

TOWN OF GORHAM, ONTARIO COUNTY, NEW YORK

DESIGN AND CONSTRUCTION STANDARDS FOR LAND DEVELOPMENT

TABLE OF CONTENTS (continued)

	<u>PAGE</u>
SECTION 3. CONSTRUCTION STANDARDS (continued)	
3.2. Site Preparation.	3-5
3.2.1. General	3-5
3.2.2. Clearing and Grubbing	3-5
3.2.3. Layout of Work	3-5
3.2.4. Topsoil Removal and Stockpiling	3-5
3.2.5. Erosion and Siltation Control	3-5
3.2.6. Temporary Access	3-6
3.3. Grading, Excavation and Related Work.	3-7
3.3.1. Grading	3-7
3.3.2. Trench Excavation	3-7
3.3.3. Trench Width Limits	3-7
3.3.4. Separation of Backfill Material	3-8
3.3.5. Dewatering	3-8
3.3.6. Maintenance of Banks	3-8
3.3.7. Pipe Bedding	3-8
3.3.8. Cradle Materials	3-9
3.3.9. Special Requirements at Structures	3-9
3.3.10. Special Requirements for Building Sewers	3-9
3.3.11. Special Requirements for Appurtenant Activities	3-10
3.4. Backfill and Embankments.	3-12
3.4.1. General	3-12
3.4.2. Materials	3-12
3.4.3. Embankments and Fills	3-13
3.4.4. Trench Backfill	3-13
3.4.5. Compaction	3-14
3.4.6. Density Tests	3-15
3.4.7. Site Maintenance and Cleanup	3-15
3.5. Water Distribution System.	3-16
3.5.1. Materials for Water Mains and Services	3-16
3.5.2. Installation of Water Mains and Appurtenances	3-19
3.5.3. Installation of Services	3-22
3.5.4. Preparation for Use	3-23

TOWN OF GORHAM, ONTARIO COUNTY, NEW YORK
DESIGN AND CONSTRUCTION STANDARDS FOR LAND DEVELOPMENT

TABLE OF CONTENTS (continued)

	<u>PAGE</u>
SECTION 3. CONSTRUCTION STANDARDS (continued)	
3.6. Sanitary Sewer System.	3-25
3.6.1. Materials	3-25
3.6.2. Installation of Main Sewers, Building Sewers and Force Mains	3-29
3.6.3. Installation of Manholes and Pumping Stations	3-31
3.6.4. Preparation of Sewer System for Use	3-33
3.7. Storm Drainage System.	3-37
3.7.1. Materials for Storm Drainage System	3-37
3.7.2. Installation of Storm Sewers	3-40
3.7.3. Installation of Manholes	3-41
3.7.4. Installation of Inlets	3-41
3.7.5. Preparation for Use	3-41
3.8. Roadways and Streets.	3-42
3.8.1. Materials	3-42
3.8.2. Preparation of Subgrade	3-44
3.8.3. Foundation Course	3-44
3.8.4. Underdrain Construction	3-44
3.8.5. Pavement Construction	3-45
3.8.6. Concrete Gutters	3-46
3.8.7. Concrete Sidewalks	3-47
3.8.8. Street and Traffic Signs	3-49
3.8.9. Monuments	3-49
3.8.10. Property Corner Markers	3-49
3.8.11. Town Road Crossings	3-49

SECTION 4. STANDARD DETAILS

See Standard Detail Index	SD-1
---------------------------	------

SECTION 5. ACCESS MANAGEMENT

SECTION 3. CONSTRUCTION STANDARDS

SECTION 3. CONSTRUCTION STANDARDS

3.1. GENERAL

3.1.1. PRELIMINARY MATTERS.

Site preparation, grading and construction of facilities shall not be started until the Final Subdivision Plan has been approved by the Planning Board and all necessary signatures have been affixed on the drawings, and until the Surety has been received by the Town. Items to be completed before the Notice to Proceed will be issued are listed on the Checklist for Notice to Proceed included in Section 3.1.12. on page 3-4.

3.1.2. PRE-CONSTRUCTION MEETING.

A pre-construction meeting shall be held prior to the start of construction to review Town requirements and to establish the project schedule. The Developer, his Engineer and Contractor shall attend this meeting to discuss the project with Town representatives.

3.1.3. INSPECTION.

All construction shall be subject to inspection by representatives of the Town. The Developer and his Contractor shall give not less than 24 hours notice for inspection and shall provide adequate access for such inspection at all stages of the work.

All costs related to engineering and inspection by representatives of the Town shall be paid by the Developer. An amount estimated by the Town for engineering and inspection shall be included in the Surety.

3.1.4. RESPONSIBILITY FOR CONSTRUCTION.

The Developer is solely responsible for construction of all dedicated facilities in accordance with the approved plans, and all applicable regulations and Town standards.

Inspection during construction shall not imply acceptance of the work by the Town. If subsequent inspections, operation or occurrences reveal defects in the work, such defects shall be corrected by the Developer to the satisfaction of the Town.

The development shall not be accepted for dedication until all construction of dedicated facilities is fully completed by the Developer and found to be satisfactory by the Town.

3.1.5. PROTECTION OF EXISTING UTILITIES AND STRUCTURES.

It is the Developer's and his Contractor's responsibility to locate and protect all existing utilities and structures before, during, and after excavation. Protect all utilities, services and systems, including public and private poles, conduits, wells, water piping, storm drainage piping and culverts, existing sewage disposal systems and farm tiles, including related structures, in a manner acceptable to the representative of the Town and the owner of each utility, service or system.

Any damage done to any utility, service, or system shall be repaired at the Contractor's expense in a manner acceptable to the representative of the Town and the owner of the system. Where construction is near or underneath any pole, conduit, pipe, or similar structure, provide any necessary support.

3.1.5. PROTECTION OF EXISTING UTILITIES AND STRUCTURES. (continued)

Notify all utilities and the Underground Facilities Protective Organization, Inc. (Telephone 1-800-962-7962) 48 hours prior to any excavation.

Where excavations are within existing pavement and sidewalk areas, pavements and sidewalks shall be sawed or cut uniformly along the limits of excavation. All disturbed pavements, sidewalks, curbs and gutters shall be replaced by the Contractor to match the existing or remaining surfaces.

3.1.6. PERMITS AND TRAFFIC CONTROL.

The Developer and his Contractor shall obtain and comply with all necessary permits from the authority having jurisdiction for construction within and adjacent to public roads.

Provide flagmen, signs, barricades, lights, and flashing signals for traffic control, safety and protection of the public as required by the authority having jurisdiction.

3.1.7. SHOP DRAWINGS AND MANUFACTURER'S INFORMATION.

The Contractor shall submit shop drawings for all materials to be incorporated in the dedicated facilities to the Developer's Engineer for review. Upon confirming that the shop drawings conform to the approved plans, specifications, and Town standards, the Developer's Engineer shall forward signed copies of such shop drawings to the Contractor and to the Engineer for the Town.

3.1.8. NOISE CONTROL.

Construction equipment and vehicles shall be maintained by the Contractor in good working condition to control noise and exhaust emissions.

Construction activity shall be restricted to Monday through Friday from 7:00 a.m. to 7:00 p.m. and Saturdays from 7:00 a.m. to 6:00 p.m. No construction activity is allowed on Sundays and holidays. Special permission shall be obtained from the Town for activities that require continuous operation beyond the restricted hours. This restriction applies also to starting up and moving of construction equipment.

3.1.9. WEATHER CONDITIONS.

Work shall be suspended during unsuitable weather conditions. The Contractor shall take necessary precautions to protect all Work, materials and equipment from damage or deterioration due to floods, rain, wind and snow storms.

The mixing and placing of concrete, construction of pavements, gutters and sidewalks, laying of masonry, and installation of sewers and water mains shall be stopped during rain storms or other unsuitable weather. Newly placed concrete and masonry shall be protected by suitable covering.

3.1.10. CONNECTION TO AND OPERATION OF EXISTING FACILITIES.

Connection to and operation of existing Town facilities is not permitted for any purpose, unless specifically authorized by a designated representative of the Town. It is strictly prohibited to operate existing hydrants, valves or other controls. Discharging sewage, groundwater or surface drainage to existing sanitary or storm sewer systems is also prohibited. Any person violating this restriction will be prosecuted to the full extent of the law.

Generally, connection to existing systems will not be permitted until all work on the new facility to be dedicated is completed, tested and found to be acceptable by the Town.

3.1.11. RECORD DRAWINGS.

Record drawings shall be prepared by the Developer's Engineer for all dedicated facilities, and two (2) prints and one reproducible on polyester film shall be submitted to the Town prior to the request for dedication.

3.1.12. CHECKLIST FOR NOTICE TO PROCEED FOR LAND DEVELOPMENT PROJECTS.

	<u>DATE</u>
1. Planning Board Approval of Final Plans	_____
2. Drawings signed by Planning Board Chairman & Town Engineer	_____
3. Stormwater Pollution Prevention Plan signed by Developer & Contractor	_____
4. NYS Department of Health Water System Plan Approval	_____
5. NYS Department of Health Realty Subdivision Approval	_____
6. NYS Department of Environmental Conservation Sanitary Sewer Plan Approval	_____
7. NYS Department of Environmental Conservation Notice of Intent for SPDES General Permit for Stormwater Discharges from Construction Activity	_____
8. NYS Department of Environmental Conservation Acknowledgement of Receipt of Notice of Intent for SPDES General Permit for Stormwater Discharges from Construction Activity	_____
9. NYS Department of Environmental Conservation Freshwater Wetlands Permit	_____
10. NYS Department of Environmental Conservation Water Supply Permit Application Approval	_____
11. NYS Department of Transportation Highway Work Permit	_____
12. Ontario County Highway Work Permit	_____
13. Water District Extension	_____
14. Ontario County Sewer District Extension	_____
15. Ontario County Sewer District Approval of Sanitary Sewers	_____
16. Utility Easement Drawing and Description	_____
17. Right-of-Way Description and Drawing	_____
18. Surety Posted with Town	_____
19. Amount of Surety	_____
20. Pre-Construction Meeting Held	_____
21. All Legal and Engineering Review Fees Paid	_____
22. Grading Permit(s) Issued	_____
23. Building Permit(s) Issued	_____

3.2. SITE PREPARATION

3.2.1. GENERAL.

Site preparation consists of clearing and grubbing, topsoil removal and stockpiling, protection of existing facilities, providing temporary access, erosion and siltation control, and related work.

3.2.2. CLEARING AND GRUBBING.

Clear and grub all areas of excavations, trenches, embankments, and areas to be graded by removing all trees, stumps, roots, brush and debris within the limits indicated on the drawings. All trees, shrubs and vegetation that are not to be removed shall be protected and preserved.

Arrange for disposal of clearing and grubbing materials satisfactory to the New York State Department of Environmental Conservation and the Town. Burning of debris in the work areas is not permitted.

All work shall be in accordance with applicable requirements of NYSDOT 201 - Clearing and Grubbing.

3.2.3. LAYOUT OF WORK.

The Developer is responsible for layout of all work on the project. All work shall be staked-out by experienced surveying personnel in accordance with the approved plans. Stake-out shall be in sufficient detail to provide correct horizontal locations and elevations of structures, pipes, roads and grading.

Stake-out shall be performed as the work progresses. Any stake-out that is disturbed shall be re-staked before continuing with the work.

3.2.4. TOPSOIL REMOVAL AND STOCKPILING.

Remove and stockpile topsoil from areas to be excavated and graded. Topsoil shall not be removed from the project site, but shall be retained until it is used in landscaping of project sites. Erosion control shall be provided and maintained for all topsoil stockpiles.

3.2.5. EROSION AND SILTATION CONTROL.

Construction of erosion and siltation control for projects disturbing more than one (1) acre shall be in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity.

The requirements of Town Code, Chapter 35 - Soil Erosion & Sedimentation Control shall be met for all disturbances less than one (1) acre as required in the Town's Limited Development Overlay District (LDO), Chapter 31 §31.19.

Pursuant to the Soil Erosion & Sedimentation Control Local Law of the Town of Gorham, construct temporary erosion and siltation control facilities before starting excavation and grading. Before starting construction of these facilities, submit to Engineer for the Town for review written description and details of the proposed erosion and siltation control facilities.

Prevent direct discharge from dewatering pumps and surface runoff from the construction sites to storm sewers, culverts, streams or ditches. Intercept and conduct surface runoff and discharge from dewatering pumps to siltation ponds before discharging to natural drainage channels.

3.2.5. EROSION AND SILTATION CONTROL. (continued)

Maintain temporary erosion and siltation control facilities during the construction period until final grading and landscaping is completed and permanent vegetation is established. All erosion and sedimentation control measures will be inspected weekly and after rain events. Prior to final acceptance, a qualified professional in erosion and sedimentation control shall perform a final site inspection to determine if the site has achieved final stabilization. After the qualified professional has certified the site, the Engineer shall be notified and shall direct the Developer or his Contractor to remove all temporary erosion and sedimentation controls.

After all areas have been restored, maintenance shall continue for the two (2) year guarantee period and shall include repair of any defects including settlements and wash outs. All permanent and temporary structural and non-structural erosion control measures shall be maintained for the two (2) year guarantee period.

Lawn areas shall be re-topsoiled, re-seeded and fertilized as required until a dense stand of turf two (2) inches in height is established free from weeds that is satisfactory to the Town.

3.2.6. TEMPORARY ACCESS.

Provide and maintain temporary parking areas and access roads to project sites for use by all Contractors on this project, and for delivery of materials.

Maintain the temporary roads and parking areas in serviceable condition until the permanent roads are completed.

3.3. GRADING, EXCAVATION AND RELATED WORK

3.3.1. GRADING.

Site grading shall be completed to within one (1) foot of finished grades and contours shown on the grading plan before starting any trench excavation, and shall include grading of lots, drainage channels, detention ponds, temporary siltation ponds, and roadways.

Graded areas shall be relatively smooth and free of ruts, depressions or mounds and shall be graded for proper drainage.

3.3.2. TRENCH EXCAVATION.

Excavation shall include the removal of all materials encountered, including rock, necessary for the installation of piping, appurtenances and structures. Trenches for water mains and appurtenances shall be excavated to provide not less than 5'-0" cover. Excavation shall also include separation and disposal of material that is not suitable for backfill and storing material that is suitable for backfill.

Trenches shall be excavated only so far in advance of pipe laying as necessary for installation of pipe and to comply with access requirements.

If encountered, rock may be loosened by blasting or other methods after review by the Engineer. The Contractor must take proper precautions to protect persons and property. Blasting operations shall be carried out only by experienced personnel. The Contractor shall obtain any permits and insurance necessary for blasting operations. Any damages resulting from rock excavation shall be the responsibility of the Contractor.

Rock, boulders and large stones shall be removed to provide a minimum clearance of 6 inches below and on each side of all pipes and a minimum clearance of 1½ feet around manhole risers.

3.3.3. TRENCH WIDTH LIMITS.

The following trench width limits must be maintained at all times until backfill is complete even if it may be necessary to leave sheeting and bracing in place:

	<u>MAXIMUM TRENCH WIDTH</u>	
	<u>At Top of Pipe</u>	<u>At Ground Surface</u>
Water Services	2'-0"	4'-0"
Water Mains	2'-6"	5'-0"
Building Sewers	2'-6"	5'-0"
Sanitary Sewers	3'-0"	7'-0"
Storm Sewers	3'-0"	7'-0"

See special requirements for excavation limits at manholes.

3.3.4. SEPARATION OF BACKFILL MATERIAL.

Excavated material which is suitable for backfill shall be separated from earth excavation which is unsuitable for backfill and rock, boulders, frozen earth, paving materials, concrete, and stones larger than 8 inches in their greatest dimension. These materials which are not to be used for backfill shall be hauled away and disposed of at a site to be arranged for by the Contractor and subject to the approval of the New York State Department of Environmental Conservation.

3.3.5. DEWATERING.

Trenches shall be dewatered so that pipe is not installed in water. The Contractor shall provide pumping equipment and other methods for dewatering trenches. The discharge from dewatering equipment shall be conducted to sedimentation basins and silt traps before discharging to natural drainage channels, gutters, drains or storm sewers. Surface water shall be diverted or otherwise prevented from entering excavations and to prevent damage to adjacent property.

Water shall not be allowed to soften the bottom of the trench. If the trench bottom becomes soft due to failure to keep the excavation dry, the softened material shall be removed and replaced with crushed stone. Trench bottom must be stable and dry.

3.3.6. MAINTENANCE OF BANKS.

Provide sheeting, bracing, and shoring of trenches as necessary to protect adjacent structures including poles, trees, pavements, pipelines and to provide safe working conditions.

The use of a trench shield will be permitted if adequate provisions are made for preventing movement of the pipe and caving of the banks while the shield is being moved. The use of a bar by a workman is not considered adequate.

The methods to maintain the stability of banks must be in accordance with applicable laws, rules and regulations, and are the sole responsibility of the Contractor.

3.3.7. PIPE BEDDING.

Pipe bedding for DIP water mains, water services and storm sewers shall be formed in solid, undisturbed earth except as otherwise specified. Water shall not be allowed to soften the bottom of the trench. The pipe bed shall be prepared accurately with hand tools so that the full length of the pipe is supported by the pipe bed. The bottom of the trench shall be checked before the pipe is lowered into the trench to make certain that the pipe to be laid will not exceed the allowable deflection. Recesses shall be excavated for pipe bells, so that the pipe does not rest on the bells. If the trench is excavated below the required depth, the excess depth shall be filled with crushed stone cradle.

Trenches shall be excavated to a level 6 inches below the bottom of the pipe in rock areas or where the trench bottom contains stones larger than 2" in diameter. The foundation for the pipe in such areas shall be provided by the use of crushed stone cradle.

3.3.7. PIPE BEDDING. (continued)

Trenches for PVC water mains, sanitary sewers and buildings sewers shall be excavated to a level 6 inches below the bottom of the pipe. The foundation for the pipe shall be provided by the use of crushed stone cradle. The crushed stone cradle shall be spread and shaped by hand to provide uniform support for the pipe for at least 3/4 of the pipe diameter and shall extend for the full width of the trench.

Where the 6 inch depth of crushed stone cradle is not adequate to provide a proper foundation for the pipe in the opinion of the Engineer, additional depth of crushed stone cradle shall be used.

If any trench is excavated below the required depth or depth as authorized by the Engineer, the excess depth shall be filled with crushed stone cradle.

Coupling or bell holes shall be prepared so that the pipe does not rest on the outer portion of the coupling or bell. Holes shall be of adequate size but must not be excessively large.

3.3.8. CRADLE MATERIALS.

Cradle materials for pipes, manholes and building sewers shall be as follows:

3.3.8.1. Crushed Stone Cradle.

NYSDOT 703-02, Size No. 2, mixed with sufficient smaller sized stone and screenings to provide a dense material that gives the maximum support to the pipe. Use only enough smaller stones and screenings to fill the voids in the No. 2 stone. Crusher run material that meets this specification is acceptable.

3.3.8.2. Concrete Cradle.

NYSDOT 501-2, Portland Cement Concrete, Class B with 1½ inch maximum slump. When approved by the Engineer, water may be omitted from the mix.

3.3.9. SPECIAL REQUIREMENTS AT STRUCTURES.

Excavation around manholes and other structures shall provide a clearance of 1½ feet. The excavation in the areas where pipes enter the structure shall be kept to a minimum.

Where any pipe passes through a structure excavation, concrete cradle shall be provided under the pipe for support. The concrete cradle with 2:1 side slopes shall extend from the pipe to the bottom of the excavation and shall support the pipe for a width equal to at least 3/4 of the pipe diameter.

Provide uniform support with concrete cradle under manhole bases as detailed.

Special attention shall be given to keeping the excavation opened and dewatered so that work around the outside of structures can be completed properly.

3.3.10. SPECIAL REQUIREMENTS FOR BUILDING SEWERS.

Where building sewers pass through main sewer trench excavations, the foundation for the pipe and tee shall be provided by the use of concrete cradle. The concrete cradle shall extend the full width of the trench. The concrete cradle shall be shaped by hand to provide uniform support for the pipe and tee for a width equal to at least 3/4 of the pipe diameter.

3.3.11. SPECIAL REQUIREMENTS FOR APPURTENANT ACTIVITIES.

Appurtenant Activities may only be conducted in accordance with the following conditions adopted as Local Law No. 12-95 by the Town Board:

1. Appurtenant activities are to be of a temporary nature for the removal and/or screening of excess topsoil. Such activities may only be conducted on parcels of land that have received a subdivision and/or site plan approval which includes an appurtenant activity plan.
2. As part of a subdivision and/or site plan approval request for any parcel on which appurtenant activities are to be conducted, the applicant shall submit a plan, which may be incorporated into other plans submitted by the applicant, including:
 - (a) Total cubic yards to be processed.
 - (b) Total cubic yards to be removed.
 - (c) A description of the proposed truck route to be utilized for hauling.
 - (d) A statement that the appurtenant activities will conform with the Town of Gorham Planning Board approved final subdivision plan, site plan, landscaping plan, grading plan or any other approved plan.
 - (e) A map prepared by a licensed engineer or surveyor at a scale of 1" = 200' or larger showing boundaries of the land from which the topsoil will be removed, and location of the stockpile(s) of topsoil to be processed.
 - (f) Drainage Plan.
 - (g) A dust control plan.
 - (h) Topsoil restoration plan.
 - (i) Such other information as the Town Planning Board in its discretion shall require.
 - (j) NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity if disturbing more than one (1) acre.

If appurtenant activities are to be conducted on any parcel where the subdivision and/or site plan approval does not include such an appurtenant activities plan, the applicant shall separately apply for a site plan approval to cover such plan and may not conduct any appurtenant activities until such site plan approval is received.

3. The requirements of Town Code, Chapter 35 - Soil Erosion & Sedimentation Control shall be met for all disturbances less than one (1) acre as required in the Town's Limited Development Overlay District (LDO), Chapter 31 §31.19.
4. Permission to conduct appurtenant activity shall expire on the same date that any subdivision approval expires, in accordance with § 47-11(B)(3)(d) of the Town of Gorham Subdivision Regulations and § 276(11) of the New York Town Law.
5. All appurtenant activities commenced henceforth shall be in conformity with the provisions of this local law, the New York State Mined Land Reclamation Law, Town of Gorham subdivision regulations, and the Zoning Ordinance of the Town of Gorham.
6. Nothing contained in this subsection shall require any person engaged in agricultural operations to obtain approval for the purpose of removing topsoil, soil or earth from one location on his or her land to another location on the same land for grading, improving or draining said land, provided that such removal is necessary for or accessory to the agricultural operations.

3.3.11. SPECIAL REQUIREMENTS FOR APPURTENANT ACTIVITIES. (continued)

7. Approved subdivisions shall provide certification that 75% of the items included in the surety are complete before appurtenant activities, that will result in the removal of topsoil from the site, can begin. Appurtenant activities to screen topsoil to be used on-site may be commenced prior to that time.
8. Topsoil may not be stockpiled closer than 100 feet to a public right-of-way or any adjoining property line not part of the subdivision.
9. Hours of operation. Appurtenant activities shall be conducted only between 7:00 a.m. and 6:00 p.m. local time and shall not be allowed on Sundays or public holidays, as defined in the General Construction Law. Loaded trucks shall leave the premises only within the hours permitted for the operation of appurtenant activities.
10. Noise. Noise from appurtenant activities and related operations shall not interfere unduly with the quiet enjoyment of neighboring properties.
11. Roads shall be kept free of stones and dirt on a daily basis.
12. Surety posted by an applicant as part of a subdivision or site plan approval shall include the value of the appurtenant activity work, in an amount of at least \$3,000 per acre for each acre of land within the area to be used for the appurtenant activity. The surety shall guarantee that within one (1) year after termination of either the approval or the operation, whether voluntarily by the operator or by order of the Town Board, whichever may come first, the land shall be restored in conformity with both the standards set forth in these regulations and the appurtenant activities plan, and shall comply with any State or Department of Environmental Conservation regulations.
12. Stop-work orders. The Town Code Enforcement Officer or other official designated by the Town Board shall have the right and authority to issue stop-work orders to those operating in violation of the terms of these regulations or contrary to the applicant's maps or plans upon which its approval was based.

3.4. BACKFILL AND EMBANKMENTS

3.4.1. GENERAL.

Backfill and embankments consist of placing and compacting backfill material in trenches and around structures, and construction of embankments and fills, including maintenance of backfilled surfaces, disposal of excess excavated material, and related work, and shall generally conform to applicable requirements of NYSDOT 203.

Embankments and fills shall be completed before installation of piping and appurtenances is started.

3.4.2. MATERIALS.

In general, construct fills and backfill trenches with excavated material provided that the excavated material is suitable in the opinion of the Engineer. Where there is a deficiency of excavated material due to the rejection of a part thereof, use excess excavated material from other portions of the project.

Granular fill shall be used for backfill, where directed by the Engineer or where there is a deficiency of suitable or select excavated material on the project.

3.4.2.1. Suitable Excavated Material.

Dry excavated material from which all frozen material, pavement materials, cinders, ashes, refuse, sod, roots, organic material, rock or stones larger than 6 inches in the greatest dimension have been removed.

3.4.2.2. Select Excavated Material.

Select, dry excavated material from which all pavement materials, concrete, cinders, ashes, refuse, organic material, topsoil, sod, roots, frozen material, boulders, rock or stones larger than 2 inches in the greatest dimension, or other material, which in the opinion of the Engineer is not suitable, have been removed.

3.4.2.3. Granular Fill.

NYSDOT 203-2.02C, Select Granular Fill with all particles passing a 2-inch square sieve.

3.4.2.4. Controlled Density Fill.

K-Krete Controlled Density Fill (CDF) Mix consisting of Portland Cement and salvaged materials as developed by K-Krete Inc.

3.4.3. EMBANKMENTS AND FILLS.

Construct fills and embankments using select excavated material within 2 feet of finished grade, and suitable excavated material below depths of 2 feet within finished grade. Place and compact fill material in layers not to exceed 12 inches and as specified under compaction requirements.

Rework embankment and fill that does not conform to these specifications to meet the requirements, or remove and replace the material with acceptable fill. Compact all fill material placed before the end of each work day. Grade the final layer placed each day for proper drainage to prevent ponding of surface run-off on the fill.

3.4.4. TRENCH BACKFILL.

3.4.4.1. General.

Trenches shall be backfilled immediately after installing the pipe and completion of work within the excavation. Backfill around each pipe shall be placed before installing the next length of pipe. Trenches shall be relatively dry during backfilling.

3.4.4.2. Pipe Sidefill and Safety Cover.

From the top of the pipe bed or cradle to a level one foot over the top of the pipe, backfill shall be select excavated material deposited by hand in 6 inch layers and compacted by tamping. Backfill shall be deposited in the trench for its full width on each side of the pipe simultaneously so as not to disturb the pipe.

3.4.4.3. Backfill Around Structures and Appurtenances.

Backfill around manholes, inlets, valve boxes and hydrants shall be select excavated material deposited in accordance with the requirements for backfill around pipe to a level one (1) foot over the top of the entering pipes. Above this level, backfill shall be deposited uniformly around the structure or appurtenance in 12-inch layers and thoroughly compacted.

3.4.4.4. Backfill Above Safety Cover.

Above the levels specified for pipe sidefill and safety cover, the trench shall be backfilled and compacted by mechanical methods. For each section of trench, the Engineer shall review the method of backfill and compaction considering the type of backfill material and the finished ground surface above the pipe.

3.4.4.5. Backfill Under Pavement Areas.

Backfill under roadways and surfaces normally subject to vehicular traffic, including pavements and gutters, shall be select excavated material or granular fill uniformly placed, leveled, and compacted in 12 inch layers using mechanical compactors.

3.4.5. COMPACTION.

Compaction methods employed shall produce the specified compaction, prevent subsequent settlement, and provide the required support for proposed construction on the compacted subgrade. Proposed compaction methods shall avoid damage to existing facilities and to completed construction.

Prior to starting placement and compaction of backfill and embankment, submit in writing to the Engineer for the Town a description of the methods and equipment proposed for compaction. The Engineer will review this information considering the type of backfill material and the finished ground surface. If the proposed method does not provide the compaction required, alternate methods shall be adopted until the required compaction is achieved.

Determine the moisture content of backfill or fill material, and adjust it to provide optimum moisture content for the required compaction.

The minimum compaction requirements are expressed in percent of the maximum dry weight density of the material as determined by ASTM D698. Minimum compaction requirements for backfill and embankment shall generally conform to the following, unless otherwise specified:

3.4.5.1. Embankments.

	<u>Maximum Layer Before Compaction</u>	<u>Minimum Compaction</u>
Under roadways, shoulders, gutters and sidewalks	12 inches	95%
All other areas	24 inches	85%

3.4.5.2. Trench Backfill.

Under pipe and pipe cradle	6 inches	95%
Pipe sidefill and safety cover to 1 foot over top of pipe	8 inches	93%
Under roadways, shoulders, sidewalks, parking areas, and gutters	12 inches	95%
All other areas	24 inches	85%

3.4.5.3. Structure Backfill.

Around all structures and appurtenances including manholes, inlets, hydrants, and valve boxes	12 inches	95%
--	-----------	-----

3.5. WATER DISTRIBUTION SYSTEM

3.5.1. MATERIALS FOR WATER MAINS AND SERVICES

3.5.1.1. Water Main Pipe.

Ductile Iron Pipe, AWWA C151/ANSI A21.51, thickness Class 52, with ANSI A21.4 cement mortar lining and seal coating inside, bituminous coating outside. ANSI A21.11 push-on joints or mechanical joints, with two brass wedge inserts to insure electrical conductivity across each joint, or

Polyvinyl Chloride (PVC) Pressure Pipe for Water, AWWA C900, DR 18, Pressure Class 150, gasket bell end with elastomeric gasket joints. Provide blue 3" wide detectable underground tape marked: "CAUTION - BURIED WATER LINES BELOW."

3.5.1.2. Fittings.

AWWA C110/ANSI A21.10 ductile iron fittings or AWWA C153/ANSI A21.53 ductile iron compact fittings with ANSI A21.4 cement mortar lining and seal coating inside, bituminous coating outside. All bolts for mechanical joints shall be fluorocarbon coated.

3.5.1.3. Gate Valves.

AWWA C-509, resilient-seated, non-rising stem gate valves as manufactured by Mueller Company with 2" square wrench nut, open left or counterclockwise, A-2370-24 push-on joints or A-2370-20 mechanical joints. Bolts for mechanical joints shall be fluorocarbon coated and bonnet bolts shall be grade 304 stainless steel.

3.5.1.4. Valve Boxes.

Sliding type, H-10364 as manufactured by Mueller Company.

3.5.1.5. Tapping Sleeve and Valves.

Cast iron split tapping sleeves with mechanical joints, Mueller Company H-615, and tapping valves with mechanical joint outlet, Mueller Company T-2360-16. Determine diameter and material of pipe to be tapped before ordering the tapping sleeves.

3.5.1.6. Hydrants.

AWWA C-502, 5 1/4" valve opening, two 2 1/2" hose nozzles and one 4 1/2" pumper nozzle, National Standard nozzle threads, O-ring seal hydrant packing, 5'-0" bury length with extensions as required, 6" DIP inlet connections with mechanical joint, 1 1/4" square operating nut, open left or counterclockwise, break-away traffic model, pressure activated drain valve. Factory painted with high visibility yellow enamel above grade and tar coated below grade. Bonnet and shoe bolts shall be grade 304 stainless steel. Mechanical joint bolts shall be fluorocarbon coated. The hydrants shall be Eddy Compression-Type, or equal.

3.5.1. MATERIALS FOR WATER MAINS AND SERVICES (continued)

- 3.5.1.7. Water Service Pipe.
- Copper Tubing ASTM B-88, Type K soft temper copper, 3/4" minimum size, with conductive compression fittings; or polyethylene service line, ASTM D2737, Class 200, National Sanitation Foundation approved, with compression type joints and stainless steel inserts. Polyethylene service line shall not be used within the road right-of-way between the corporation stop and the curb stop unless the length exceeds the available coil length for a copper water service.
- 3.5.1.8. Corporation Stops.
- Mueller Company H-15008, 3/4" minimum size, with conductive compression connection.
- 3.5.1.9. Curb Stops.
- Mueller Company H-15209, 3/4" minimum size, with conductive compression connections.
- 3.5.1.10. Curb Boxes.
- Mueller Company H-10314.
- 3.5.1.11. Concrete.
- Concrete for backing, bracing, encasement and cradle shall be NYSDOT 501-2, Portland Cement Concrete, minimum 2,500 psi 28-day compressive strength, 2-inch maximum slump. Water may be omitted from the mix for cradle and encasement when approved by the Engineer.
- 3.5.1.12. Crushed Stone Cradle.
- NYSDOT 703-02, Size No. 2, mixed with sufficient smaller size stone and screenings to provide a dense material that gives maximum support to the pipe. Crusher run material meeting these specifications will be acceptable.
- 3.5.1.13. Casing Pipe.
- Welded steel pipe AWWA C 200, 0.25 inch wall thickness, 24 inch minimum inside diameter or larger at the option of the Contractor for his convenience in installation.
- 3.5.1.14. Casing Sand.
- NYSDOT 703-3, Mortar Sand.
- 3.5.1.15. Meter Pits for Water Services.
- Plastic meter setter pit, minimum 20" I.D. PVC pipe, double lid cover and polyfoam insulating blanket, pre-assembled, pre-aligned and pre-tested, conforming to Plastic Pit for Water Meter Standard Detail, as supplied by Mueller Company or equal.

3.5.2. INSTALLATION OF WATER MAINS AND APPURTENANCES (continued)

3.5.2.6. Installing Fittings and Valves.

Install fittings and valves where indicated on the drawings. Additional fittings, not shown on the drawings, also shall be provided if needed to install the water main and make connections to the existing system. Fittings not indicated or called for shall be used only after approval by the Engineer. The additional fittings shall be shown on the Record Drawings.

A valve box and cover shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut. The cover shall be adjusted to meet the finished grade.

3.5.2.7. Setting Hydrant Units.

All hydrants shall stand plumb and shall have pumper nozzles facing the road. Hydrants shall be set with the ground line mark at the existing grade or as directed by the Engineer. Each hydrant shall be connected to the main with a 6" branch controlled by an independent 6" gate valve. A carpenter's or mason's level shall be used to set the hydrant branches level with the water main so that the hydrant will stand plumb. Use barrel extensions as required.

Concrete blocking at the base of the hydrant may be deleted from the hydrant branch installation, if the Contractor uses mechanical joint anchoring fittings as manufactured by U.S. Pipe and Foundry Company. Securely anchor the hydrant branch to the water main including all joints. Provide concrete blocks for the hydrant barrel as shown in the Standard Detail regardless of branch anchorage used.

3.5.2.8. Painting.

The outside surfaces of hydrants above finished grade and all valve box covers shall be thoroughly cleaned and painted upon completion of all work.

Paint with two (2) coats of New Color Horizons High Gloss Finish as manufactured by Rust-Oleum Corporation. Color to be selected by the Water Department.

3.5.2.9. Connection to Existing Mains.

After testing and disinfection of new water mains is complete, connections shall be made to existing mains where indicated on the drawings by shutting down the existing main and making a non-pressure connection or by installing a tapping sleeve and valve.

Non-pressure connections shall be made with a minimum of disruption of service. The existing main shall be cut and connecting pieces or adapters shall be installed as detailed or as needed to make a proper connection.

3.5.2. INSTALLATION OF WATER MAINS AND APPURTENANCES (continued)

3.5.2.10. Special Requirements for Protection of Water Mains.

All work near and under existing water mains shall be in accordance with requirements of the Water Department.

Water mains shall be laid at least 10 feet horizontally from sanitary sewers, storm sewers, and manholes, whenever possible. Water mains laid closer than 10 feet to existing sewers shall be installed so that the elevation at the top of the sewer pipe is at least 18 inches below the bottom of the water main.

Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. At the crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water main and the sewer may be required.

When it is impossible to provide the specified separation distances, follow the NYS Department of Health requirements for Separation of Water and Sewer Lines as shown in the Standard Details.

3.5.2.11. Anchorage and Blocking.

All plugs, tees and other fittings shall be provided with backing or movement shall be prevented by attaching galvanized steel rods and clamps. Backing shall be solid concrete blocks or poured rods and clamps. Backing shall be solid concrete blocks or poured concrete and shall be placed between solid ground and the fitting to be anchored. The following backing areas against solid ground shall be the minimum areas used for the fittings described. It may be necessary to use greater areas for backing or rods and clamps when soils with low bearing values are encountered. It shall be the Contractor's responsibility to prevent movement of pipe and fittings.

Backing Areas in Square Feet

<u>Pipe Size</u>	<u>Tees, Hydrants Reducers Direction Change 22 ½°</u>	<u>End Plugs & Direction Change 45° & 90°</u>
4"	1.5	2.0
6"	3.0	4.0
8"	5.0	7.0
10"	8.0	11.0
12"	11.5	16.2
16"	15.5	28.0

At the end of water mains, a full length of pipe shall be installed beyond all tees. The plug at the end of the pipe shall be provided both with backing and with galvanized steel rods and clamps.

The backing shall be so placed that the pipe and fitting joints shall be accessible for repairs.

3.5.2.12. Repairs.

If it is necessary to repair or relay a section of pipe due to broken pipe, faulty line or grade, or any other reason, repair clamps shall not be used, but the pipe to be repaired shall be removed and replaced with new pipe.

3.5.3. INSTALLATION OF SERVICES

3.5.3.1. General.

Services shall not be connected until testing and disinfecting of the water main is complete. Services shall be installed to within 1.0 foot from the right-of-way, utility easement or as directed by the Engineer.

3.5.3.2. Preparation of Bed.

The service line bed shall be prepared so that the full length of the line is installed with a minimum cover of 5'-0". The bed and backfill over the copper service line shall be free from stones larger than 2 inches in size, sharp or angular stones and any material that might puncture or damage the service line. Provide select granular material if needed to cushion and protect the service from damage.

3.5.3.3. Installing Water Services.

Tubing shall be uncoiled in such a manner as to prevent damaging, denting or kinking the line. The tubing, fittings, and appurtenances shall be inspected for defects before installation. Every precaution shall be taken to prevent foreign material from entering the tubing. When installation is not in progress, the open ends of the line shall be closed by temporary plugs. Install tubing with a horizontal expansion loop at the water main connection. A single piece of service line shall be used from corporation stop to the curb stop.

3.5.3.4. Corporation Stop Installation.

A corporation stop shall be installed at the main for each water service. The main shall be drilled and tapped directly and the corporation stop inserted. After the connection has been made to the service pipe and the curb stop, the corporation stop shall be left in the full open position.

3.5.3.5. Installing Curb Stops and Curb Boxes.

Locate curb stops 1.0' inside the street right-of-way unless otherwise shown. The curb boxes shall be installed vertically over the center of the stop with the lid extending ½ inch above finished grade.

3.5.3.6. Installation of Meter Pits.

Install meter pits 1.0' inside the right-of-way unless otherwise shown. The meter pit bed foundation shall be provided by the use of crushed stone cradle as detailed. The meter pit shall be installed vertically with the lid extending ½ inch above finished grade. Slope finished grade away from meter pit.

3.5.3.7. Crossing Under Pavement.

Water services under existing pavements, curbs, and gutters shall be installed by washing, boring, or driving, or any other method satisfactory to the authorities having jurisdiction over the street. Open cut installation of the service lines will not be permitted nearer than 2.0 feet to the edge of existing pavement unless authorized.

3.5.4. PREPARATION FOR USE

3.5.4.1. Water Supply.

Water for testing and flushing shall be obtained from the existing water system. Arrangements shall be made with the Water Department for installation of a water meter and for payment of water used.

3.5.4.2. Flushing.

Flush mains and services before testing. Minimum flushing velocity shall be 2.5 feet per second.

3.5.4.3. Testing Water Mains and Hydrant Units.

Before testing, sections adjacent to the test section shall be filled with water. Furnish all water, equipment, connections, piping, meters, measuring devices, pumps and temporary enclosures necessary to perform the required tests, subject to the review and approval by the Town Water Department. Testing shall be made on sections of water main not exceeding 2,000 feet in length.

Testing shall meet the minimum requirements of AWWA C-600 Section 4 except where more rigid requirements are established by these specifications. Before applying test pressure, all air shall be expelled from the pipe. After the pipe has been filled, it shall be subjected to hydrostatic pressure of 50 psi above normal line pressure or a minimum of 150 psi for a period of two hours.

Leakage shall be determined at 30 minute intervals by means of volumetric measurement of the water added during the test.

Leakage shall not exceed 1.8 gallons per inch of pipe diameter per 1,000 feet of pipe per 24 hours.

Test pressure shall be based on the elevation of the lowest point under test. Pressure shall be applied by a pump connected to the pipe. The pump, pipe, connections, gauges and measuring devices shall be calibrated to the satisfaction of the Engineer.

A preliminary test of 50 psi above normal line pressure or a minimum of 150 psi shall be performed by the Contractor. After the preliminary test is satisfactory, the Engineer shall be given 24 hours notice and a final test performed.

Leakage shall be defined as the quantity of water supplied to the section of pipe under test necessary to maintain the required pressure. Should any test disclose leakage greater than the allowable, the defect shall be located and repaired.

3.5.4.4. Testing Services.

During installation, test each service before backfilling by subjecting the service to normal line pressure. Open the corporation stop, expel all air from the line, close the curb stop, and observe the line for leakage. Repairs, if required, shall be made and the service retested until no leakage is observed.

3.5.4. PREPARATION FOR USE (continued)

3.5.4.5. Disinfection.

All water mains and appurtenances shall be disinfected in accordance with AWWA C651-92 Disinfecting Water Mains, Item 5.1. deleted, and the requirements of the New York State Department of Health. The requirements of NYS Department of Health shall govern when there is a conflict. Use 50 ppm initial chlorine dose. Disinfectant shall remain in the system for a period of 24 hours after which the residual shall be at least 10 ppm. The system shall then be drained and refilled with clean water.

A water sample shall be collected by the Contractor and analyzed by a New York State Department of Health approved testing laboratory for bacteriological content. The work will not be accepted until a report is submitted to the Engineer showing that a water sample is satisfactory and the system is ready for use.

3.6. SANITARY SEWER SYSTEM

3.6.1. MATERIALS

3.6.1.1. Polyvinyl Chloride (PVC) Main Sewer.

ASTM D3034 SDR 35, PVC Plastic Gravity Sewer Pipe with elastomeric gasket joints. Provide 4 inch diameter branch fittings. Use SDR-21 PVC pipe for sewers deeper than 16 feet.

3.6.1.2. Polyvinyl Chloride (PVC) Building Sewer.

ASTM D3034-SDR 35, PVC Plastic Gravity Sewer Pipe and fittings with elastomeric gasket joints.

3.6.1.3. Ductile Iron Pipe (DIP) Force Main.

AWWA C151/ANSI A21.51, thickness Class 50 with ANSI A21.4 cement mortar lining and seal coating inside, bituminous coating outside, ANSI 21.11 push-on joints.

3.6.1.4. Polyvinyl Chloride (PVC) Force Main.

ASTM D2241 SDR 21, PVC Pressure Rated Pipe, 200 psi pressure rating, with elastomeric gasket bell ends, PVC fittings with elastomeric gasket bell ends, PVC fittings and adapters and 3" wide detectable underground tape. Detectable tape shall be green and read, "CAUTION - BURIED SEWER LINES BELOW". As manufactured by Lineguard Maintenance System, Stock No. 25830.

3.6.1.5. Crushed Stone Cradle.

NYSDOT 703-02, Size No. 2, mixed with sufficient smaller size stone and screenings to provide a dense material that gives maximum support to the pipe. Crusher run material meeting these specifications will be acceptable.

3.6.1.6. Concrete.

Concrete for backing, bracing, encasement and cradle shall be NYSDOT 501-2, Portland Cement Concrete, minimum 2,500 psi 28-day compressive strength, 2-inch maximum slump. Water may be omitted from the mix for cradle and encasement when approved by the Engineer.

3.6.1.7. Cleanouts.

Fabricated from ASTM D3034 SDR 35, PVC Plastic Gravity Sewer Pipe and fittings, and brass screw plugs as shown in the Standard Details.

3.6.1. MATERIALS (continued)

3.6.1.8. Manholes.

a. Bases, Risers, and Cone Tops.

Precast reinforced concrete manhole units conforming to NYSDOT 706-04 requirements for circular manhole units and ASTM C-478. Refer to Standard Details for dimensions, minimum base slab reinforcing steel and other features.

b. Cover Slabs.

Precast reinforced concrete cover slabs. NYSDOT 555-2, Structural Concrete, Class A conforming to NYSDOT 501-1, 501-2 and 501-3 and ASTM A-615, grade 60 deformed reinforcing steel and other features.

c. Base, Riser, and Cover Slab Joints.

Tongue and groove with continuous solid rubber ring gasketed joints conforming to ASTM C-443.

d. Pipe Connections.

Preformed openings with flexible rubber V-gasket cast into the opening and serrated rubber press-wedge seal conforming to ASTM C443, Press-Wedge as manufactured by Press Seal Gasket Corporation, or equal. All flexible manhole seals shall be sized for inlet and outlet pipes to provide a watertight seal.

e. Manhole Steps.

Aluminum Alloy 6005-T5 forged from a solid extruded section Part No. 20100 conforming to ASTM B221, as manufactured by Aluminum Company of America or Relgrit Part No. LR-800 as manufactured by Reliance Steel Products Company, or equal.

The portion of the step embedded in concrete shall be coated with a six mil coat of Bitumastic No. 505 as manufactured by Koppers Company or a 15 mil coat of DeGraco Moisture/Gard 9330 thick black as manufactured by the Detroit Graphite Company, or equal.

f. Manhole Frames and Covers.

Cast iron frames and covers, uniform quality, free from blow holes, porosity, hard spots, shrinkage defects, cracks, fins, burrs, sand and slag. Cleaned by sand blasting. Asphalt coated. Materials shall conform to ASTM A-48, Class 30. Bearing surfaces shall be ground or machined. Designed to carry a wheel load of 16,000 pounds plus impact. Total weight of frame and cover shall be not less than 370 pounds. Covers shall be cast with the words "SANITARY SEWER" as part of the design.

Standard frames and covers with indented top design as manufactured by Neenah Foundry Co., Catalog No. R-1726, Type B; Syracuse Castings Sales Corp., Catalog No. 1032, or equal.

3.6.1. MATERIALS (continued)

3.6.1.8. Manholes. (continued)

g. Concrete for Benches and Inverts.

NYSDOT 555-2, Structural Concrete, Class A conforming to NYSDOT 501-1 and 501-3.

h. Dampproofing.

Two 3.6 wet mil coats of tar base paint applied by the manufacturer on interior and exterior surfaces, except the base slab. Bitumastic Black Solution as manufactured by Koppers Company or DeGraco 9329 Standard Black as manufactured by the Detroit Graphite Company, or equal.

i. Non-Shrink Grout.

Fast setting, non-shrink, non-metallic, high strength, water resistant, pre-mixed grout. Octocrete as manufactured by Penncrete Products Company, or equal.

j. Grade Rings.

ASTM C-478 precast reinforced concrete rings, 2 inches thick, 8 inches wide and 24 inches inside diameter.

k. Brick.

ASTM C-32 sewer and manhole clay or shale brick.

l. Mortar.

ASTM C-270, Type M. Mix design by volume shall be one part Portland Cement Cement, one part masonry cement, and five parts mortar sand. Lime shall not be used.

m. Concrete Curing Compound.

ASTM C-309 Liquid membrane-forming compound for curing concrete.

n. Drop Pipe.

Ductile Iron Pipe, AWWA C151/ANSI A21.51, thickness Class 50, with ANSI A21.4 cement mortar lining. ANSI A21.11 push-on joints. Provide an adaptor for jointing the drop pipe to the main sewer tee.

o. Drop Pipe Bend.

ANSI A21.10 cast iron bend with a plain end and a push-on joint bell end or mechanical joint end.

3.6.1. MATERIALS (continued)

3.6.1.8. Manholes. (continued)

p. Manhole Cover Inserts.

High density polyethylene bowl, ASTM D1248, Class A, Category 5, minimum thickness 1/16 inch. Black, closed cell neoprene gasket, ASTM-D-1056-73T, cemented to the underside of the insert bowl rim by the manufacturer.

One gas pressure relief and one vacuum relief valve installed in the insert bowl. Valve bodies manufactured of high density polyethylene with neoprene valve plugs confined with stainless steel springs. The pressure and vacuum relief valves shall release at a differential pressure of 1 psi.

Sewer Guard as manufactured by Preco Industries, Ltd., or equal.

3.6.1.9. Septic Tanks for Gorham Sewer District No. 1.

a. Septic Tanks.

Precast reinforced concrete septic tanks and cover slabs, 1,000 and 1,500 gallons minimum capacity, conforming to ASTM C-478.

Structural design shall be in accordance with ASTM C0-478 and ACI 318.83.

b. Riser Section and Cover Slab Joints.

Riser sections and cover slabs shall be formed with tongue and groove joints. All joints shall be sealed with GS #5 Vault Sealant, a non-hardening, rubber base extruded sealant, as manufactured by General Sealants, Inc., or equal.

c. Pipe Connections.

Flexible rubber seals cast or inserted into preformed openings for all inlet and outlet pipes.

d. Coating.

Coat all inside and outside surfaces of septic tanks with two coats of 3.6 wet mil thickness, Bitumastic Black Solution as manufactured by Koppers Company, or equal.

3.6.2. INSTALLATION OF MAIN SEWERS, BUILDING SEWERS AND FORCE MAINS.

3.6.2.1. Handling Materials.

The Contractor shall inspect pipe for damage before unloading. The pipe shall be unloaded in accordance with the manufacturer's instructions and with care to avoid damage. Pipe shall not be dropped or bumped against pipe already on the ground or any other object on the ground. Prevent damage to the pipe ends. Keep interior and ends of pipe free from dirt.

The pipe shall be lowered into the trench to prevent impact and damage. As the pipe is lowered, the ends and interior of the pipe shall be inspected for cleanliness and shall be cleaned, if necessary. Do not allow the pipe to be dragged along the ground or trench bottom.

3.6.2.2. Making Joints.

Joints shall be made in accordance with the manufacturer's instructions and direction of the Engineer. The interior of the pipe and coupling already in place shall be cleaned, the gasket inserted in the groove, lubricant applied, and the length of pipe to be installed pushed home. A gauge shall then be used to verify that the rubber ring is located in the groove all the way around.

The pipe joint shall not be made under water.

3.6.2.3. Other Installation Requirements.

Pipe installation shall commence at the lowest elevation and shall terminate only at manholes. Pipe bells or couplings shall be laid on the upstream end.

Each section of pipe shall rest on the prepared pipe bed or cradle for the full length of the barrel. The pipe shall be laid true to established line and grade to within 1/4 inch. Any pipe that is disturbed after laying shall be taken up and relaid.

If a trench shield is used, the pipe joint shall not be covered until after the shield has been advanced in the trench and the joint has been inspected for movement.

The upstream end of the pipe shall be plugged at all times when pipe laying is not in progress. Water and dirt shall be prevented from entering the pipe.

3.6.2.4. Special Requirements for Main Sewers.

Tee branches for building sewers shall be installed at the locations shown on the drawings or as directed by the Engineer. The tee branches shall be installed with the main sewer pipe.

3.6.2. INSTALLATION OF MAIN SEWERS, BUILDING SEWERS AND FORCE MAINS (continued)

3.6.2.5. Special Requirements for Building Sewers.

Building sewers shall be 4 inch diameter unless otherwise shown and shall be laid at a grade of 1/4 inch per foot. A riser shall be installed if necessary, so that the building sewer can be laid at a grade of 1/4 inch per foot to meet the required end elevation.

Concrete cradle, bend, end cap and marker shall be installed for each building sewer before backfilling the main sewer pipe. If risers are to be used, they shall also be installed with these fittings.

Building sewer extensions shall be made as required after the main sewer has been completed or may be installed immediately after installation of the main sewer.

Whenever the end of a building sewer is to be backfilled, whether temporarily or permanently, a removable plug or end cap shall be installed. The plug or end cap shall be braced with removable blocking to prevent movement during testing. A 2" x 4" hardwood marker shall be placed at the end of all building sewers.

3.6.2.6. Special Requirements for Force Mains.

Force main installation shall commence at the pumping station with pipe bells or couplings laid on the upstream end. The force main shall slope up from the pumping station to the discharge manhole without sags, dips or air pockets.

Force main fittings shall be provided with concrete backing against undisturbed earth to prevent movement during testing and operation. Soft, unstable soil may require the use of tie rods and clamps.

Provide a minimum area of 2.0 square feet of blocking against undisturbed earth for each force main fitting.

3.6.2.7. Repairs.

If it is necessary to repair or relay a section of pipe due to broken pipe, faulty line or grade or any other reason, repair clamps shall not be used, but the pipe to be repaired shall be removed and replaced with new pipe.

3.6.3. INSTALLATION OF MANHOLES AND PUMPING STATIONS.

3.6.3.1. Handling and Setting Manholes.

Precast manhole sections shall not be shipped or handled until concrete is completely cured. Any damage that occurs during shipping or handling shall be cause for rejection. Precast sections shall be inspected before unloading and any sections that have been damaged or do not meet the specifications shall not be unloaded.

Set the manholes on concrete cradle as detailed. All pipe openings shall be preformed as detailed.

3.6.3.2. Openings and Joints.

Openings around pipes and lift holes shall be completely filled with nonshrink grout and after initial set waterproofed on the outside with two coats of dampproofing. Riser, top, and grade ring joints shall be made using nonshrink grout in a sufficient quantity to cover the joint approximately 1/4 inch thick for a strip 4 inches wide all around the outside of the manhole and waterproofed by covering with two coats of dampproofing. All joints and openings shall be closed upon setting the manhole.

3.6.3.3. Benches and Inverts.

Benches and inverts shall be formed of concrete and accurately shaped to a semicircular section conforming to the inside of the adjacent sewer pipe. Change in size and grade shall be made gradually and evenly. Changes in direction of the sewer and entering branches shall have a radius 1/2 the inside diameter of the manhole. Inverts for straight through manholes shall be constructed by laying the pipe through the manhole and then removing the upper half of the pipe. Benches shall be constructed of concrete and sloped to drain.

3.6.3.4. Grade Rings and Covers.

Grade rings shall be used to bring the manhole cover and frame to an elevation 1/4 inch below finished grade in paved areas and to meet finished grade in other areas. Total height of grade rings shall not exceed 8 inches.

3.6.3.5. Manhole Cover Inserts.

Furnish and install watertight manhole cover inserts where shown on the drawings or designated by the Engineer.

After completion of all other work on the manhole, clean manhole frame bearing surface of all dirt and debris. Place insert with the rim gasket in full contact on the frame bearing surface. Replace the manhole cover being careful to prevent damage to the pressure and vacuum relief valves.

Test the seal with water after installation of the manhole cover insert. If infiltration is more than 1 gallon per 24 hours, remove the manhole cover, reseal the insert rim gasket and retest the seal.

3.6.3. INSTALLATION OF MANHOLES AND PUMPING STATIONS (continued)

3.6.3.6. Installation of Pumping Stations.

Install pumping station structure, enclosure, and mechanical and electrical equipment as shown on the drawings. Installation of pumps, level control system, electrical equipment, and related components shall be in accordance with the manufacturer's instructions.

The electric service for the pumping station shall be as shown on the drawings. Arrangements for the final connection shall be made by the Contractor.

Install an underground electric service at a minimum depth of 24 inches, from the connection on the power company power pole to the meter box. Use galvanized heavy wall rigid conduit from the conduit on the electrical control panel to the power pole.

All electrical work shall conform to National Electrical Code and shall meet all requirements of the New York Board of Fire Underwriters. Upon completion of the work, the Contractor shall furnish a certificate of inspection and approval by the New York Board of Fire Underwriters. Inspections and final approval of the work shall be obtained and paid for by the Contractor.

Provide lightning arresters on the electric service located adjacent to the meter in accordance with National Electrical Code requirements.

Provide the proper electrical equipment including any transformers necessary for the electric service provided, to operate pumps, controls and accessories at their respective voltage and ampere ratings.

All metal conduits, cabinets and other enclosures and neutral conductor of systems shall be permanently grounded to grounding rods or underground piping. Make all ground connections as required by the National Electrical Code. All circuits and feeders shall be tested and proven free of improper grounds.

3.6.4. PREPARATION OF SEWER SYSTEM FOR USE

3.6.4.1. General.

Provide all labor and equipment for cleaning and testing including hoses, pumps, plugs, temporary connections, gauges, meters and measuring devices to perform the specified tests. Testing shall be done under observation of the Engineer for the Town.

3.6.4.2. Water Supply for Testing and Flushing.

The Contractor shall make arrangements for furnishing and disposing of water for testing. Any water obtained from the Town water system requires installation of a water meter and payment for water used.

3.6.4.3. Cleaning and Flushing.

Each section of sanitary sewer shall be flushed to remove all silt, sand, gravel, and other debris prior to testing. Hydraulic propelled devices, rodding equipment or machines for direct removal shall be used if any sections of pipe cannot be flushed clean.

Flushing shall be started at the highest end and proceed to the lowest end of the system. All debris shall be removed at each consecutive manhole and shall not be flushed into downstream sections.

3.6.4.4. Testing Requirements.

All sewers and manholes shall be tested for exfiltration and infiltration. Exfiltration testing of sewers shall be done by the use of compressed air. Manholes shall be tested for exfiltration by water testing or by vacuum testing.

Force mains shall be tested by hydrostatic pressure test.

Any section of sewer and force main, and any manhole that does not meet the specified test results must be repaired and retested until a satisfactory test is completed.

3.6.4.5. Air Testing Main Sewers and Building Sewers.

Building sewers shall be tested with the main sewer and the following procedure shall be used:

- (a) The test shall be conducted between two (2) consecutive manholes.
- (b) The test section of the sewer line shall be plugged at each end. One of the plugs used at the manhole must be tapped and equipped with air inlet connection for filling the line from the air compressor.

3.6.4. PREPARATION OF SEWER SYSTEM FOR USE (continued)

3.6.4.5. Air Testing. (continued)

- (c) Ends of building sewers, cleanouts, stubs and fittings into the sewer test section shall be properly capped or plugged, and carefully braced against the internal pressure to prevent air leakage.
- (d) An air hose shall be connected to tapped plug from the portable air control equipment which shall include valves and pressure gauges to control the air entry rate, and to monitor the air pressure in the pipeline.
- (e) A second air hose shall be connected between the air compressor and the air control equipment.
- (f) Supply air to the test section slowly, filling the pipeline until a constant pressure of 3.5 psig is maintained. The air pressure shall be regulated to prevent the pressure inside the pipe from exceeding 5.0 psig.
- (g) When constant pressure of 3.5 psig is reached, throttle the air supply to maintain the internal pressure above 3.0 psig for at least five minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.
- (h) After the stabilization period, the air pressure shall be adjusted to 3.5 psig and the air supply disconnected. Observe the gauge until the air pressure reaches 3.0 psig. At 3.0 psig, commence timing with a stop watch which is allowed to run until the line pressure drops to 2.5 psig, at which time the stop watch shall be stopped. The time required, as shown on the stop watch, for a pressure loss of 0.5 psig shall be used to compute the air loss.
- (i) An air pressure correction shall be required when the prevailing groundwater is above the sewer line being tested. Under this condition, the air test pressure shall be increased to 0.433 psig for each foot the groundwater level is above the invert of the pipe.
- (j) When building sewers are tested with the main sewers, the time requirement shall be determined by averaging the time for each diameter in proportion to the length of each size of pipe tested.
- (k) If the length of the sewer being tested is less than 200 feet, an adjustment shall be made for the length and diameter of pipe in determining the allowable length of time for the loss of air at the average rate of 0.0011 cubic feet per minute per square foot of internal pipe surface under test from 3.0 psig to 2.5 psig.

Any time in paragraph (h) which is less than 5 minutes, 6 seconds shall be cause for rejection.

3.6.4. PREPARATION OF SEWER SYSTEM FOR USE (continued)

3.6.4.6. Water Testing Manholes.

Exfiltration tests shall be conducted on all manholes by filling the manhole with water to the top of the cast iron frame and allowing to stand for at least two hours. More than one inch drop in water level shall be cause for rejection.

3.6.4.7. Infiltration Testing.

A satisfactory infiltration test will be required for all sections of sanitary sewers before final acceptance of the system. The infiltration test shall include main sewers, building sewers and manholes and the following procedure shall be used.

- (a) The test shall be conducted in the downstream manhole.
- (b) Any leaks into manholes shall be repaired prior to conducting the test.
- (c) Place a V-notch weir into the upstream pipe in the manhole. The weir shall be installed so as to maintain a watertight seal between the weir and the interior surface of the pipe to prevent water by-passing the V-notch weir.

V-notch weirs shall be commercially manufactured specifically for infiltration testing of sewers. All weirs used for testing shall be approved by the Engineer.

- (d) After the V-notch weir has been installed, allow 24 hours for the infiltrating water to build-up and level off behind the weir, and thus permit a steady, uniform flow to pass over the V-notch weir.
- (e) Measurements shall be taken after steady flow occurs over the V-notch weir. Leakage is determined from the readings, either directly or by converting the readings of the flow into terms of gallons per inch of pipe diameter per mile per day.

Infiltration rates exceeding 100 gallons per day per inch of sewer diameter per mile shall be cause for rejection.

3.6.4.8. Deflection Testing.

Deflection tests shall be performed on all flexible pipe main sewers. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5%. If the deflection test is to use a rigid ball or mandrel, it shall have a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.

3.6.4. PREPARATION OF SEWER SYSTEM FOR USE (continued)

3.6.4.9. Vacuum Testing of Manholes.

Each manhole shall be tested immediately after assembly and prior to backfilling. All lift holes shall be plugged with an approved non-shrink grout. All pipes entering the manhole shall be plugged, taking care to securely brace the plug from being drawn into the manhole.

The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturers' recommendations.

A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 48" diameter, 75 seconds for 60" and 90 seconds for 72" diameter manholes.

If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.

3.6.4.10. Testing Force Mains.

Pressure test force mains by filling with water, expelling air, applying hydrostatic pressure of 50 psi above normal operating pressure at lower end of force main for a 2 hour period. After 2 hours, if the pressure has fallen below 50 psi, measure the volume of water necessary to bring pressure up to 50 psi.

Leakage shall not exceed 0.17 gallons per inch of pipe diameter per 1,000 feet per 2 hours. Leakage shall be located and repaired until this limitation is met.

3.6.4.11. Inspection After Testing.

After testing, the Engineer will make a complete visual inspection of the system. The Contractor shall remove and replace manhole covers and furnish lights to assist the Engineer in making this inspection. All defects shall be promptly repaired by the Contractor.

3.6.4.12. Testing Pumping Stations.

The pumping station piping, equipment and control systems shall be tested for proper operation under normal operating conditions. The manufacturer's representative shall inspect the installation and operation of the equipment and controls, and make adjustments as necessary for proper operation of all equipment and systems.

Upon completion of testing, provide manufacturer's certification that the equipment has been installed and operates in accordance with the manufacturer's specifications.

3.7. STORM DRAINAGE SYSTEM

3.7.1. MATERIALS FOR STORM DRAINAGE SYSTEM

3.7.1.1. Storm Sewers.

Reinforced Concrete Pipe (RCP), NYSDOT 706-02, Class IVP, Wall B Minimum, bell and spigot type joints with elastomeric gaskets, or

Corrugated Steel Pipe (CMP), NYSDOT 707-02, helically corrugated, 14 gauge minimum thickness, galvanized, fully bituminous coated, with corrugated steel connecting bands. Provide corrugated, bituminous coated branch fittings for storm sewer laterals, or

NYSDOT 706-14, Corrugated Polyethylene Storm Drain Pipe (CPEP), smooth interior, conforming to AASHTO M-252 and M-294, including split couplings corrugated to engage a minimum of four pipe corrugations and neoprene gaskets, branch tees and laterals. Provide for culverts NSYDOT 707-10 Galvanized Steel End Sections.

3.7.1.2. Culverts and Storm Sewer Laterals.

Corrugated Steel Pipe (CMP), NYSDOT 707-02, helically corrugated, 14 gauge minimum thickness, galvanized, fully asphalt coated, with corrugated steel connecting bands. Provide galvanized steel end sections for culverts.

3.7.1.3. Concrete.

NYSDOT 501-2, Portland Cement Concrete, Class A, conforming to NYSDOT 501-1, 501-2 and 501-3.

3.7.1.4. Reinforcing Steel.

ASTM A-615, Grade 60 deformed reinforcing steel.

3.7.1.5. Nonshrink Grout.

Nonshrink, high strength, non-metallic, water resistant, pre-mixed grout. Octocrete as manufactured by Penncrete Products Company, or equal.

3.7.1.6. Concrete Curing Compound.

ASTM C-309 liquid membrane-forming compound for curing concrete.

3.7.1.7. Concrete Cradle.

NYSDOT 501-2, Portland Cement Concrete, Class B, 2-inch maximum slump.

3.7.1.8. Manholes.

a. Bases, Risers, and Cone Tops.

Precast reinforced concrete manhole units conforming to NYSDOT 706-04 requirements for circular manhole units and ASTM C-478. Refer to Standard Details for dimensions, minimum base slab reinforcing steel and other features.

3.7.1. MATERIALS FOR STORM DRAINAGE SYSTEM (continued)

3.7.1.8. Manholes. (continued)

b. Cover Slabs.

Precast reinforced concrete cover slabs. NYSDOT 555-2, Structural Concrete, Class A conforming to NYSDOT 501-1, 501-2 and 501-3, and ASTM A-615, Grade 60 deformed reinforcing steel. Refer to Standard Details for cover slab dimensions, reinforcing steel and other features.

c. Base, Riser, and Cover Slab Joints.

Tongue and groove joints set in fast setting, nonshrink, high strength, water resistant, nonmetallic, premixed grout.

Continuous solid rubber ring gasketed joints conforming with ASTM C-443 will be considered by the Engineer in lieu of the nonshrink grout joints.

d. Manhole Steps.

Aluminum Alloy 6061-T6, forged from a solid extruded section Part No. 12653A as manufactured by Aluminum Company of America or Relgrit Part No. LR-800 as manufactured by Reliance Steel Products Company, or equal.

The portion of the step embedded in concrete shall be painted with a six mil coat of Bitumastic No. 505 as manufactured by Koppers Company or a 15 mil coat of DeGraco Moisture/Gard 9330 thick black as manufactured by the Detroit Graphite Company, or equal.

e. Dampproofing.

Two 3.6 wet mil coats of tar base paint on the exterior surface. Bitumastic Black solution as manufactured by Koppers Company or DeGraco 9329 Standard Black as manufactured by the Detroit Graphite Company, or equal.

f. Manhole Frames and Covers.

Castings shall be uniform quality and shall be free from blow holes, porosity, hard spots, shrinkage defects, cracks, fins, burrs, sand and slag. Castings shall be cleaned by sand blasting and shall be asphalt coated by the manufacturer. Materials shall conform to ASTM A-48, Class 30.

Castings shall be true to pattern with satisfactory fit of component parts. Bearing surfaces shall be ground or machined. Castings shall be designed to carry a wheel load of 16,000 pounds plus impact.

Total weight of frame and cover shall be 350 pounds.

Standard manhole frame and cover, Catalog No. R-1726, Type B, indented top design as manufactured by Neenah Foundry Company, or Catalog No. 1042 indented top design as manufactured by Syracuse Castings Sales Corporation, or equal.

3.7.1. MATERIALS FOR STORM DRAINAGE SYSTEM (continued)

3.7.1.8. Manholes. (continued)

g. Grade Rings.

ASTM C-478 precast reinforced concrete rings, 2 inches thick, 8 inches wide and 24 inches I.D.

h. Brick.

ASTM C-32 sewer and manhole clay or shale brick.

3.7.1.9. Inlets.

a. Concrete Catch Basins.

Precast, reinforced concrete catch basins conforming to NYSDOT 706-04, designed for AASHTO HS-20 loading. Refer to Standard Details for dimensions and other requirements.

b. Concrete Block.

ASTM C-139 solid load bearing units.

c. Mortar.

ASTM C-270, Type M. Mix design by volume shall be one part Portland Cement, one part masonry cement, and five parts mortar sand. Lime shall not be used.

d. Inlet Frame and Grate.

NYSDOT 655-2.02, Frames and Grates. Rectangular steel welded grates and frames, galvanized, supplied with locking devices.

3.7.2. INSTALLATION OF STORM SEWERS

3.7.2.1. Alignment and Grade.

Pipe installation shall commence at the lowest point with pipe bells laid on the upstream end. Pipe shall be installed at the elevation and grades shown on the drawings and with straight alignment between manholes and inlets.

3.7.2.2. Preparation of Pipe Bed.

The pipe bed shall be prepared using hand tools to shape the bottom of the trench to match the barrel of the pipe with recesses for the joints. The pipe bed shall provide as nearly as possible a uniform and continuous bearing for the full length of the pipe between joints. Tolerances up to 1/4± inch variance in the pipe bed will be permitted.

Except where excavation for rock or unsuitable foundation material is required, care shall be taken not to excavate below the depth necessary to lay the pipe. If excavation does exceed the necessary depth, the trench shall be backfilled under the pipe with crushed stone, thoroughly tamped.

Where rock is encountered, it shall be removed to a depth six inches below the bottom of the pipe. Support the pipe on crushed stone cradle.

Where wet or unsuitable foundation material is encountered, it shall be removed. Support the pipe on crushed stone cradle.

3.7.2.3. Handling Pipe.

The Contractor shall inspect pipe for damages before unloading. The pipe shall be unloaded with care to avoid damage. Pipe shall not be dropped or bumped against pipe already on the ground or any other object. Keep the pipe ends and interior clean.

3.7.2.4. Making Joints.

Joints shall be made in accordance with the manufacturer's instructions and as directed by the Engineer. The coupling or bell already in place shall be cleaned, the gasket inserted in the groove, lubricant applied, and the pipe or fitting carefully pushed into position. A gauge shall then be used to verify that the rubber ring is located in the groove all the way around and is at the proper depth in the joint. Joints shall not be made under water.

3.7.2.5. Installation of Pipe.

Each length of pipe shall rest on the prepared pipe bed or cradle for the full length of the barrel. The pipe shall be laid true to established line and grade to within 1/4 inch. Any pipe that is disturbed after laying shall be taken up and relaid.

If a trench shield is used, the pipe joint shall not be covered until after the shield has been advanced in the trench and the joint has been inspected for movement.

3.7.2.6. Repairs.

If it is necessary to repair or relay a section of pipe due to broken pipe, faulty line or grade, or any other reason, repair clamps shall not be used, but the pipe to be repaired shall be removed and replaced with new pipe.

3.7.3. INSTALLATION OF MANHOLES

3.7.3.1. Handling and Setting Manholes.

Precast manhole sections shall not be shipped or handled until concrete is completely cured. Any damage that occurs during shipping or handling shall be cause for rejection. Precast sections shall be inspected before unloading and any sections that have been damaged or do not meet the specifications shall not be unloaded.

Set the manholes on concrete cradle as detailed. All pipe openings shall be preformed as detailed.

3.7.3.2. Openings and Joints.

Openings around pipes and lift holes shall be completely filled with nonshrink grout and after initial set waterproofed on the outside with two coats of dampproofing. Riser, top and grade ring joints shall be made using nonshrink grout in a sufficient quantity to fill the joint completely and to cover the joint approximately 1/4 inch thick for a strip 4 inches wide all around the outside of the manhole and waterproofed by covering with two coats of dampproofing. All joints and openings shall be closed immediately upon setting the manhole.

3.7.3.3. Benches and Inverts.

Benches and inverts shall be formed of concrete and accurately shaped to a semicircular section conforming to the inside of the adjacent sewer pipe. Change in size and grade shall be made gradually and evenly. Changes in direction of the sewer and entering branches shall have a radius $\frac{1}{2}$ the inside diameter of the manhole.

3.7.3.4. Grade Rings and Covers.

Grade rings shall be used to bring the manhole cover and frame to an elevation 1/4 inch below finished grade in paved areas and to meet finished grade in other areas. Total height of grade rings shall not exceed 8 inches.

3.7.4. INSTALLATION OF INLETS.

Construct inlets in accordance with NYSDOT 604-3, and as shown in the Standard Details, with full mortar joints not greater than 1/2-inch wide.

Openings around pipes shall be completely filled with non-shrink grout. Inverts and benches shall be formed of concrete and shaped to drain.

Frames and grates shall be set in full mortar beds.

3.7.5. PREPARATION FOR USE

3.7.5.1. Cleaning.

All pipes and appurtenances shall be cleaned by flushing or mechanical methods to remove all foreign material. Water shall be furnished and disposed of by the Contractor. Any water obtained from the Town water system requires installation of a meter and payment for water used.

3.7.5.2. Inspection.

After cleaning, the Engineer will make a complete visual inspection of the system. The Contractor shall remove and replace manhole covers and furnish lights to assist the Engineer in making this inspection.

3.8. ROADWAYS AND STREETS

3.8.1. MATERIALS.

3.8.1.1. Granular Fill.

NYSDOT 203-2.02C, Select Granular Fill except that the material shall have the following gradation:

<u>U.S. Standard Sieve</u>	<u>Percent Passing By Weight</u>
2"	100
No. 40	0 - 70
No. 200	0 - 15

3.8.1.2. Foundation Course.

NYSDOT 304-2, Subbase Course, Type 4, gravel or crushed stone, with the following gradation limits:

<u>U.S. Standard Sieve</u>	<u>Percent Passing By Weight</u>
2"	100
1"	75 - 100
1/4"	30 - 65
No. 40	5 - 40
No. 200	0 - 10

3.8.1.3. Crushed Stone for Underdrain.

NYSDOT 703-0201, Crushed Stone, consisting of equal parts of Size 1 and 2 washed crushed stone.

3.8.1.4. Filter Fabric for Underdrains.

High porosity nonwoven geotextile fabric composed of polypropylene filaments, Mirafi 140N as manufactured by Mirafi, Inc.

3.8.1.5. Underdrain Pipe.

NYSDOT 707-02, Corrugated Steel Pipe (CMP), helically corrugated, 16 gauge, perforated, galvanized, conforming to AASHTO M36, including corrugated, galvanized connecting bands, or NYSDOT 706-14, Corrugated Polyethylene Storm Drain pipe (CPEP), perforated, conforming to AASHTO M252, including corrugated split couplings.

3.8.1. MATERIALS. (continued)

3.8.1.6. Geotextile Fabric.

Nonwoven or woven geotextile fabric for stabilization of soft subgrade, conforming to AASHTO/ AGC Task Force 25 Specifications and the following minimum requirements:

<u>Fabric Property</u>	<u>ASTM</u>	<u>Property Value</u>
Tensile Strength	D-4632	180 lbs.
Puncture	D-4833	75 lbs.
Trapezoidal Tear	D-4533	75 lbs.
UV Resistance	D-4355	70%

3.8.1.7. Crushed Stone.

NYSDOT 703-0201, Crushed Stone, Size 1A for surface treatment, or size selected by Engineer.

3.8.1.8. Bituminous Material.

NYSDOT 702-3101, Asphalt Emulsion, Grade RS-2, or grade and type of material selected by Engineer and Contractor.

3.8.1.9. Asphalt Concrete.

NYSDOT 401-2, Bituminous Plant Mix, Type 3 Binder Course and Type 7 Top Course.

3.8.1.10. Concrete.

NYSDOT 501-2, Portland Cement Concrete conforming to NYSDOT 501-1, 501-2 and 501-3. Class and compressive strength as specified.

3.8.1.11. Sidewalks.

NYSDOT 608-2, Concrete Sidewalks, Class A, except that wire fabric reinforcing shall be omitted. Minimum 4000 psi 28 day compressive strength.

3.8.1.12. Concrete Gutters.

NYSDOT 624-2.02, Conventionally Formed Concrete Gutters, Class A concrete, minimum 4,000 psi 28 day compressive strength. NYSDOT 624-2.05, Machine Formed Concrete Gutters. Submit concrete mix design to Town Engineer for approval. Minimum 4,000 psi 28 day compressive strength, air content 7%.

3.8.1.13. Joint Fillers.

NYSDOT 705-07, Premoulded Bituminous Joint Filler.
NYSDOT 705-02, Asphalt Filler.

3.8.1.14. Curing Compound.

NYSDOT 711-05, Membrane Curing Compound.

3.8.2. PREPARATION OF SUBGRADE.

Preparation of subgrade shall not be started until all underground utilities are installed, tested and found acceptable by the Town.

After completion of all underground construction, grade the subgrade surface to the required cross-section and grade, and compact it to form a smooth surface free of ruts, depressions and mounds. The final subgrade surface shall not deviate more than 1 inch from the required grade and cross-section.

The Contractor shall notify the Town Highway Superintendent, the Developer's Engineer, and the Engineer for the Town when the subgrade is completed. The completed subgrade shall be proof-rolled with a roller of not less than 10 tons operating weight. The subgrade shall not roll, deflect or displace when proof rolled.

Remove any soft or saturated subgrade material, replace it with granular fill and compact in accordance with requirements for Backfill and Embankments.

3.8.3. FOUNDATION COURSE.

Do not start placing foundation course material until the subgrade is proof-rolled and inspected and approved by the Town Highway Superintendent or Town Engineer.

Place, grade and compact the foundation course on completed subgrade surface to the alignment, grade and cross-section shown on the drawings. The subgrade surface shall be free of standing water, snow, ice and frozen material prior to placing the foundation course.

Construct the foundation course in accordance with NYSDOT 304-3. Compaction shall be in accordance with applicable requirements of NYSDOT 203-3.12, and shall provide not less than 95% of the maximum dry weight density of the material as determined by ASTM D698.

Construct the foundation course for roads and streets in two equal lifts to a minimum total compacted thickness of 12 inches. Construct the foundation course for sidewalks and gutters in a single lift to a minimum compacted thickness of 6 inches.

Adjust all manhole and drop inlet frames and covers, valve boxes, and other appurtenances to conform to finished grades.

3.8.4. UNDERDRAIN CONSTRUCTION.

If ground water or unsuitable soil conditions are encountered, the Developer shall be required to install perforated underdrain and crushed stone weeps to drain the subgrade. Construction of underdrain shall not be started until preparation of subgrade is completed.

Excavate the underdrain trench to conform to the Standard Detail. Place filter fabric carefully in the trench. Provide sufficient width to allow wrapping of the fabric over the top of the underdrain trench with a minimum of one (1) foot overlap. Transverse splices shall be in accordance with manufacturer's instructions.

Place the underdrain pipe in the trench with perforations in the down position and cap the high end of the pipe.

Stone shall then be carefully placed on the fabric and around the pipe, brought to normal subgrade elevation, and compacted prior to placement of the road base. After the stone has been placed, the filter fabric shall be wrapped over the top of the weep and fastened. Connect underdrain pipe to drop inlets and storm manholes.

3.8.5. PAVEMENT CONSTRUCTION.

3.8.5.1. General.

After completion of the foundation course and only after inspection and approval by the Town Highway Superintendent, construct pavements to the alignment, grade and cross-section shown on the drawings. The foundation course shall be free of standing water, snow, ice and frozen material prior to and during pavement construction.

The finished pavement surface shall be dense, smooth, free of ruts, ridges, roller marks, cracks, depressions or other irregularities. Any defective pavement that cannot be corrected by additional rolling, shall be removed and replaced with new pavement.

The type of pavement shall be as shown on the drawings and on typical sections.

3.8.5.2. Asphalt Concrete Binder.

Binder shall be constructed to a minimum compacted thickness of two (2) inches, or greater thickness shown on the drawings, in accordance with applicable requirements of NYSDOT 401-3. The material shall be placed with a self-propelled bituminous paver conforming to NYSDOT 401-3.05, and compacted with vibrator type or static steel wheel type roller conforming to NYSDOT 401-3.06.

Install a temporary asphalt binder rebate along the gutter, flush with the top of concrete. Installation shall be performed to provide a smooth ingress and egress to existing driveways. Maintain and protect the asphalt rebate until removal. Remove and dispose of all binder rebate material prior to asphalt top course placement.

3.8.5.3. Asphalt Concrete Top.

Before placing of the top course, the binder shall be cleaned of mud, dust and debris, and shall be inspected by the Town Highway Superintendent. Tack coat shall be applied at a rate of 0.1 gallon per square yard before placing the top course. Any depressions or settlements in the binder shall be repaired by shimming before placing the top course.

Top course shall be constructed to a minimum compacted thickness of one (1) inch, or greater thickness shown on the drawings, in accordance with applicable requirements of NYSDOT 401-3.

Placing and compaction shall be as specified for the binder course.

3.8.5.4. Bituminous Surface Treatment.

Bituminous surface treatment shall be constructed on completed foundation course in accordance with NYSDOT 410-3.02 - Bituminous Surface Treatment - Double Course for Pavement, by applying a first course of 0.25 - 0.50 gallons per square yard of bituminous material and 20 - 30 pounds per square yard of crushed stone, followed by a second course of 0.25 - 0.40 gallons per square yard of bituminous material and 15 - 25 pounds per square yard of crushed stone.

3.8.5. PAVEMENT CONSTRUCTION. (Continued)

3.8.5.5. Stabilized Shoulders.

Stabilized shoulders shall be constructed on completed foundation course in accordance with NYSDOT 410-3.03 - Bituminous Surface Treatment - Single Course for Shoulders, by applying 0.4 gallons per square yard of bituminous material followed by 20-30 pounds per square yard of crushed stone.

3.8.6. CONCRETE GUTTERS.

3.8.6.1. General.

Concrete stone weeps shall be provided under all concrete gutters.

Concrete gutters shall be constructed using conventional steel forms or machine forming.

Before setting forms, the foundation course shall be inspected by the Town Highway Superintendent. Any ruts, depressions and soft areas shall be corrected and the surface regraded and thoroughly compacted. The foundation course shall be thoroughly wetted before placing concrete.

Construct concrete gutters where indicated on the drawings in accordance with the Standard Details and NYSDOT 624-3.02.

3.8.6.2. Casting Segments.

Conventionally formed gutters shall be cast in 8-foot segments. An 1/8-inch thick separator plate cut to fit the section shall be used in each joint and removed as the concrete hardens, or the gutter may be constructed in alternate sections, 24 hours to elapse before construction of adjacent sections. Construction joints shall be poured full with Asphalt Filler.

3.8.6.3. Conventional Forms.

Forms shall be steel, straight, free from warp, and constructed not to interfere with inspection for grade or alignment. All forms shall extend for the full gutter depth and shall be braced and secured to prevent displacement from alignment during placing of concrete.

3.8.6.4. Concrete Placing and Finishing.

Concrete shall be placed in conventional forms in accordance with the applicable requirements of NYSDOT 555-3.04. Excess concrete shall be screeded off perpendicular to the flow line of the gutter. Forms shall be left in place for 24 hours or until the concrete has sufficiently hardened, as determined by the Engineer, so that they can be removed without damage to the gutter.

The gutters shall be finished to produce a smooth surface and then lightly broomed to a uniform texture.

3.8.6. CONCRETE GUTTERS. (Continued)

3.8.6.5. Machine Forming.

Gutter shall be machine formed to the proper line and grade. The Engineer may require the Contractor to demonstrate that the specific equipment he proposes to use is capable of satisfactorily placing the concrete mix.

Any gutter placed outside of tolerance of $\frac{1}{2}$ inch of the established line or $\frac{1}{4}$ inch of the established grade shall be removed and replaced at the Contractor's expense.

Maximum placement slump shall be $2\frac{1}{2}$ ". Air content shall be within $\pm 1\%$ of design.

3.8.6.6. Contraction Joints.

Contraction joints for machine formed gutter shall be spaced every 10 feet and formed or sawcut $\frac{1}{8}$ " wide and $\frac{3}{4}$ " deep. The sawcut or formed joints shall be left unfilled.

3.8.6.7. Expansion Joints.

Expansion joints for conventionally formed and machine formed gutter shall be $\frac{1}{2}$ -inch wide and shall be formed with Joint Filler, placed at intervals not to exceed 50 feet. The filler material shall be cut to conform to the cross-section of the gutter and shall extend the full width and depth of the gutter.

3.8.6.8. Concrete Curing.

Curing shall comply with the requirements of NYSDOT 502-3.10, Curing. Curing compound shall be applied by spraying in accordance with manufacturer's instructions upon initial setting of the concrete.

3.8.6.9. Protection.

The Contractor shall keep the gutter clean, aligned, and protected from damage until final acceptance of the work. Any gutter damaged prior to final acceptance of the work shall be repaired or replaced at the Contractor's expense.

3.8.7. CONCRETE SIDEWALKS.

3.8.7.1. General.

Before setting forms, the foundation course shall be inspected by the Town Highway Superintendent. Any depressions, ruts and soft areas shall be corrected and the surface regraded and thoroughly compacted. The foundation course shall be thoroughly wetted before placing of concrete.

Construct concrete sidewalks where shown on the drawings in accordance with the Standard Details and NYSDOT 608-3.01.

3.8.7. CONCRETE SIDEWALKS. (Continued)

3.8.7.2. Forms.

Forms shall be steel, straight, free from warp and constructed not to interfere with screeding of concrete. Wood forms may be used only for curved sections. All forms shall extend the full 5-inch depth of the sidewalk and shall be braced and secured to prevent displacement of alignment during placing of concrete.

3.8.7.3. Concrete Placing and Finishing.

Concrete shall be placed to the full depth shown on the drawings and in the Standard Details.

Transverse construction joints shall extend to the full depth of the slab and shall be spaced 20 to 25 feet apart. The edges of joints shall be finished with an edging tool having a 1/4-inch radius.

A premolded bituminous joint filler 1/2-inch thick shall be installed at all construction joints and joints between sidewalk and curb, pavement and buildings.

The concrete surface shall be scored at intervals of three to five feet so that the finished walk will be marked in squares. The concrete shall be finished to produce a smooth surface and then lightly broomed to a uniform texture.

3.8.7.4. Curing.

Curing shall comply with the requirements of NYSDOT 502-3.10. Curing compound shall be applied by spraying in accordance with manufacturer's instructions upon initial setting of the concrete.

3.8.7.5. Protection.

The Contractor shall keep the sidewalk clean and protected from damage until final acceptance of the work. Any sidewalk damaged prior to final acceptance of the work shall be repaired or replaced at the Contractor's expense.

3.8.7.6. Detectable Warnings.

Install stamped concrete detectable warnings during construction of sidewalk curb ramps. Dark gray color shall be applied immediately before stamping.

3.8.8. STREET AND TRAFFIC SIGNS.

3.8.8.1. Street Signs.

Street signs shall be provided at all street intersections, shall be of the type approved by the Town Highway Superintendent, and shall conform to the requirements of NYS Manual of Uniform Traffic Control Devices.

3.8.8.2. Traffic Signs.

Traffic signs shall be provided at intersections designated by the Town Highway Superintendent and shall conform to the requirements of NYS Manual of Uniform Traffic Control Devices.

3.8.9. MONUMENTS.

Monuments shall be 4-inch diameter or square precast concrete 36 inches long, with a ½ -inch steel reinforcing rod embedded in the center. The top of the rod shall serve as the point of reference.

Monuments shall be installed plumb, with the top set 1/4-inch lower than adjacent finished grade, at the locations shown on the approved final plans and staked out by a Licensed Surveyor. Fill the space around the monument with thoroughly compacted dry concrete.

3.8.10. PROPERTY CORNER MARKERS.

During construction lots may be staked with wood hubs. After construction and final grading is completed, permanent corner markers consisting of 3/4-inch diameter solid steel rod 24-inches long shall be set by a Licensed Surveyor at all corners of each lot.

The top of the rod shall be set 1/4-inch lower than adjacent finished grade.

At the option of the property owner, monuments conforming to Section 3.8.8. may be used in lieu of steel rods.

3.8.11. TOWN ROAD CROSSINGS.

Town road crossings shall be made by boring unless specific approval is granted by the Town Highway Superintendent for open cut. If crossing by open cut is approved, the road shall be repaired in accordance with the Standard Detail of Typical Town Road Crossing.