a maximum of two (2) inches from the inside wall.

Structure Steps

- A. Storm drainage structure steps are required when the structure depth from the top of frame (rim) elevation minus the invert out elevation exceeds four (4) feet. Steps must line up from the base to the top.

5-2 Materials

Concrete

- A. All reinforced concrete shall be 4,000 pounds-per-square-inch (psi) compressive strength concrete at 28 days with Portland cement, coarse and fine aggregate, steel reinforcement, and low water cement ratios consistent with workability.
- B. Reinforcement for all precast structures shall meet the following standards:
 - a. *ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, Grade 60*
 - b. *ASTM A1064/1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete, Grade 65*
- C. Fine and coarse aggregates shall meet the quality requirements for Concrete Aggregates *ASTM C33/C33M - Standard Specification for Concrete Aggregates*. Gradation requirements may be modified as required, subject to approval of the Commissioner of Public Works or Public Works Operations Supervisor.
- D. Entrained air shall be between five-and-one-half and nine-and-one-half (5.5 – 9.5%), except for drywells which shall have entrained hair between five and nine percent (5.0 – 9.0%).

E. All concrete shall be thoroughly mixed by a mechanical batch mixer.

Catch Basins

A. Catch basins shall be square precast concrete, two-and-one-half foot by two-and-one-half foot by three-and-one-half foot (2.5' x 2.5' x 3.5') ID solid-wall catch basins manufactured by The Fort Miller Co., Inc. or an approved or equal.

Storm Sewer Manholes

A. All storm sewer manhole materials and dimensions are to be in accordance with the *Highway and Drainage Standard Details*.

B. All precast concrete manhole sections, lids, and bases shall conform to *ASTM C478/C478M – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections*.

C. Storm sewer manholes shall be round precast concrete, in accordance with the four-foot (4'), five-foot (5'), six-foot (6'), six-and-one-half-foot (6'-6"), seven-foot (7'), and eight-foot-(8') ID manhole sections as manufactured by The Fort Miller Co., Inc. or an approved or equal.

Drywells

A. Drywells shall be 48 inches tall with an ID of 72 inches as manufactured by The Fort Miller Co., Inc. or an approved equal.

B. Drywells shall have tapered holes.

Junction Boxes

A. Junction boxes shall meet *ASTM C890 – Standard Practice for Minimum Structural Design Loading for Monolithic Sectional Precast Concrete Water and Wastewater Structures*.

B. Junction boxes shall be square precast concrete, two-and-one-half foot by two-and-one-half foot by two-and-one-half foot (2.5' x 2.5' x 2.5') ID catch basin as manufactured by The Fort Miller Co., Inc. or an approved or equal.

Steps

A. Storm structure step material shall be reinforced plastic over a steel core and comply with *NYS DOT SS §725-02 Steps for Manholes (January 1, 2023)*.

Granular Subbase

A. Standard subbase material for drainage structures shall be Type 2 Crusher Run or Type 3 Subbase Gravel in accordance with *NYS DOT SS §304 – Subbase Course (May 1, 2008)*.

B. An alternate subbase material may be chosen upon review and approval by the Commissioner of Public Works or Public Works Operations Supervisor.

Mortar

A. The mortar mixture used in field construction for a storm sewer drainage structure shall be one (1) part Type 1A Portland cement and two (2) parts Clean Masonry Sand in compliance with *NYS DOT SS §703-03 Mortar Sand (January 1, 2023)*. Mortar shall not be used after

initial setting of the cement has taken place. Mortar shall only be used to set frame and grate and risers. The Portland Cement shall be Type 1A air entrained cement as per the specifications *ASTM C150/C150M – Standard Specification for Portland Cement* and *AASHTO M 85 – Standard Specification for Portland Cement*, unless otherwise specified or shown on the plans.

- B. When a water condition exists that may cause any mortar not to set, then “*Preco Plug Cement*” by Sakrete, or an approved equal, shall be used instead of mortar, and where inverts are greater than 48 inches in diameter, or when *Kor-N-Seal*[®] is not possible.

5-3 Installation

Structures

- A. All drainage structures shall be installed in accordance with the *Highway and Drainage Standard Details*.
- B. Prior to street dedication, all storm sewer drainage structures shall be cleaned and free of all deposits of sand, dirt, concrete or other foreign matter.
- C. All joints between sections of storm sewer manholes shall be sealed using butyl rope.
- D. Over dig drywell holes by three (3) feet on all sides and fill to the top of the drywell with Type 3 Subbase Gravel.
- E. Install geotextile underdrain fabric (see **Section 3-2 Materials, Geotextile Filter Fabric**) to cover the drywell prior to filling the hole with topsoil or gravel.

Steps

- A. Steps shall be installed at 12-inches on-center.
- B. First step shall be installed a minimum of 12 inches below the storm water structure lid.
- C. Steps shall be installed within the structure with the centerline equidistant from pipe penetrations.

Granular Subbase

- A. The drainage structure subbase shall be installed in accordance with the *Highway and Drainage Standard Details*.
- B. Any material larger than four (4) inches in the maximum dimension shall be considered unacceptable and shall be removed from the subgrade. The subgrade shall be compacted prior to the placement of any subbase so that no significant rutting is observed.
- C. The subbase material shall have a moisture content suitable for compaction to 95 percent (95%) of the Standard Proctor Maximum Density. The layer thickness used during installation shall not exceed 12 inches.

Backfill

- A. No drainage structure shall be completely backfilled until such time as all mortar has completely set.

- B. Stone shall be spread evenly and leveled prior to structure installation.
- C. All backfill shall be brought up to the finished elevation of the subgrade.
- D. The backfill material shall have a moisture content suitable for compaction to 95 percent (95%) of the Standard Proctor Maximum Density. The layer thickness used during installation shall not exceed 12 inches.
- E. Gravel shall be compacted to a minimum 95 percent (95%) of the Standard Proctor Maximum Density. Compaction shall meet the requirements of *NYSDOT SS §203-3.12-Compaction (May 1, 2008)*.
- F. Compaction shall be required between lifts by means of a mechanical compactor.
- G. Compaction tests are to be performed every 300 feet of trench line, and at every other sanitary sewer manhole.

End of Section

Section 6 – Frames, Grates, Lids and Grade Adjustments

6-1 General

Grade Adjustments

- A. The grade adjustment for all drainage structures shall be in accordance with the *Highway and Drainage Standard Details*.
- B. All requirements used for precast concrete drainage structures are applicable for the grade adjustment rings or squares.
- C. Junction boxes shall not require grade adjustment.

Frames and Grates/Covers

- A. Frames and grates/covers shall be flush with the binder grade or as ordered by Engineer.
- B. Cascade grates shall be required when the street center line grades are in excess of five percent (5%).

6-2 Materials

Concrete

- A. Precast concrete components must meet the following standards:
 - a. *ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, Grade 60*
 - b. *ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete, Grade 65*
 - c. *ASTM C33/C33M - Standard Specification for Concrete Aggregates*
- B. All reinforced concrete shall be 4,000 psi compressive strength concrete at 28 days with Portland cement, coarse and fine aggregate, steel reinforcement, and low water-cement ratios consistent with workability.
- C. All concrete shall be thoroughly mixed by a mechanical batch mixer.

Grade Adjustments

- A. Grade adjustment for all drainage structures shall be made with precast reinforced concrete grade adjustment rings or squares with an opening to match the proposed frame and grate/cover.

Lids

- A. For a storm sewer drainage structure, flat lids or cone section shall be the last unit section installed prior to the grade adjustment installation.
- B. Precast round concrete lids shall be reinforced concrete with a minimum thickness of eight (8) inches.

- C. Precast square concrete lids shall be reinforced concrete with a minimum thickness of five (5) inches.
- D. Precast lids are to be installed on both catch basins and storm manholes. The precast risers shall be stacked on the precast lid, starting with the smallest and ending with the largest.
- E. All lid types shall be designed to withstand all superimposed earth loads in addition to the maximum AASHTO H20 truck loadings (maximum wheel load of 16,000 pounds).
- F. All lids shall be cast with an opening of the shape and size required to match the frame and grate/cover specified by the plans, Commissioner of Public Works or Public Works Operations Supervisor.
- G. Flat slab tops for drywells shall be five (5) inches when installed in grass, or eight (8) inches thick when installed in roadway.
- H. Covers installed on drywells shall be solid, precast concrete and H20 rated.
- I. Junction box cover shall be Campbell 1009 without vent holes or equal, labeled "TOWN OF COLONIE STORM SEWER", flush with finished grade.

Frames and Grates/Covers

- A. Drainage structure frames and grates/covers shall be cast iron, conforming in all respects to those specified in the *Highway and Drainage Standard Details*.
- B. Standard round frames and grates for catch basins and storm water manholes within paved areas of the streets shall be Neenah R-2556-A Grate Type F or an approved or equal.
- C. Cascade frames and grates, used for slopes exceeding five percent (5%), shall be Neenah R-3588-LL4 or an approved or equal.
- D. Standard round frames and covers within paved areas of the streets shall be Campbell 1009, without vent holes and clearly marked "TOWN OF COLONIE STORM SEWER" or an approved or equal.

6-3 Installation

Grade Adjustments

- A. The grade adjustment for all drainage structures shall be in accordance with the *Highway and Drainage Standard Details*.
- B. When variable thicknesses of precast grade adjustment rings or squares are required, the rings or squares shall be installed such that the thinnest ring or square is installed on the precast concrete lid or cone section and the remaining rings or squares are installed such that they increase in thickness until the thickest ring or square is installed below the frame.

Frames and Grates/Covers

- A. All frames and grates or covers shall be installed in accordance with the *Highway and Drainage Standard Details*.

- B. When installing a Neenah R-2556-A frame and grate (or an approved or equal), the installation shall be such that the middle of the grate shall be in alignment with the gutter line formed at the intersection point of the outer edge of the carriage way and the toe of the wing wedge curb.

End of Section

Section 7 – Roadways

7-1 General

- A. A highway work permit must be obtained from the Town of Colonie Highway Department prior to any work proceeding in an existing Town right-of-way (ROW).
- B. Prior to the placement of each course of material specified herein, the Commissioner of Public Works or the Public Works Operations Supervisor shall inspect and approve the roadway construction.
- C. Should density tests be performed on any material, the results shall indicate that not less than 95 percent (95%) of the Standard Proctor Maximum Density is attained for any portion of the material.
- D. The highway materials specified herein shall be graded and installed to the finished elevations and widths in accordance with the approved project drawings and the *Highway and Drainage Standard Details*.
- E. If requested by the Commissioner of Public Works or Public Works Operations Supervisor, the Contractor shall provide a cop of the plant(s) NYSDOT Plant Certification within seven (7) calendar days.
- F. Any damage to an existing street occurring during the course of development of lands adjacent to the street shall be the responsibility of the applicant obtaining the highway permit for the work that was the cause of such damage and shall be repaired to the satisfaction of the Commissioner of Public Works or the Public Works Operations Supervisor prior to the refunding of the highway permit fee or issuance of written approval for a certificate of occupancy. If such damage occurs during the winter months, the developer shall post a cash escrow to cover the cost of said repair. The escrow agreement shall specify a date by when such repairs shall be completed. If the repairs are not completed by the date specified, the Commissioner of Public Works shall have the authority to use the escrow moneys to complete the repairs.
- G. It shall be the responsibility of the Contractor to supply and install all materials in accordance with the requirements of this section. The Commissioner of Public Works and/or the Public Works Operations Supervisor reserves the right to conduct any testing to verify that the material and/or installation is within the requirements of this section. If the installation or materials are not in compliance, the Contractor shall, at his own expense, correct the unacceptable material and/or installation. The Contractor shall also reimburse the Town for all costs associated with the testing of the materials and/or installations that are not in accordance with the requirements of this section.
- H. Private utilities (electric, gas, communications) shall be installed within the ROW, two-and-one-half (2-1/2) feet inside of the boundary.
- I. All streets shall be in accordance with the *Code of the Town of Colonie (Code), Chapter 162, Streets and Sidewalks*, hereafter known as the *Highway Law*.
- J. A description of the various street classifications is presented *Highway Law §162.11, Classification of streets*.

- K. Type I streets shall have a minimum paved surface of 30 feet measured from the back-of-curb to back-of-curb.
- L. Type II streets shall have a minimum paved surface of 32 feet measured from the back-of-curb to back-of-curb.
- M. The minimum ROW for Type I streets shall be 50 feet.
- N. The minimum ROW for Type II streets shall be 60 feet with an additional six-foot (6') permanent utility easement along each side.
- O. Cul-de-sacs for Type I and II streets shall have a 120-foot ROW as shown in the *Highway and Drainage Standard Details*.
- P. ROW for all streets shall be measured perpendicular to the lot lines on tangents and on the radial line on curves.
- Q. All streets shall conform to the *Highway and Drainage Standard Details*.
- R. Street grades shall be between three-quarters percent (3/4%) and six percent (6%).
- S. All utilities for lots shall be laid out as shown in the *Highway and Drainage Standard Details*.

7-2 Materials

Subgrade

- A. The highway subgrade shall be defined as the surface of soil that the highway subbase material shall be placed upon.
- B. Any material particles larger than six inches in the maximum dimension shall be considered unacceptable and shall be removed from the subgrade.

Subbase

- A. All subbase materials shall be furnished, installed and compacted in accordance with the *NYS DOT SS §304 Subbase Course (May 1, 2008)*.
- B. Subbase shall be *NYS DOT Item 304.12 – Subbase Course, Type 2 (May 1, 2008)*.
- C. Material furnished for Type 2 Subbase shall consist solely of approved Blast Furnace Slag or Stone which is the product of crushing ledge rock. This material is commonly referred to as crusher run.
- D. For cold weather placement of subbase, the air temperature, ground temperature, and material temperature must be above 32 degrees Fahrenheit. For winter earthwork, the Contractor shall submit details of how standard subbase material will be placed, and what modified methods will be used, to adjust for weather influence on compaction operations.
- E. All materials shall be well graded from course to fine and free of organic or any other deleterious materials.
- F. Subbase gradation shall meet *NYS DOT SS Table 304-1 Percent Passing by Weight, Type 2*.

Geotextile

- A. The geotextile undercut fabric to be used for highway subgrade stabilization shall be “WINFAB 200W” nylon woven by WINFAB or an approved or equal. The material and manufacture of an approved or equal must be listed in the *NYS DOT Approved Materials, Equipment, Methods and Procedures (July 14, 2022)*.

Base Course

- A. Bituminous plant-mixed hot asphalt concrete shall be used to construct a base pavement course in conformance with the *NYS DOT SS, §403 - Hot Mix Asphalt (HMA) Pavements for Municipalities (May 1, 2008)*.
- B. Base course shall be *NYS DOT SS, Item 403.118902 – Asphalt Concrete, Type 1 Base Course (May 1, 2008)*.
- C. Base course shall meet the composition requirements in *NYS DOT SS Table 403-1, Composition of Hot Mix Asphalt Mixtures, Base Type 1*.
- D. Crushed glass **shall not** be allowed to be used as an admixture for the base course of asphalt pavement.
- E. For additional specifications refer to *NYS DOT SS §403-2 Materials (May 1, 2008)*.

Binder Course

- A. Binder course shall be *NYS DOT SS, Item 403.138902 - Hot Mix Asphalt, Type 3 Binder Course (May 1, 2008)*.
- B. Binder course composition is as follows in *NYS DOT SS Table 403-1, Composition of Hot Mix Asphalt Mixtures, Binder Type 3*.

Top Course

- A. Bituminous plant-mixed hot asphalt concrete shall be used to construct a top pavement course in conformance with the *NYS DOT SS, §403- Hot Mix Asphalt (HMA) Pavements for Municipalities (May 1, 2008)*.
- B. Top Course shall be *NYS DOT SS, Item 403.178902 - Hot Mix Asphalt, Type 6 F2 Top Course, or Item 403.198902 – Hot Mix Asphalt Type 7 Top Course (May 1, 2008)*.
- C. Top course composition is as follows in *NYS DOT SS Table 403-1, Composition of Hot Mix Asphalt Mixtures*.
- D. For additional specifications refer to *NYS DOT SS, §403- Hot Mix Asphalt (HMA) Pavements for Municipalities, §403-2 Materials (May 1, 2008)*.

Tack Coat

- A. Asphalt emulsion shall be used between layers of hot mix asphalt to create a bond between the different materials.

- B. Tack coat shall be tested in accordance with *AASHTO T 59 – Standard Method of Test for Emulsified Agents*.
- C. Tack Coat shall comply with *NYSDOT SS Table 702-10, Tack Coat (May 1, 2008)*.
- D. Tack coat shall be *NYSDOT SS Item 407.0101 – Tack Coat (May 1, 2008)*.

7-3 Installation

Subgrade

- A. Prior to placement of any granular subbase material, the subgrade material shall be compacted. It is the responsibility of the contractor to properly compact all subgrade materials in the road section.
- B. If construction equipment or other vehicle traffic must travel on the subgrade, the subgrade shall be graded such that it will be two (2) inches higher than the proposed final grade of the subgrade. Prior to the placement of any subbase material, this additional two (2) inches of material shall be removed.
- C. Prior to the placement of any subbase material, the subgrade shall be graded and compacted to the allowable tolerance of one-half (1/2) inch of the proposed finished lines and grades.

Subbase

- A. The Contractor shall coordinate the installation of all conduits required by any utility company at the depths and locations required by the utility company prior to the placement of any gravel subbase material.
- B. The types and thickness of crusher run material to be installed between the finished top of subgrade and the bottom of the asphalt concrete pavement shall be a minimum of 18 inches.
- C. When the existing subgrade soil conditions consist of stone fragments, gravel, sand, fine sand, silty or clayey gravel, and sandy or silty soils, the total subbase thickness shall be at least 18 inches of Type 2 Subbase material, installed in two lifts.
- D. When the existing subgrade soil conditions consist of clayey soils, a geotextile undercut fabric must first be installed on the finished subgrade or as ordered by the Commissioner of Public Works or Public Works Operations Supervisor.
- E. All Subbase material shall be installed to the proposed finished lines and grades in a manner which minimizes segregation.
- F. Subbase shall be mechanically compacted. It is the responsibility of the contractor to properly install and compact all subbase materials in the road section. The Commissioner of Public Works or the Public Works Operations Supervisor shall conclude from a visual observation that proper compaction has been attained when significant rutting under the action of the compactor is not observed on the final passes on a lift.
- G. Perform a proctor test to confirm proper mechanical compaction of the subbase at every other sewer manhole.

- H. Prior to the placement of any asphalt, graded concrete pavement the subbase material shall be installed, graded and compacted to the allowable tolerance of one-half (1/2) inch of the proposed finished lines and grades.

Base Course (Type II Streets)

- A. The asphalt concrete base course of pavement for Type II streets shall be installed in one lift and compacted such that the final compacted thickness of pavement is not less than three (3) inches.
- B. Prior to any asphalt concrete base course of pavement placement, the subbase surface average temperature taken at three separate locations at least 25 feet apart shall be at least 40 degrees Fahrenheit.
- C. No asphalt concrete base course of pavement shall be installed on frozen or wet subbase material.
- D. For additional specifications refer to *NYS DOT SS, Section 401- Plant Production, §401-3 Construction Details (May 1, 2008)*.
- E. Upon acceptance of the asphalt concrete base course of pavement, placement of the asphalt binder course of pavement shall commence.

Binder Course

- A. For Type I streets, the asphalt concrete binder course of pavement shall be installed in one (1) lift and compacted such that the final compacted thickness of pavement is not less than three (3) inches.
- B. For Type II streets, the asphalt concrete binder course of pavement shall be installed in one (1) lift and compacted such that the final compacted thickness of pavement is not less than two (2) inches.
- C. The back of the final compacted integral wing wedge shall be the elevation of the finished road centerline.
- D. No asphalt concrete binder course of pavement shall be installed on frozen or wet base material.
- E. All manhole frames and covers, catch basin frames and grates, water valve boxes, gas valve boxes, etc. shall be raised to the proposed finished grade of the asphalt concrete binder course of pavement.
- F. Determinations for final acceptance of the pavement structure shall be made from core samples taken upon the completion of the binder course. Core samples shall be taken along the street at its beginning and end points, and at intervals of not greater than 500 feet or one-third (1/3) the length of the street, whichever distance is less. Additional samples may be required by the Town. The cost associated for obtaining the core samples and report shall be borne by the Owner/Developer.
- G. Core sample holes shall be filled with compacted hot, plant-mixed asphalt concrete of the same specification as the binder course material.

- H. The total thickness of each individual core shall be no less than three (3) inches for Type I streets and no less than five (5) inches for Type II streets.

Top Course

- A. The asphalt concrete base course of pavement shall be swept and cleaned with a self-propelled street sweeper.
- B. All joints, settlements, and cracks shall be cleaned, filled, and compacted with wearing surface material.
- C. The asphalt concrete top course of pavement for all streets shall be installed in one lift and compacted such that the final compacted thickness of pavement is not less than one-and-one-half (1-1/2) inches.
- D. No asphalt concrete top course of pavement shall be installed on frozen or wet surfaces.
- E. Prior to any asphalt concrete top course of pavement placement, the asphalt concrete base course of pavement surface average temperature taken at three (3) separate locations at least 25 feet apart shall be at least 50 degrees Fahrenheit.
- F. For additional specifications refer to *NYS DOT SS, Section 401- Plant Production, §401-3 Construction Details (May 1, 2008)*.

Tack Coat

- A. Tack coat shall be applied using a distributor capable of applying it uniformly in thickness and pressure on variable widths up to 15 feet.
- B. Distributor shall be calibrated within the last 12 months in accordance with *ASTM D2995 - Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors*.
- C. The asphalt emulsion shall be homogeneous and stored in the distributor tank to be heated and maintained between 85- and 160-degrees Fahrenheit. It must be agitated or circulated prior to application.
- D. Apply tack coat only on prepared, clean, dry pavement when the surface temperature is above 40 degrees Fahrenheit. See *NYS DOT SS Table 407-1, Tack Coat Application Rates (May 1, 2008)*.

Equipment: Asphalt Concrete Bituminous Pavers

- A. The outside (pavement edge) of the screed or strike-off assembly shall be modified to extrude the asphalt pavement to the shape detailed by the *Highway and Drainage Standard Details*, forming an integral wing wedge with each pavement course.
- B. A minimum of one-ton static-wheeled roller shall be used to obtain satisfactory compaction of the integral wing wedge. Hand rollers and plate tampers will be considered sufficient in compaction when used in conjunction with a one-ton roller. They are not considered sufficient for finish top paving.

- C. The screed shall be capable of installing a two-foot-wide wing wedge curb a minimum of six (6) inches tall.

Compaction

- A. Compaction shall be performed in accordance with *NYS DOT SS Table 402-5, Number of Passes (May 1, 2008)*.
- B. Hand rollers and plate tampers cannot be the primary source of compaction method – not considered sufficient equipment for compaction of entire wing wedge – but may be used for finish work.

End of Section

Section 8 – Right-of-Way Monumentation

8-1 General

- A. Monumentation to be installed prior to building commencement on the lot. The presence of the monumentation must be confirmed prior to road dedication and certificate of occupancy (CO).

8-2 Materials

- A. Granite minimum dimensions shall be four inches by four inches by four feet (4" x 4" x 4'), with a cross cut at the top of the monument and a one-half (1/2) inch diameter hole drilled one-half (1/2) inch deep at the point of crossing.
- B. Precast concrete minimum dimensions shall be four inches by four inches by four feet (4" x 4" x 4'), with a flush one-quarter-inch (1/4") diameter galvanized, zinc plated or copper pin at the top center of the monument.

8-3 Installation

- A. The Town highway right-of-way (ROW) shall be cleared and graded in accordance with the *Highway and Drainage Standard Details*.
- B. All trees and stumps within the limits of the ROW shall be removed.
- C. All ROW monuments shall be installed at the locations shown on the approved project drawings and in accordance with the *Highway and Drainage Standard Details*.
- D. All ROW monuments shall be installed such that they will be three inches (3") above the finished ground elevation.
- E. Completion of the ROW monumentation installation shall be certified by a land surveyor licensed to practice in the State of New York.

End of Section

Section 9 – Open Channels

9-1 General

- A. All open channels shall be designed to carry a 10-year peak flow. Site conditions should be such that a 100-year peak flow will not present serious endangerment to life or personal property.
- B. Based on the velocity at peak flow conditions, an appropriate lining of the channel bed and side slopes shall be employed to eliminate erosion.
- C. When channels discharge into an existing stream appropriate measures shall be taken to minimize stream bed erosion at the point of discharge.
- D. Measures shall also be taken to minimize soil erosion prior to any construction as described in **Section 11 - Erosion and Sediment Control**.
- E. All open channels that are intended to be operated and maintained by the Town shall require a utility easement or deed to the Town. The easement or deed shall be required to incorporate a minimum 30-foot-wide utility easement at the top of the channel, measured from the channel centerline, the entire length of the channel, in order that maintenance of the channel can be performed. The Commissioner of Public Works shall determine whether an easement or deed shall be required for the open channel.

9-2 Materials

(Not used)

9-3 Installation

(Not used)

End of Section

Section 10 – Traffic Control

10-1 General

(Not used)

10-2 Materials

(Not used)

10-3 Installation

- A. The Contractor shall notify the following entities of the tentative work plans and schedule a minimum of 48 hours prior to the commencement of any work in the area:
 - a. All involved public and private utilities
 - b. Town of Colonie Public Safety Communication Center at 518-783-2811
 - c. North Colonie School District, Transportation Director at 518-785-8696
 - d. South Colonie School District, Transportation Director at 518-869-8527
 - e. Transportation director of any other school district which the proposed work is within
 - f. All property owners or tenants of private property who may be affected by the work
- B. The Contractor shall provide and maintain traffic signals, signage, flagmen, barricades, barriers, lights, flares, equipment, service and personnel and all other traffic control devices as required to regulate and protect all traffic and warn of hazards. All such material, equipment and labor shall conform to the requirements of the Town and be in accordance with the *New York State Supplement to the Manual of Uniform Traffic Control Devices for Streets and Highways (NYS MUTCD) (March 16, 2011)*. The Contractor shall remove all temporary equipment and facilities when they are no longer required and restore the ground to the original conditions or to that specified.
- C. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under the control of the Contractor, or affected by the operations of the Contractor.
- D. Provide traffic control and directional signs, mounted on barricades or standard posts at the following locations for the purposes of lane closures and detours:
 - a. Each change of direction of a roadway
 - b. Each cross road
 - c. Detours and hazardous areas
 - d. Parking areas
- E. Provide qualified and suitably equipped flagman when construction operations encroach on traffic lanes, as required for regulation of traffic and in accordance with the requirements of the Town and the *NYS MUTCD*.
- F. Provide flares and/or lights during periods of low visibility to clearly delineate traffic lanes, guide traffic, to warn of hazardous areas, and provide illumination of critical traffic and parking areas. Flares or lights are to be used by flagmen in directing traffic during these periods.

- G. Contractor-related vehicular parking within the limits of the work shall not interfere with the public traffic or parking, access by emergency vehicles, operations of the Town or other construction operations. Provide temporary parking facilities for the public as may be required because of construction or operations.
- H. Monitor parking of all construction and private vehicles. Contractor shall make all arrangements for and provide parking areas for private vehicles of the workmen to ensure compliance with applicable laws, regulations, codes and/or ordinances.
- I. Maintain free vehicle access to and through parking areas.
- J. Prohibit parking on or adjacent to access roads, or in non-designated areas.
- K. Confine construction traffic to designated haul routes which are **not** to be newly paved roads.
- L. Provide traffic control at critical areas of haul routes to expedite traffic flow and minimize interference.
- M. Where the Town requires traffic control plans, such plans shall be prepared by the Contractor and submitted to the Town for approval prior to the commencement of any construction work.
- N. Corridors for the routing of construction traffic shall be predetermined to minimize land disturbance. Construction traffic shall not cross ditches or streams except at appropriate and specified crossings.
- O. Construction traffic routes and staging areas shall be wetted with water or have non-corrosive calcium chloride (CaCl₂) applied to control dust generation from the site. Use of calcium chloride shall comply with *NYS DOT SS §712-02 Calcium Chloride (January 1, 2023)*.

End of Section

Section 11 – Erosion and Sediment Control

11-1 General

- A. The Soil Erosion and Sediment Control Measures set forth in the following paragraphs and the *New York State Standard Specifications for Erosion and Sediment Control (Blue Book) (2016)*, or latest revision, shall be incorporated into the final plans and employed prior to and during any construction in order to minimize the degree of soil erosion and sedimentation caused by construction activity. The *Blue Book* sections and appendices are available at the following link: [New York State Standard Specifications for Erosion and Sediment Control](#).
- B. The Developer or its Contractor shall be responsible for the implementation, construction and maintenance of all soil erosion and sediment control measures in accordance with all applicable federal, state and local laws, rules and regulations.
- C. Damage to surface waters resulting from erosion and sedimentation shall be minimized by stabilizing disturbed areas and by removing sediment from construction site discharges.
- D. Insofar as practicable, existing vegetation shall be preserved.
- E. Site preparation activities shall be planned to minimize the area and duration of soil disruption.
- F. Permanent traffic corridors shall be established and “routes of convenience” shall be avoided.
- G. Construction traffic shall not cross streams or ditches except at suitable crossing facilities, and shall not operate unnecessarily within the waterways or drainage ditches.

Storm Sewer Drainage Structure

- A. All storm sewer drainage structures having an open grate shall be required to have inlet protection in conformance with the *Blue Book*.

Stone Check Dams or Aggregate Sediment Filters

- A. Stone check dams or aggregate sediment filter shall be constructed at least every 200 feet along the course of each drainage ditch and at its downstream terminus. Dams shall be installed such that the elevation of the crest of the downstream dam is at the same elevation of the toe of the upstream dam.
- B. Ditches less than 200 feet in total length shall have a stone sediment filter constructed at the downstream termini.
- C. Additional stone check dams or aggregate sediment filters shall be constructed as deemed necessary by the Commissioner of Public Works or Public Works Operations Supervisor.

Temporary Dewatering Sediment Basins

- A. Whenever the discharge from dewatering operations cannot be directed over stable areas, i.e. paved or well vegetated areas, temporary shallow ditches shall be cut to convey the flow to temporary sediment basins.

- B. Such temporary sediment basins shall be shallow excavated basins and be of suitable size to permit the settling of solids.
- C. The outlets of all such temporary basins shall be stabilized with graded aggregate in sizes ranging up to one-and-one-half inch (1-1/2") diameter.

Headwalls and Riprap

- A. Headwalls shall be designed and installed such that their location will be as far from the edge of the roadway as is necessary to provide a safe and stable slope. A suitable access area for maintenance shall be provided within the ROW or easement.
- B. The soils downstream of all headwalls shall be stabilized with riprap.
- C. Rip rap shall be installed at a minimum depth thickness of 18 inches and grouted in place.
- D. Prior to the installation of riprap, a geotextile undercut fabric shall be installed upon the subgrade, in an anchoring trench one-foot deep and one-foot wide, with the length equal to the width of the riprap apron at that point. The anchoring trench shall be backfilled with pea gravel.

11-2 Materials

- A. Geotextile underdrain fabric shall be "*WINFAB 200W*" by WINFAB or an approved or equal. The material and manufacture of an approved or equal, must be listed in the *NYS DOT Engineering Division Approved Materials, Equipment, Methods and Procedures (July 14, 2022)*.
- B. Aggregate used for aggregate sediment filter construction shall consist of well-graded stone up to one-and-one-half inches (1-1/2") in diameter.
- C. Outlet stabilization aggregate for temporary dewatering sediment basins shall be graded, ranging up to one-and-one-half inch (1-1/2") diameter stone.
- D. All riprap will fall within the weight range of 20 to 35 pounds with 75 percent (75%) of the riprap in the 25- to 35-pound weight range. Riprap shall be grouted in place.
- E. Pea gravel shall be U.S. Standard Sieve Mesh No. 6.
- F. Mulch shall be wood fiber hydromulch or another sprayable product approved for erosion control (nylon web or mesh) applied according to the manufacturers' specification.
- G. Mulching blanket for steep slopes and drainage swales: "*Curlex Enforcer*" by American Excelsior Company, "*GEOWEB Slope Protection System*" by Presto Geosystems, or an approved or equal. For all slopes exceeding three-on-one (3:1), slope protection shall be "*GEOWEB Slope Protection System*" by Presto Geosystems. The material and manufacture of an approved or equal must be listed in the *NYS DOT Engineering Division Approved Materials, Equipment, Methods and Procedures (July 14, 2022)*.
- H. Topsoil shall be fertile, friable, natural loam free of subsoil, clay lumps, brush, stones or other deleterious materials larger than two inches in the greatest dimension, conforming to the requirements of the *Blue Book* and meeting the gradation requirements in Table 11-1.

Topsoil shall have a pH range of 5.5 to 7.5 standard units (s.u.) and an organic content of two (2) to 20 percent (20%).

Table 11-1 – Topsoil Gradation

Sieve	Percent Passing
1-1/2 inch	100
1 inch	85-100
1/4 inch	65-100
No.200	20-100

- I. Seed shall be by weight as shown in Table 11-2 unless a specific mixture is indicated on the plans and approved by the Town. Total pure live seed shall be 80 pounds per acre and weed seed content shall not exceed one-quarter percent (0.25%).

Table 11-2 – Seed Mixture

Name	Variety	Weight of Pure Live Seed	Percent Generation
Creeping Red Fescue (<i>Festuca Rubra</i>)	Commercial	20	85
Perennial Ryegrass (<i>Lolium Perenne</i>)	Norley	20	85
Tall Fescue (<i>Fesyuca Elatior</i> Var.)	Kentucky 31	30	85
Blue Grass	Merion	10	80

11-3 Installation

Storm Sewer Drainage Structure

- A. The developer or his representative shall be responsible for maintaining all inlet protection until such time as the roadways are dedicated to the Town or in the opinion of the Commissioner of Public Works or the Public Works Operations Supervisor that sufficient vegetation has been established.
- B. Immediately following completion of any and all of the proposed storm sewer drainage structures outside of the proposed roadway, storm sewer drainage structures and inlet protection shall be installed in accordance with the *Blue Book*. The structure shall function to prevent any sediment entrance into the storm sewer drainage structure. They shall be maintained in good condition until final vegetation cover is well established.

Aggregate Sediment Filters and Silt Fence

- A. Until such time as final site stabilization is completed with permanent drainage ditches, all drainage flows will receive treatment with aggregate sediment filters so as to effectively trap sediment and minimize its release off-site in accordance with the *Blue Book*.
- B. Aggregate sediment filters shall be placed in a ditch prior to disturbance of the area which that ditch drains.
- C. The aggregate sediment filter shall be placed so as to fully span the ditch cross section such that all flow shall pass through rather than around or over the filters.
- D. Downstream of the aggregate sediment filter, exposed soil over which dewatering discharge occurs shall be protected with hay mulch anchored by stapled jute or plastic netting.
- E. The developer or his representative shall be responsible for maintaining the proper function of the aggregate sediment filters throughout the construction period and until such time as final stabilization of the upstream areas contributing flow is achieved.
- F. The developer or the Public Works Operations Supervisor shall be responsible for removing aggregate sediment filters after, in the opinion of the Commissioner of Public Works or the Public Works Operations Supervisor, stabilization of upstream contributory areas is achieved.
- G. Silt fence, or approved equal form of erosion and sediment control, shall be constructed around all stockpiles of fill, topsoil or excavated overburden that are to remain exposed for longer than 14 days.
- H. Silt fence shall be anchored and maintained in good condition until such time as said stockpiles are removed and stockpiling areas are brought to final grade and permanently stabilized.

Temporary Dewatering Sediment Basins

- A. Stabilize outlets of basins with graded aggregate.
- B. The aggregate shall be placed in and across the outlets and maintained so as to span the entire cross section of flow, and be of sufficient thickness and width such that all flow passes through it, rather than around or over it.
- C. The anchored netting shall extend to the point where flow will occur over permanently stabilized areas (vegetated or paved).
- D. The developer or his representative shall be responsible for constructing and maintaining the temporary ditches and sediment traps such that they function effectively for the life of the dewatering operations.

Headwalls and Riprap

- A. Install riprap a minimum depth thickness of 18 inches.

- B. Install geotextile undercut fabric upon the subgrade prior to the installation of riprap. The fabric shall be installed in accordance with the manufacturer's recommended methods for installation.
- C. The fabric shall be installed in an anchoring trench one-foot deep and one-foot wide with the length equal to the width of the riprap apron at that point.
- D. Backfill the anchoring trench with pea gravel.
- E. The fabric shall be installed to extend the length and width of the area to have riprap installed.

Stockpiled Material

- A. Topsoil and fill that is to remain stockpiled on-site for periods greater than 14 days shall be stabilized and seeded. Prior to the seeding operation, the stockpiled material shall be graded as needed and feasible to permit the use of conventional equipment for seedbed preparation seeding, mulch application and mulch anchoring.
- B. Following grading, fertilizer (5-5-5) shall be applied at the rate of two pounds of nitrogen per 1,000 square feet or equivalent and pulverized dolomitic lime ("lime") at the rate of 20 pounds per 1,000 square feet. Fertilizer and "lime" shall then be worked into the soil as nearly as practical to a depth of four inches with a disc, spring tooth harrow or other suitable equipment.
- C. Annual rye grass seed shall then be uniformly spread at a rate of seventh-tenths (0.7) pounds per 1,000 square feet. If seeding takes place in late fall or early winter, apply Certified "Aroostook" winter rye at a rate of two-and-one-half (2.5) pounds per 1,000 square feet. Optimum seeding dates for this type seed are during the period of March 15 to May 1, or August 15 to November 1.
- D. Seed application shall be performed by hand, cyclone, and drill or cultipack seeder or by an appropriate hydro seeding method.
- E. If stabilization by seeding cannot occur during the recommended seeding periods above, topsoil, fill and excavated materials shall be stabilized with anchored mulch, or an approved or equal until such time as effective seeding may occur.
- F. Mulch shall be spread in accordance with the *Blue Book Table 4.2 (2016)*.
- G. Liquid mulch binder shall consist of asphalt emulsion or cutback asphalt, applied at 0.075 gallon per square yard, heavier at the edges and at the crests of banks. The remainder of the stockpile shall receive uniform treatment.
- H. Application of liquid mulch binder shall be heavier at the edges and at the crests of banks. The remainder of the stockpile shall receive a uniform treatment.
- I. In no case shall erodible material be stockpiled within 25 feet of any ditch, stream or other surface water body.

Permanent Vegetative Cover

- A. Immediately following the completion of construction activities in any portion of the site, permanent vegetation shall be established on all exposed soils. Such areas shall include, but not be limited to lawn areas and exposed soil overlying sub-surface pipes.
- B. Apply liquid mulch binder to equipment staging areas, abandoned roadways, and any areas adjacent to these which have also been disturbed by construction activities.
- C. Stabilization with permanent vegetation cover shall be performed only between April 1 to October 15, or as weather permits.
- D. In the event that stabilization is necessary at a time outside these periods, the disturbed area shall be temporarily stabilized with anchored mulch or an approved or equal until such time as effective seeding may occur.
- E. Areas to be stabilized with permanent vegetation shall be prepared by applying topsoil to a uniform depth of four (4) inches.
- F. The Contractor may amend natural topsoil with approved materials and by approved methods to meet the above specifications.
- G. Immediately prior to topsoil application, the surface shall be scarified to provide a good bond with the topsoil.
- H. When topsoil is deemed unnecessary, seedbed preparation shall be employed. Apply lime in accordance with the *Blue Book page 4.29 (2016)*.
- I. The seed mixture shall be applied in accordance with *Blue Book Table 4.5 (2016)*.
- J. Mulch shall be applied to all newly seeded areas immediately following seeding.
- K. Provide and install a mulch adequate to protect the seeding during its growing period. It shall be the responsibility of the Contractor to determine the appropriate mulching techniques for the particular site conditions and acquire approval of the same from the Commissioner of Public Works or the Public Works Operations Supervisor.

End of Section

Section 12 – Stormwater Facilities

12-1 General

- A. Stormwater detention is defined as a means by which runoff from a site is temporarily stored and gradually released at a predetermined rate. Detention is facilitated through the use of outlet control devices on storage ponds, parking lots, or building roofs.
- B. Stormwater retention is defined as a means by which runoff is permanently stored on-site until it evaporates or is absorbed into the groundwater table. Retention is facilitated through the use of dry wells and ponds or reservoirs with no outlet other than an emergency overflow.
- C. Use of these facilities, also known as post-construction stormwater management practices (SMP's), may be necessary to satisfy stormwater management criteria as described in the *New York State Stormwater Management Design Manual (White Book) (2015)*.
- D. All facilities that are intended to be operated and maintained by the Town shall be on an independent parcel and deeded to the Town.

Design

- A. All stormwater facilities shall be in accordance with the *White Book (2015), Chapters 5 and 6*.
- B. The maximum management practice facility side slopes, both inside and outside, shall be four-on-one (4:1).
- C. Integral to the design shall be measures to ensure minimal maintenance of such facilities.
- D. All stormwater facilities shall have a minimum six-foot-high (6') black vinyl clad chain link fence installed around its perimeter, at a location to be determined by the Commissioner of Public Works or the Public Works Operations Supervisor. Chain link fence shall be designed and installed in accordance with the *Highway and Drainage Standard Details*.
- E. A four-foot (4') wide, lockable man gate is required for all locations where outlet pipes are located within the practice.
- F. Stormwater parcels to be deeded to the Town shall have a minimum of 80 feet of frontage along a Town road, or frontage equivalent to the average frontage of lots within the subdivision that contain houses.
- G. In the event that the 80 feet of frontage cannot be met as specified above, all facilities that are intended to be operated and maintained by the Town shall have a minimum 12-foot-wide access drive deeded to the Town if frontage is not available from a Town roadway. The access drive shall extend to the outlet piping system cleanout point of the practice. The access drive shall be present within 12 linear feet of any outlet control structure (OCS) within the practice. If the distance between the 20-foot wide double swing gate and the end of the access drive exceeds 20 linear feet, a collapsible two-way bollard must be installed to prevent vehicle off-street parking. The access drive in its entirety shall be built to meet the requirements of the *Highway and Drainage Standard Details*.

- H. Measures shall also be taken to minimize soil erosion over the long term, as well as during the construction of these facilities. Refer to **Section 11 – Erosion and Sediment Control**.
- I. Riprap shall be installed at the inlet point of the stormwater management practice. To minimize stream bed erosion at the point of discharge for a practice, a plunge pool and/or larger grouted riprap shall be installed.

Stormwater Retention Facilities

- A. A drywell shall be installed at the lowest point of the retention basin as part of the stormwater management system that implements the usage of a retention system.
- B. Install an inlet control structure to contain all sediment from accumulating in the retention basin.
- C. The pond drainage system must interconnect to allow both the forebay and micro-pool to drain at the same time using one pump and/or valve system. A key for the drain valve (to be exposed outside of the open grate of the outlet structure) shall be provided on-site. The key must be a between three (3) and five (5) feet from the top of frame. If the valve for the drain system is not located within an OCS, the maximum allowable depth from frame to the top of the valve nut shall not exceed six (6) feet.
- D. For practices unable to achieve gravity drainage, the Town must be supplied with a pump and an intake and discharge hose. The pump and hose must be capable of dewatering the largest pond in the subdivision within 24-hours.

12-2 Materials

General

- A. All pipe sizing shall be in accordance with these Standards and the *Standard Format for Stormwater Management Plans and Reports*.
- B. All berms or perimeter walls of the stormwater management practices shall be constructed such that either the core, berm section, or walls are an impervious material that shall not allow the migration of any detained stormwater. The remainder of the berm or walls shall be constructed of compacted soil materials.
- C. All chain link fence and components shall be black vinyl clad.
- D. All drywells shall be eight-foot (8') outside diameter (OD) as manufactured by The Fort Miller Co. Inc., or an approved or equal.
- E. Pond drain gate valves shall all be in accordance with the Latham Water District gate valve standards.
- F. Concrete for spillways shall be 4,000 psi compressive strength concrete and shall be in accordance with *ASTM C150/C150M - Standard Specification for Portland Cement* and *AASHTO M 85 – Standard Specification for Portland Cement*.
- G. Riprap shall fall within the weight range of 20 to 35 pounds, with 75 percent (75%) of the riprap in the 25-to-35-pound weight range.

- H. Geotextile undercut fabric shall be “*WINFAB 200W*” nylon woven by WINFAB or an approved or equal. The material and manufacturer of an approved or equal must be listed in the *NYS DOT Engineering Division Approved Materials, Equipment, Methods and Procedures (July 14, 2022)*.
- I. Pea gravel shall be sized U.S. Standard Sieve Mesh No. 6.
- J. The core of berms shall be constructed of a material (i.e. clay, or other non-permeable material) and in such a manner that shall prevent the seepage of any stormwater through the berms.

12-3 Installation

General

- A. Prior to the installation of riprap, a geotextile undercut fabric shall be installed upon the subgrade. The fabric shall be installed in accordance with the manufacturer’s recommended methods of installation. The fabric shall be installed in an anchoring trench one-foot deep and one-foot wide with the length equal to the width of the riprap apron at that point. The anchoring trench shall then be backfilled with pea gravel.
- B. Riprap shall be installed at a minimum depth thickness of 18 inches. Riprap shall be grouted in-place at emergency spillways and control weirs.

Stormwater Management Practices

- A. The stormwater management practice shall be constructed in accordance with the approved project drawings or as directed by the Commissioner of Public Works or the Public Works Operations Supervisor.

Stormwater Retention Facilities

- A. The retention basin shall be constructed in accordance with the approved project drawings or as directed by the Commissioner of Public Works or the Public Works Operations Supervisor.

End of Section