

SITE DESIGN AND DEVELOPMENT CRITERIA

As adopted by the Marcellus Village Board of Trustees on

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**Village of Marcellus
Site Design and Development Criteria**

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SECTION 1 General Information

1.1 Purpose

The purpose of these Specifications is to provide minimum criteria for the design and construction of improvements within the Municipality which, upon the satisfactory completion thereof, may be offered for dedication to the Village of Marcellus for perpetual operation and maintenance. The information contained in this document is to be used in conjunction with the subdivision and site plan regulations provided in the Village Code.

The criteria established is intended to provide minimum standards, which may be upgraded to serve the best interests of the Municipality. The information in this booklet is provided to aid in the submission of material in a uniform manner and attempt to expedite the various review and approval procedures.

These criteria shall govern in all areas of private, public, industrial and commercial development and/or areas that will involve the connections to existing municipal systems.

Developers are required to follow all the regulations relating to the: NYS DEC SPDES Permit for Stormwater Discharges from Construction Activities for General Construction and the NYS Stormwater Management Design Manual. The development must provide the appropriate Stormwater Pollution Prevention Plan (SWPPP) and ensure the equivalency of the design specification to the erosion and sediment control practices and performance criteria and the sizing criteria of post construction practices.

1.2 Responsibility

It is the responsibility of the Developer to insure preparation of Plans sufficient to meet the standards and requirements herein incorporated. Said Plans shall be prepared by a professional, licensed in the State of New York, who shall have experience in design of land development.

The municipality and/or its representatives shall review the proposed Plans as to their compliance with the standards and conditions encountered while meeting the best interests of the Municipality.

It is the responsibility of the Contractor, acting for the Developer, to construct the facilities in conformance with the approved Plans, Village standards and MS4 requirements.

Construction observation shall be provided by the Municipality or its designated representative to review construction as it is being performed.

The final results of the project remain the prime responsibility of the Developer and until the development is satisfactorily approved by the Municipality and/or its representatives, said development shall not be accepted for dedication.

The Applicant's Design Engineer shall provide a certificate of completed construction to the Department of Health upon completion of construction (i.e. completed works for water).

1.3 Building Permits

Building permits shall not be granted until:

- A. An approved subdivision plat is filed in the office of the Onondaga County Clerk and the liber and page is filed with the Village Office; and/or
- B. An approved site plan is filed in the Village Office; and/or
- C. Either an area variance or use variance has been granted by the Zoning Board of Appeals; and/or
- D. A special use permit has been granted by the Planning Board.

1.4 Dedication of Improvements

All utilities including: sanitary sewers, storm sewer systems and stormwater management facilities, roads, sidewalks and landscaping in the right-of-way and easements shall be completed, tested and dedicated to the Village prior to any service connections being made.

1.5 Utilities

If sewer, water, gas, electrical, street lighting or other public utility facilities are to be located within street right-of-way, their location and installation shall be coordinated so that they may be added to, repaired or enlarged at minimum cost.

Lighting is required by the Village. Where required by the Planning Board, the developer shall first be responsible for the installation of street lights in accordance with the Board's condition of final approval.

Where proposed development abuts adjacent lands (identified in the comprehensive plan as being) suitable for future development, then the utilities shall be installed within the site seeking approval up to the property line and an easement granted to the Village for access and maintenance purposes.

1.6 Road Construction

Due to the general soil conditions within the Village and normal construction sequences for development, it is deemed to be in the best interests of the Village that the following procedures be followed:

- A. Binder material shall not be placed prior to the completion and approval of all underground utilities and inspection of the base by the Department of Public Works.
- B. The weather and seasonal limitations as specified under the Standard Specifications of New York State D.O.T. shall apply for placing of bituminous mixtures.

Restrictions (a) and (b) imply completion of all underground systems well in advance of the Developer's schedule for paving.

- C. No Certificates of Occupancy will be approved unless a proper road surface as herein specified has been constructed.
- D. Should construction sequences not allow the required road construction to be completed in the current construction season, the Developer shall provide a temporary road surface as herein specified over which proper ingress and egress throughout the development can be obtained by the residents, school buses, emergency vehicles and highway plows.

The temporary road surface shall only be accepted should the Developer and/or Builder desire Certificates of Occupancy for any residences within the development.

- E. Upon the completion of the binder pavement and all other items related to the completion of a project, the Village may elect to accept for dedication the completed facilities if (1) a two-year maintenance agreement (letter of credit or certified check) is submitted to and accepted by the Village (2) the Developer presents a sum of money to complete the top pavement course by Village in the future. The amount of money to be transferred to the Village will be established by the Department of Public Works. This sum shall include the cost of the Village's labor and material to cause the proper installation of the top course.

It is the intent of this option by the Village to allow the Developer to offer the project for dedication before the final pavement is installed. In the opinion of the Village and when the Developer has substantially completed the related construction in the developed area, the Village will install the final pavement top. In this manner the area will receive a

new pavement top that has not been marred or patched as a result of normal construction activity.

Before the expiration of the maintenance agreement and before the final top is applied, the Village and the developer will hold the final site review to assess any damages or repairs that may be necessary by the developer under the maintenance agreement.

1.7 Haul Roads

Haul roads are temporary roads built to facilitate the movement of people, materials and equipment along the route of a job off of existing public roads. Haul roads may be required by the Planning Board, when applicable upon review with the Department of Public Works, Village Code Enforcement Officer, Village Board and/or Village Engineer. All vehicles 10 tons or more are required to use the haul roads. Performance bonds [a form of surety acceptable by the Village Board] may also be considered as an option in lieu of construction of a haul road for necessary repair and maintenance of existing public roads.

1.8 Driveway Culverts

New driveway culvert installation shall be the responsibility of the landowner. The Department of Public Works shall review approve the proposed location, size and material of such culverts. See Section 2.5 and 2.6 and associated Appendices for additional design information regarding driveways.

The Village reserves the right to remove and/or install driveway or roadway culverts along existing Village roads to properly transmit surface drainage as determined by the Department of Public Works.

1.9 Financial Guarantees

The following guarantees will be required:

A. Letter of Credit

An irrevocable letter of credit shall be submitted by the developer to insure the installation of improvements in an amount determined by the Developer's Engineer and approved by the Village Board.

The amount shall include but not be limited to the following items (see G-Series Appendices):

- 1) Total estimated construction cost of all utilities, laterals, water services, roads, gutters, earthwork, sidewalks, stormwater management facilities, etc.
- 2) Minimum 10% contingency factor

- 3) Street signs and surveyor's monuments
- 4) Record Maps

B. Inspection of Improvements

A deposit for inspection fees is to provided in accordance with Section 223-3.20 of the Village Code.

1.10 Partial Releases of Credit

Refer to Section 5 of this manual.

1.11 Maintenance Guarantee

A maintenance guarantee (an irrevocable Letter of Credit, bond, or other form of surety acceptable to the Village) shall be provided guaranteeing the total construction value of the project against faulty workmanship or materials for a period of one (1) years after acceptance by the Village Board. Individual portions of the project, i.e., sanitary system, storm sewer system, can be guaranteed after their individual acceptances by the Village The financial guarantee for the pavement, gutters, curb, street lights and/or sidewalks will not be accepted until the entire project is ready for dedication (see Section 5 for procedural requirements).

1.12 Methods of Release of Funds

A. Surety Release Procedure

The procedure required for the release of funds is referenced in Section 5 of this manual. Please refer to Appendix G-2.0 for the approved Letter of Credit Release Form.

B. Release of Retainage

Retainage release shall be considered only after a one-year maintenance bond has been accepted by the Village Board and after the systems have been tested, approved and dedicated to the Village (see Section 5 of this manual for additional procedural requirements).

C. Release of Maintenance Guarantee

Release of Maintenance Guarantee shall be authorized in writing by the Village Mayor upon final inspection of the project site and signing off by Village authorities including the Department of Public Works, and Village Engineer. This inspection shall be completed at least sixty (60) days before the expiration of the Maintenance Guarantee (see Section 5.13 Maintenance Guarantee and Section 5.14 Final Release of Funds of this manual for additional procedural requirements).

1.13 Applicability of Regulations

The regulations contained in Sections 2, 3, 4 and 5 of this document shall **apply to all improvements** within the Village of Marcellus.

1.14 Record Information

The Village reserves the option to complete the record drawings themselves and draw from the letter of credit, bond, or other surety the appropriate monies to complete them.

Record Information shall be provided in accordance with the New York State Department of Transportation (NYSDOT) Land Surveying Standards and Procedures Manual, latest revision. Standards procedures, Control Network Densification and Extensions Surveys are performed to Federal Geodetic Control Subcommittee Standards and Specifications approved by NYSDOT and the National Geodetic Survey.

The Base Mapping Digital Terrain Models and Geometry shall conform to the NYSDOT CADD Software Standards and the NYSDOT CADD Standards and Procedure Manual (see Section 5 for additional Record Information requirements).

1.15 Review of Plans

Refer to the Village Land Use Subdivision Regulations for procedures and timeline for plan submissions and approvals.

SECTION 2 Design Criteria

2.1 Sewage Disposal Systems

Connection to the Village Sewer system is mandatory. On-site wastewater treatment and disposal is not permitted.

A. Public Sanitary Sewers (see also S-series Appendices)

A minimum 20-foot sanitary sewer easement shall be provided to the Village and may be greater where conditions necessitate additional width (i.e. sewers deeper than 12 feet) as determined by the Village. Additionally, no structures shall be within 5-feet of the easement.

Minimum requirements shall be as established by the New York State Department of Health and/or the Department of Environmental Conservation, the Village of Marcellus Sewage and Sewage Disposal Law(s) except as noted herein:

1. Gravity Sewers

- a. Sewer mains shall be a minimum of 8-inch diameter.
- b. Manhole spacing, maximum of 400 L.F.
- c. The sewer shall be designed at such a depth to provide basement drainage. If site conditions are such that basement drainage cannot be provided to all units, a specific note to that effect shall be placed on the plan.
- d. Water mains, sewer mains and sewer laterals shall not be allowed in a common trench. There shall be at least a ten-foot (10') horizontal separation between the water service and this sewer lateral all the way to the basement wall with a minimum eighteen-inch (18") vertical separation.
- e. All necessary mains and laterals required to connect to the public sewage system as shown on the final approved plan shall be installed by the Developer.
- f. Elevations - Where other utilities parallel or cross the sanitary system, vertical clearance between the systems shall be provided to permit the satisfactory installation of all services.
- g. Laterals for each individual lot shall be:
 - i) Minimum of 4 inches in diameter.
 - ii) Slope shall be between 1/8"/L.F. (1%) and 1/2"/L.F., or as approved by the Department of Public Works.

- iii) Cleanouts shall be provided at a maximum distance of 85 feet and one shall be located on the right-of-way or easement line.
- h. Sanitary Manholes – for sewer 8"- 12", minimum 4'-0" inside diameter; over 12", minimum 5'-0" inside diameter; three or more pipes in a manhole requires a 5'-0" inside diameter. Larger pipes may require special design.
- i. Connections to existing manholes shall utilize core boring with no impact tools and rubber boots with stainless steel snap locks or screw-wedge or sand collars epoxied in place.

2. Pressure Sewers

- a. Sewer mains shall be a minimum of 8-inch diameter.
- b. Pressure sewer systems shall be laid out in a configuration that is hydraulically efficient.
- c. Access shall be provided at the upstream end of each forcemain branch.
- d. All appurtenances and fittings shall be compatible with the piping system designed and shall be full bore with smooth interior surfaces.
- e. Building service connections shall have a minimum diameter of 1-1/4 inches and shall tap into the forcemain with a corporation stop. A check valve shall be provided near the service pump.
- f. The required pipe size shall be determined on the basis of these principal criteria:
 - i) Velocities adequate to assure scouring should be achieved
 - ii) Size should be determined on the basis of the required flow rate
 - iii) Head loss should not exceed pumping pressure capabilities
- g. A velocity of two to five feet (2' – 5') per second must be achieved at least once and preferably several times per day based on design flows.
- h. Design shall be for peak sewage flow rate and negligible infiltration
- i. Four-inch (4") diameter pipe shall be the smallest used for raw sewage forcemains. Smaller pipe may be considered if

grinder pumps or similar equipment are installed. These instances will be reviewed on an individual basis.

- j. Automatic air-relief valves shall be provided at high points and major changes in slope in the forcemain to prevent air locking.
- k. Forcemains shall enter a gravity sewer at the bottom of a manhole in line with the flow. If this is not possible, the forcemain shall not enter the receiving manhole more than two feet (2') above the flow line.
- l. Forcemains in systems that operate on a seasonal basis shall be provided with draining capability.
- m. Normal operating pressure shall be in the range of 40-60 psi and shall not exceed 60 psi for any appreciable amount of time.
- n. Cleanouts shall be placed at a maximum spacing of 400 feet, at major changes in direction and where one collector main joins another main. These cleanouts shall include an isolating valve and capped Y-branch fitting located on either side of the isolating valve and pointed upstream and downstream for access during maintenance procedures.

3. Sewage Lift Stations

- a. In all cases, the use of gravity systems is encouraged over pump stations. Specific geographic and/or topographic areas may require the use of sewage lift stations to transmit contributory flows to the trunk sewer system.
- b. In all cases, the use of gravity systems is encouraged over pump stations. Specific geographic and/or topographic areas may require the use of sewage lift stations to transmit contributory flows to the trunk sewer system.
- c. Before sewage pumping stations are designed they will be discussed with the Village to provide compatible equipment to that already in use.
- d. Compliance with Design Criteria of the New York State Department of Environmental Conservation recommended standards for Wastewater Facilities (latest edition).
- e. Provision of an audible and visual high-water alarm system, battery back-up operated.
- f. Provision to operate pumps on supplied auxiliary power equipment.

- g. Pump stations shall be designed to have the controls and motors above ground, unless approved otherwise by the Village.
- h. Elapsed time meters shall be provided on the motors to determine quantity of flow being pumped from the station.
- i. Provision for telemetry system which will be equivalent and compatible to the existing telemetry systems used at other Village pump stations and as required by the Department of Public Works.

2.2 Storm Drainage Systems (See ST-series Appendices)

A. General Design Criteria

This section is to provide guidance for the design of storm drainage facilities within an MS4. These facilities shall be designed to collect and transport the run-off from streets, lawns, paved areas, roof areas, and upstream areas while meeting the NYS DEC and Village/MS4 requirements. The developer is required to follow the most current edition of New York State New York State Stormwater Management Design Manual. Also, is required to file for latest version of the State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Construction Activities (Construction General Permit) and submit a Notice of Intent (NOI) form to obtain permit coverage. Prior to submitting this information to NYSDEC for coverage, an MS4 SWPPP Acceptance Form is required to be completed and submitted to the Village of Marcellus for approval. Once approved, this form is to be submitted to NYSDEC along with the SWPPP and NOI. A copy of the MS4 Acceptance form is to remain within the approved SWPPP.

As the Village of Marcellus is located within an Enhanced Phosphorus Removal Watershed listed in Appendix C of the Construction General Permit, all development requiring a SWPPP with post-construction stormwater management practices are required to comply with Enhanced Phosphorus Removal Standards as described in Chapter 10 of the NYSDEC Stormwater Management Design Manual.

In general, the preservation of natural watercourses is preferable to the construction of drainage channels and wherever practical such natural watercourses should be preserved. Storm sewers and drainage facilities shall be based upon a design flow with the minimum return interval of ten (10) years. The design of natural watercourse channels shall depend upon the drainage area according to the following table:

DESIGN RETURN INTERVALS FOR NATURAL WATERCOURSES

<u>Drainage Area</u>	<u>Recurrence Interval</u>
Above 20 square miles	100 years
Between 4 to 20 square miles	50 years
Less than 4 square miles	25 years

Storm drains and channels shall be designed and provided to adequately convey the anticipated runoff from the development, as well as, all contributing area upstream or uphill from the development in question. The minimum size piping used for storm drains shall be twelve (12") inches, except that catch basin crossovers may be eight (8") inch diameter piping.

The minimum curve number to be used is shall be based upon the most current NYSDEC Stormwater Management Design Manual. Runoff within the subdivision shall be computed by TR-55, TR-20 or other computer modeling software. Design of major channels or piping systems conveying water through the subdivision shall be designed using the "25-year storm". The design engineer shall give particular attention to time of concentration in hilly areas. Analysis of the time of concentration shall be submitted to the Village for review and approval.

Points of discharge shall be recognized U.S.C. & G.S. drainage courses which may require the Developer to acquire downstream easements for dedication to the Village.

Culverts shall be designed to accommodate the design storm for the drainage area but shall be checked for the next highest increment of storm return interval to evaluate the possible complications or as required by the Village of Marcellus. Headwater and/or tailwater calculations will be required to determine ponding that may occur. In general, the use of multiple culverts is discouraged because of maintenance problems. Inlets and outlets of culverts shall be protected from erosion or turbulence problems by the use of rip-rap, headwalls, energy dissipaters, etc.

Backyard swales shall be designed with minimum side slopes of 1 on 4 and a minimum longitudinal slope of 1.0 percent. Field inlets shall be generally provided every 300 lineal feet at all low points and where swales intersect.

Retention or detention ponds may be required for developments within the Village where, in the judgment of the Planning Board and the Village, these facilities may be applied to the existing conditions or topography which dictate the practicality of this alternative.

If a detention pond is to be used on the site, the following parameters shall be adhered to:

- a. Pond shall be designed to accommodate the 100-year, 24 hour design storm plus a 1'-0" minimum freeboard.
- b. The pond outlet should be protected against erosion.
- c. An overflow mechanism should be designed to allow for the next larger return interval design storm.
- d. Ponds designed in fill or using dikes shall consider soil stability of the facility.
- e. Runoff calculations for larger facilities may use alternate methods such as the unit hydrograph or one of the Soil Conservation Service methods applicable to the situation and acceptable to the Village.

The Design Engineer shall submit as a minimum, the following information for review of the drainage design:

- a. Manual calculations, or hydrology reports generated by hydrology modeling software, meeting or exceeding NYSDEC requirements. Report shall be sufficiently detailed and shall include any information required by the Village Code Enforcement Officer or Village Engineer. Software analysis may be required by the village if manual calculations would result in oversimplification.
- b. A map of the development showing the drainage analysis area, time of concentration paths, and the location of all nodes identified in the hydrology model. Such mapping shall be provided for both the existing conditions and proposed conditions.

The developer's engineer shall be responsible for furnishing, as part of their plans to be presented before the Planning Board, full and sufficient calculations and details of all hydraulic structures. This includes, but is not limited to, cross sections of drainage channels, special manholes and all such other items as may be necessary to establish fully the methods and materials to be followed in construction.

The developer's engineer shall design the vertical control of their subdivision so that surcharge of storm drainage systems will not cause a backup or flooding of basements. This will normally require that cellar drains not be connected to the storm drainage system unless (a) the cellar floor is higher than pavement grade in order that the street drainage system can run fully surcharged or (b) that basements drainage discharges through a sump pump and check valve.

B. Accommodations for House and Lot Storm Drainage

Finished ground level adjacent to house foundation wall shall be a minimum of one (1') foot higher than the edge of pavement or shall provide a minimum slope of 2% away from the foundation to a swale, culvert, or other collection system. Provisions shall be made for draining positively the surface of each lot by proper grading and construction of swales, ditches or drains. These items shall receive the same careful design attention as the street drainage system.

Yard inlets shall be provided along swales to collect runoff from a maximum distance of three (3) lots or four hundred (400') feet (in any one direction), whichever is less.

C. Stormwater Management Facilities

Stormwater management facilities, sedimentation basins, and erosion control measures in all new land development shall be provided where, in the judgment of the Village Engineer and compliance with the MS4 and NYSDEC requirements; it is felt necessary in order to provide proper drainage and/or erosion control.

The design engineer shall design the stormwater facility and Stormwater Pollution Prevention Plan in accordance with the most recent edition of the following regulations:

- a. NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity.
- b. NYSDEC SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4).
- c. NYSDEC Stormwater Management Design Manual, including Chapter 10, Enhanced Phosphorus Removal.

Plan view and details are required to show the pond location, size, inlet structures, and outlet structures as well as any appurtenances. If to be dedicated to the Village, a twenty-five (25') foot access easement shall be provided around all portions of said pond and pond maintenance road to allow access or the pond shall be located on lands dedicated to the Village of Marcellus.

In designing the detention facility, attention shall be given to the types of soils found in the site. The Village may require that the pond bottom be lined or constructed of impervious soils or manufactured sealants (i.e. Bentonite) to prevent seepage or piping of stored water along the underlying bedrock.

In order to arrive at an engineering estimate of storm flows and proposed detention pond size, the engineer should proceed according to the steps listed herein. The Design Engineer may also be required to identify impacts of particular site drainage on the watershed as a whole. The use of computer modeling by developer's engineers is permitted. However, proper documentation of the variables and procedures for the software should be submitted to the Village Engineer for review and approval.

During design, the Village may require the Developer to provide a soils report done by a professional soil engineer to determine if the on-site material meets the requirements for infiltration capacity or as a pond liner. The Developer's engineer shall submit, with his final plans, drainage calculations justifying the size of pipes, channels, impoundment basins, and related structures.

Stormwater management facilities shall be required to mitigate the impact of land development to downstream properties and drainage systems. The following represents the basic philosophy regarding stormwater discharge:

1. No developed area shall discharge more stormwater into adjacent culverts and channels than occurs under a natural undeveloped condition.
2. The flow capacity of channels and culverts immediately downstream from a development does not necessarily govern the adequacy of the total drainage system downstream
3. As one travels downstream in any given drainage basin (and, therefore, from any given development) the area contributing to any drainage channel is increasing.
 - a. Culverts and channels downstream from any development may be able to handle the total runoff from that development alone, but this does not imply that said channels and culverts can handle the total runoff to that location.
 - b. The fact that downstream facilities are inadequate prior to the development and, therefore, flood at certain times, does not imply that this flooding condition or any greater frequency flooding is desirable.
 - c. If downstream sewers, culverts or channels have a capacity of less than the derived rate, this downstream capacity shall control as the allowable discharge rate.
4. Design the collection system using the standard rational method, TR-20, or other methods as approved by the Village Engineer.

5. Benchmarks shall be set on outfall structure elevations.

While the Village reserves the right to establish particular parameters in each individual instance, the general philosophy is to permit runoff from any particular development to an amount no more than would normally occur under a natural, undeveloped condition, for the particular design storm. The discharge from these facilities shall be at a rate equivalent to the discharge from the upstream area under a natural, undeveloped condition. The Village reserves the right to establish other more restrictive parameters.

D. Flood Hazard Prevention

Flood hazard prevention shall include the control of soil erosion of land surface and drainage channels and the prevention of inundation and excessive ground water seepage by comprehensive site grading and the establishment of adequate elevations of buildings, building openings and roadways above the observed, anticipated or computed water levels of storm sewers, streams, channels, floodplains, detention basins and swales.

Particular attention shall be paid to development in the vicinity of Ninemile Creek, tributaries and their floodplains. No alteration of the existing characteristics of the area shall take place without the specific approval of the regulatory agency and the Village Engineer as to the adequacy of the protective measures taken, if any. The effects of such development on upstream and downstream reaches of the watercourses, as well as adjacent properties, shall be defined by the applicant.

All development proposed within the special Flood Hazard Area as delineated by the National Flood Insurance Program and defined by the Federal Insurance Administration shall comply with the various regulations set forth by the Federal Insurance Administrator and the Village of Marcellus Code.

Any filling within a floodplain shall be compensated with an excavated area that is 1.25 times the volume filled within the designated floodplain. The compensatory storage area shall be located in an area adjacent to the affected floodplain. No filling within a floodplain shall be allowed without a Floodplain Development Permit first being issued by the Village Code Enforcement Officer (CEO).

Where developments are located in the lower reaches of a watershed, the Village Engineer may elect to waive all requirements for detention/retention facilities to allow runoff to pass through the area before impact of upstream runoff is observed.

E. Erosion Control

1. General

In order to ensure that the land can be developed without danger of flooding or erosion of downstream areas, the Village shall require the developer to follow the latest version of the New York State Standards and Specifications for Erosion and Sediment Control and MS4 requirements. The Village Engineer shall verify that the required procedures are being put into practice. Such procedures may include:

- a) Exposing the smallest practical area of land at any one time during development; no more than 5 acres of disturbance is permitted at one time without written authorization from the Village MS4 Official.
- b) Installation of temporary vegetation and/or mulching to protect critical areas as soon as grading is complete;
- c) Installation of adequate drainage facilities to accommodate the increased runoff caused by changed soil and surface conditions during and after development. The developer's engineer shall show, as part of their submitted plans, the interceptor swales and sedimentation basins along the lower edges of all developments. Significant topographic data and design grades for the swales shall be shown on the plans;
- d) Fitting of the development plan to the topography and soils so as to minimize the erosion potential;
- e) Retention and protection of natural vegetation wherever possible;
- f) Installation of adequate protective measures when slopes in excess of 1 on 3 are graded; and minimizing such steep grading. This shall include erosion control fabrics and blankets, and steep slope seed mixes;
- g) Installation and maintenance of geotextile fabrics over catch basin, yard inlet, or outlet structures;
- h) Installation of other protective measures as required by the Village Engineer.

2. Design and Implementation

It shall be the sole responsibility of the developer's engineer to incorporate into the subdivision and/or site plans the SWPPP for approval by the Village Engineer and Village Code Enforcement

Officer. All procedures for inspections and corrections must be completed in accordance with the SPDES General Permit.

The design of erosion and sediment controls shall be shown on the approved plans. The Village Engineer, Village Code Enforcement Officer, or other field representative, reserves the right to modify or order periodic maintenance of said erosion control measures. Adequate funds shall be held in the Irrevocable Letter of Credit, Bond or Surety to assure that these systems are installed and maintained during the completion of all site work.

If any portion of the erosion control devices fail, causing downstream siltation, the developer shall bear the cost for any associated clean up or removal of silt from drainage ways, culverts, or ponds. The Village reserves the right to hold contingency money to insure proper remediation.

F. Storm Drains

1. Minimum pipe size - 12-inch diameter*
2. Minimum velocity when flowing full - 3 fps
3. Maximum manhole and catch basin spacing - 300 lineal feet.
4. In general, only natural waterways may be continued in open channels. Street drainage and other parts of a storm sewer system shall be in closed conduit. When gradient and tributary runoff require conduit greater than 36 inches in diameter, then open channel design may be considered after review by the Municipality.
5. All pipes shall be smooth bore.
*Any drains less than 12" must be justified with drainage calculations and shall be subject for review by the Department of Public Works and forwarded to the Village Engineer.

G. Storm Laterals

Laterals installed to the right-of-way or easement line shall be a minimum of 6 inches in diameter. Sump pumps and roof runoff will be required to discharge to storm laterals or, in the absence of storm sewers, to splash pads directed to side or rear yard drainage swales.

H. Catch Basins

Catch basins shall be placed at all low points and intersections with maximum spacing of 300 feet. Catch basin leads shall only be connected to the storm sewers at manholes.

I. Storm Manholes

Storm manholes shall be designed to accommodate the pipes entering and exiting the structures.

A schedule of manhole diameters shall be provided on the final plan.

J. Drainage Easements

Drainage easements shall be provided when requested by the Village. The minimum easement width shall be 20 feet. Where open channel drainage is permitted, easements shall be of a proper width to permit adequate maintenance as approved by the Village.

2.3 Water Mains

All work performed and materials furnished for the purpose of supplying the development with potable water shall comply with the following:

Recommended Standards for Water Works;
Village of Marcellus;
Onondaga County Water Authority;
NYS Department of Health;
Onondaga County Health Department.

2.4 Grading

A. General

The finished grading on developed lands shall provide for the effective removal of storm water runoff to a drainage system.

In general, the Design Engineer shall try to establish a finished grade at the structure line to permit a minimum of 2.0 percent grade away from the structure to the drainage system.

Drainage shall generally be to side or rear lot swales provided:

1. Swales are of a proper cross-section to permit ease of maintenance by the individual owner.
2. Easements are provided for access and/or maintenance where necessary.

3. Where multi-lot grading is proposed, all swales required for positive drainage will be installed prior to the issuance of a building permit. Easements will be required in this instance to cover all affected lots.

B. Grading Plan

A Grading Plan shall be submitted, with the final plan for any development, showing at a minimum the following items:

1. Existing contours.
2. Proposed finish contours.
3. Spot elevations of proposed finish grades at key locations.
4. Garage floor elevations.
5. Minimum elevations of any architectural opening where flood hazard areas exist.
6. Culvert invert elevations.
7. All elevations shall be established from USC&GS datum and the plan shall show a site benchmark.
8. Drainage flow directional arrows.

2.5 Driveway Design Requirement

Design and location of driveways shall be in accordance applicable Village Standards contained in these regulations and requirements of the New York State Department of Transportation Policy and Standards for Entrances to State Highways. These standards shall also apply to driveways entering on Village, County, and Village roads and streets.

A. Vertical Alignment

1. Maximum grade shall not exceed 10%.
2. Finish grade at right-of-way line shall be not more than 2 feet above finish grade at centerline and the driveway slope within the lot shall not be greater than 10 percent.
3. A leveling area of 3 percent maximum adjacent to the right-of-way shall be provided which is a minimum of 30 feet in length from the edge of the street pavement.

4. Driveway shall slope away from the edge of road pavement at the same slope as the road shoulder, and the slope shall extend at least the full width of the shoulder so as not to create a bump or depression in the shoulder area unless shown otherwise in Standard Details.
5. All driveways shall be designed so as to avoid the sheeting of surface water runoff onto an adjacent highway.

B. Horizontal Alignment

1. Minimum radius along the centerline of driveways shall be 60 feet.
2. Minimum radius along the inside edge of driveway shall be 35 feet unless shown otherwise in Standard Details.
3. Driveway pavement shall extend at least 10 feet back from the edge of the travel lane.
4. Driveway turnaround areas, when practical, should be incorporated into all plans.
5. All driveways shall be designed so as to avoid the sheeting of surface water runoff onto an adjacent public highway.
6. Where practical, all driveways are to be a minimum 5 feet from the property lines.
7. All driveways are to be a minimum distance of 43 feet or twice the width of the driveway (14') plus 15 feet from all intersections as measured from the shoulder.

C. Application Requirements

Written application including a plan and a profile of the driveway may be required by the Department of Public Works for approval.

D. Fire Department Requirements

All common driveways regardless of length and individual driveways, which are longer than 500 feet, shall be constructed to support HS-20 loading and provide an emergency pull off area that is 30' x 80' at intervals of 250' for emergency access clearance from the edge of the driveway to any obstruction. Plans and details of such driveways shall be submitted to the Fire Department for review.

2.6 Driveway Culverts

Design and location of driveway culverts shall be in accordance with applicable Village Standards and requirements of NYSDOT Policy and Standards for Entrances to State Highways. These standards shall apply also to driveways entering on County and Village roads and streets.

- A. Shall be provided along existing road frontage lots to properly convey roadside drainage. The culverts shall be set to the proper grade to allow the natural flow of water. All culverts set shall be subject to the review of the Department of Public Works having jurisdiction on the road (see Appendix H-5.0 for driveway culvert installation requirements).
- B. Minimum of 12-inch diameter unless they are a part of a larger drainage course, which may require larger diameter pipes.
- C. The culverts shall extend a minimum of 3 feet beyond the edge of the driveway pavement and be provided with end sections or headwalls. Riprap material or other energy dissipation material should be used as determined by the Department of Public Works.
- D. Elevations to be set by U.S.C. & G.S. datum.
- E. Culverts shall have a minimum of 12 inches of cover. If High Density Polyethylene (HDPE) pipe is utilized, 12 inches of cover per 12-inch diameter of pipe shall be provided.

2.7 Roads

The following designations will be used by the Village to classify roads and their respective design criteria (see Appendices H-1.0 through H-10.0):

- Major Street
- Village Collector
- Minor (subdivision) Road
- Private (non-dedicated)
- Commercial/Industrial Road

The basic considerations of each road classification are as follows:

- A. Major
 - 1. Provides connections between communities and represents major traffic pattern throughout the Village
 - 2. Design speed of 30 MPH or less
 - 3. High volume traffic and/or heavy truck traffic
 - 4. Provides access to collectors and minor streets

- B. Collector
 - 1. Provides connections to major roads
 - 2. Design speed of 30 MPH or less
 - 3. High volume traffic and/or heavy truck traffic
 - 4. Provides access to minor streets

- C. Minor (Subdivision)
 - 1. Densities as permitted by the zoning ordinance
 - 2. Design speeds of 30 MPH or less
 - 3. Low volume of traffic
 - 4. Individual driveways at regular intervals
 - 5. Usually no effect on overall Village traffic pattern

- D. Private (non-dedicated)
 - 1. Has a minimum of 40-foot ownership on a dedicated street
 - 2. Low volume of traffic
 - 3. Has no effect on overall Village traffic pattern
 - 4. Design speed of 30 MPH or less
 - 5. Maintenance covered by deed agreement or Homeowner's Association depending on number of units.

- E. Commercial/Industrial
 - 1. Provides access to established and future commercial and industrial areas
 - 2. Provides access to local roads
 - 3. Relatively low density of residential traffic
 - 4. High volume truck/tractor trailer traffic

Each of these roads has basic characteristics that may be varied to be consistent with unique proposals of development and construction. The individual variations of the conditions will not be permitted if they sacrifice design safety or maintenance of a proposed road type. Standard roads shall comply with the typical cross sections shown on Appendix H-1.0 and H-2.0.

2.8 General Road Design Considerations

- A. Right-of-Way
 - 1. Minimum width 60 feet for dedicated roads, except for major streets. Major streets will be provided with a minimum width of 66 feet.
 - 2. Minimum width of 40 feet for private roads.
 - 3. Private underground utilities to be located on easements beyond right-of-way limit.
 - 4. All dead-end streets shall be constructed to the property line and have either: a cul-de-sac or a hammerhead turnaround designed

in accordance with the standards in the Appendix of this manual. Selection of the type of dead-end shall be at the discretion of the Planning Board and Department of Public Works.

B. Horizontal Alignment

The following factors shall be incorporated into the design of each road type:

1. Sight distance must conform to minimum safe stopping sight distance per "Geometric Design of Highways and Streets" AASHTO Latest Edition.
2. Clear sight at intersections
3. No centerline intersection angles less than 75 degrees.
4. Minimum centerline radius of 150 feet.
5. Road pavement intersections shall have a minimum of 35-foot radius.
6. Cul-de-sacs shall not exceed 1,000 feet in length or provide access to more than 10 lots, and shall end with either a cul-de-sac or a hammerhead turnaround (See Appendices for design and radius requirements).
7. Access to future developments will be provided to property lines.
8. Tangent sections shall be used between curves to maintain the proper flow of traffic at design speeds.

C. Vertical Alignment

The minimum length of vertical curves shall be based upon current AASHTO distance, passing sight distance, riding comfort, and headlight sight distance. Vertical curves are required whenever changes in grade exceed 1 percent.

D. Sight Distance Requirements

Refer to the most current edition of AASHTO, *A Policy on Geometric Design of Highways and Streets*, for sight distance and stopping distance requirements.

E. Road Grades

1. Minimum - 0.7 percent with shoulders; 0.5 percent with gutters.
2. Maximum - 8 percent - Maximum grade may exceed 8 percent for short distances with engineering justification.

F. Leveling Areas

Leveling areas shall be incorporated at all street intersections for a minimum distance of 100 feet from the edge of the pavement and the grade shall not exceed 3 percent.

Leveling areas for driveways shall be a minimum distance of thirty (30) feet from the edge of highway right-of-way and the grade shall not exceed three percent (3%).

G. Road Widths (Refer to Appendices H-1.0)

H. Special Considerations

1. Roadside Swale - Where grades exceed 5 percent and/or unstable soil conditions warrant, the swales shall be designed to control flow velocities.
2. Underdrains / Stone Weeps – Will be required on all Village Collector, Major, and Minor streets, unless proven to be unnecessary. The method used shall be subject to the review of the Village Department of Public Works. All pipe shall be perforated and shall be a minimum of four inches (4") in diameter.
3. Frontage Development - Where frontage development is to be approved along major or collector streets with existing roadside swales, the Planning Board may require that the roadside swale be enclosed in conduit along the fronts of the development. Such conduits shall be of the proper size to accommodate anticipated flows as previously outlined. A parallel access road may also be considered by the Planning Board and discussed during sketch plan submittal.

2.9 Road Design

A. General Requirements

The Design Engineer shall consider the proposed use of the road or street when preparing a design. The following criteria is listed as minimum standards to be considered by the designer. It is the intent of these requirements to obtain a road and a base that is stable and capable of supporting H-20 loading to the sites.

B. Minimum Design Standards for Each Road Type (see Appendix H-2.0)

1. Major & Collector Streets

- a. Geotextile fabric shall be used in all areas of unstable sub-base per discretion of the Department of Public Works.
- b. Two 6-inch lifts of Type 2 crusher-run stone equally mixed.
- c. One 3-inch lift of Type 1 crusher-run stone.
- d. Asphaltic concrete courses shall be 3-inches compacted of Type 3 binder and 1.5-inch compacted of Type 7F top.
- e. Concrete gutters, and curbs per Appendices.

2. Minor Streets

- a. Geotextile fabric shall be used in all areas of unstable sub-base per discretion of the Department of Public Works.
- b. Two 6-inch lifts of Type 2 crusher-run stone equally mixed.
- c. One 3-inch lift of Type 1 crusher-run stone.
- d. Asphaltic concrete courses shall be 3-inches compacted of Type 3 binder and 1.5-inch compacted of Type 7F top.
- e. Concrete gutters, and curbs per Appendices.

3. Private

- a. A minimum of 6-inch lifts of No. 2 crusher-run stone mixed equally. Driveways shall be paved within the right-of-way. Refer to Appendices H-1.0 and H-2.0.
- b. Fabric shall be used in all areas of unstable sub-base.
- c. A private drive off a dedicated road shall:
 - i) Be designed to keep surface water flows from entering the travel way of the dedicated street.
 - ii) Provide soil erosion measures on the site as it is being developed.
 - iii) Provide an adequately sized culvert with end sections or headwall treatment.
 - iv) Finish grade and seed the area immediately upon completion of the private drive base.
 - v) Provide a hard surface from the edge of the existing pavement at least 30 feet toward the developed site.
 - vi) No private drive should exceed a slope of 3 percent from the edge of the pavement to a point 30 feet

into the property being developed to provide a leveling area.

- vii) Maximum grade within the development site shall be 10 percent.

4. Commercial/Industrial Road

- a. Geotextile fabric shall be used in all areas of unstable sub-base per discretion of the Department of Public Works.
- b. Two 6-inch lifts of Type 2 crusher-run stone equally mixed.
- c. One 3-inch lift of Type 1 crusher-run stone.
- d. Asphaltic concrete courses shall be 3-inches compacted of Type 1 Base, 3-inches compacted of Type 3 binder, and 1.5-inch compacted of Type 7F top.
- e. 5' paved shoulders constructed of two 6 inch lifts of No. 2 and 3 crushed stone, one 6 inch lift of Type 2 crusher-run stone, 3 inches of compacted Type 3 binder, and 1 ½ inches of Type 7F top. See Appendix H-3.0. Gutters with underground conduit may be installed/required instead of 5' stabilized shoulders. (See Appendix H-6.0).

NOTE: All depths are compacted thicknesses.

2.10 Concrete Gutters, Concrete or Stone Curbs

All streets to be dedicated to the Village of Marcellus shall include gutter or curbs, or as otherwise approved by the Department of Public Works. Refer to the H-Series Appendices.

2.11 Sidewalks

Where required by the Planning Board, sidewalks shall be concrete and installed in accordance with design standards contained in the H-Series Appendices. All sidewalk surfaces are to be continuous in accordance with the Americans with Disabilities Act. Where sidewalks are to cross driveways, the driveways are to be saw cut for the concrete sidewalk.

2.12 Monuments

Monuments per Appendix H-10.0 shall be located at:

- A. Point of Curve and Point of Tangent of all horizontal curves along one side of the right-of-way.

B. Maximum of 1,000 feet along one side of right-of-way line.

2.13 Reserved Land for Future Use

Where land areas are reserved for future connections to adjacent parcels, all improvements, i.e., sanitary, storm, water, sidewalks, roads, will be constructed to the common property line.

2.14 Guiderail

Guiderail shall be provided where required by the Village Department of Public Works or Village Engineer. All guiderail locations shall be in accordance with the NYSDOT Highway Design Manual or as approved by the Village Department of Public Works. All guiderail shall be of a type currently approved by NYSDOT or as approved by the Village Department of Public Works. Where NYSDOT approved guiderail systems are to be utilized, the plans shall include all relevant NYSDOT detail sheets in full. If so requested by the Village Department of Public Works or Village Engineer, the Applicant's Design Engineer shall be required to provide a Guiderail Justification Report, inclusive of point of need analysis and considered alternatives.

2.15 Drainage Structures

Where drainage structures such as large diameter pipe culverts, concrete box or three-sided culverts, U-channels, or other constructed drainage ways are proposed, if so requested by the Village Department of Public Works or Village Engineer, the Applicant's Design Engineer shall provide scaled profiles, cross sections, structural details, hydraulic analysis, hydrology analysis, and any other information deemed necessary by Village Staff.

SECTION 3 Material Specifications

3.1 General Information

The materials intended to establish the degree of excellence are herein included and deemed to be of satisfactory quality for installation within the Village. When new materials may be made available, their use may be permitted in limited test sections with the restriction that should these materials prove unsatisfactory through the test period as established by the Village, they shall be removed and replaced with those herein called for at no expense to the Municipality.

3.2 Sanitary Sewers

A. Polyvinyl Chloride (PVC) Pipe for Gravity Sewer

Shall meet the requirements of ASTM D-3034 for Sewer Pipe and Fittings, minimum wall thickness SDR-35. The joints shall be bell and spigot conforming to ASTM D-3212 with elastomeric gasket conforming to ASTM F477. All pipe and fittings shall be made from PVC components as defined and described in ASTM D-1784. Pipe shall be new enough to have manufacturer's specifications still painted on the length of pipe and consist of glossy finish.

B. Polyvinyl Chloride (PVC) Pipe for Sewage Force Mains

Shall meet the requirements of ASTM D-2241 for PVC plastic pipe. Pipe and fittings shall be 160 psi, minimum SDR-21 extruded from clean, virgin, resin compound conforming to ASTM D-1784. Bell and spigot joints are required with elastomeric gaskets conforming to ASTM D-3139. Metallic tracer tape shall be placed over the center of all mains on top of the 18-inch minimum safety cover. Pipe shall be new enough to have manufacturer's specifications still painted on the length of pipe and consist of glossy finish.

C. High Density Polyethylene (HDPE) Pipe for Sewage Force Mains

Shall be DR 17, PPI designation PE 3408, and conform to AWWA C906. All joints shall be fuse welded mechanical joints with compression couplings and stainless-steel inserts. No glued joints allowed underground. Metallic tracer tape shall be placed over the center of all mains on top of the 18-inch minimum safety cover.

D. Sewer Connections for Gravity Sewer

Sewer connections on new sewer main installations shall be made with wye fabricated or injection molded fittings. The minimum strength classifications of these fittings shall be equal to that of the pipe and the fitting shall be compatible with the pipe. Connections to an existing sewer shall be made with GENECO SEALTITE Type "E" Multi-Range Wye Sewer Saddle, with single-wide stainless steel band and stainless steel bolts for sewers up to 14-inches in diameter and GENECO bolt-on saddles for sewers greater than 14-inches in diameter. Connections to mains must be separated by a minimum of 10 feet.

E. Sewer Lateral Pipe for Gravity Sewer

1. Cast iron sewer pipe shall be medium or standard class with rubber gasket joints and maximum lengths equal to 5'-0" per ASTM A-74.
2. PVC pipe shall be of a minimum 4-inch diameter and wall thickness SDR-35 with elastomeric gasket joints, supplied in standard lengths and conform to ASTM D-3034. All SDR-35 pipe will be bedded in stone as indicated in these specifications.
3. ABS Schedule 80 or other equal material approved by the Sewer Department.
4. No glued joints will be allowed underground, elastomeric or mechanical joints only will be allowed.
5. All tee connections to be GENECO SEALTITE Type "E" Multi-Range Wye Sewer Saddle.

*All commercial applications within building walls shall be SCH. 40. Consult with Code Enforcement Officer for further limitations.

F. Sewer Pressure Pipe for Forcemain

1. Polyvinyl chloride (PVC) pipe and fittings shall meet the same requirements as PVC force mains.
2. Polyethylene (PE) pressure pipe and fittings shall conform to ASTM D-2737 with pressure class PE 2305.
3. High Density Polyethylene (HDPE) 3408

3.3 Storm Drain

A. Reinforced Concrete Pipe

Shall be supplied in conformance with ASTM C-76 Class II. Joints shall be of the bell and spigot type with compression type joint ASTM C443.

B. Polyvinyl Chloride (PVC) Pipe

Shall meet the requirements of ASTM D-3034 or ASTM F679, minimum wall thickness SDR 35 with elastomeric gasket joint, ASTM D-3212.

C. Corrugated Steel Pipe

All pipes shall be coated inside and outside and have joints made with connecting bands. Thickness gauge will be dependent on the load conditions, except that 16 gauge shall be the minimum allowable thickness.

D. High Density Polyethylene (HDPE)

All pipes shall be N12 smooth interior and shall conform to AASHTO M-294. All fittings shall conform to ASTM D1248.

E. Storm Laterals

PVC conforming to ASTM D-3034, with a wall thickness of SDR-35 and a minimum pipe diameter of 6 inches.

F. Catch Basin Leads

Shall be a minimum of 12 inches in diameter (see Appendix ST-2.0); cross-over pipes are to be 12 inch perforated.

1. Reinforced Concrete Pipe.
2. Polyvinyl Chloride Pipe (PVC).
3. High Density Polyethylene (HDPE).
4. Corrugated Steel Pipe.

G. Underdrains

Shall be a minimum of 4 inches in diameter, perforated polyethylene. Required on all Village Roads unless proven to be unnecessary by the Department of Public Works.

3.4 Manholes and Manhole Ladders

A. Manholes (see Appendix S-1.0 and S-2.0)

Precast reinforced concrete sections shall be manufactured in accordance with ASTM Specification C-478. Riser sections shall have tongue and groove ends and super "O" joints and gaskets conforming to ASTM C-443. Manhole bases may be pre-formed or poured in the field. Roof slabs shall be precast structural concrete, reinforced for H-20 loading

and 30 percent impact loading. A 24-inch diameter hole shall be eccentrically located in the roof slab. In place of preformed openings in base sections, flexible manhole sleeves (rubber boots/A lok) cast directly into the base walls may be used with compatible pipe material.

All manholes shall be sealed inside and outside completely with two coats of heavy-duty water repellent protective coating which complies with ASTM Specification D-450, Type B.

Manholes constructed of other materials shall be considered for approval following a review of said manhole construction. In specifying these manholes, the Developer's Engineer shall submit adequate design data and/or shop drawings to substantiate the materials.

1. Shallow Sanitary Sewer Manholes (less than 8' deep)
 - Refer to Appendix S-1.0 for detail
 - Apply epoxy in vicinity of any forcemain connection at the discretion of the Department of Public Works.
 - Step alignment less than 1" (vertical) alignment tolerance
2. Deep Sanitary Sewer Manholes (greater than 8' deep)
 - Refer to Appendix S-1.0 for detail.
 - Apply epoxy in vicinity of any forcemain connection at the discretion of the Department of Public Works.
 - Step alignment less than 1" (vertical) alignment tolerance
 - Eccentric cone riser sections can be used when manhole depth is greater than eight (8) feet
 - Safety platform required when manhole depth is over 14' deep. Fiberglass platform by Access Industrial or approved equal.

B. Manhole Ladders and Steps

Manhole ladders or steps shall be provided in all sanitary and storm manholes and shall be constructed of one of the following materials.

1. Non-corrodible, aluminum magnesium alloy ladders, with intermediate supports at 5-foot intervals.
2. Forged aluminum with drop front design and grooved tread surface.
3. Nylon/Co-Polymer Polypropylene with steel reinforcement manhole steps.
4. Cast iron steps shall not be used.

Steps shall be cast into the walls of riser sections and shall be aligned in each section to form a continuous ladder with rungs equally spaced vertically in the assembled manhole at a distance of 12 inches apart. The first step shall be a maximum of 32 inches from the manhole cover. Step alignment less than 1" (vertical) alignment tolerance in all manholes.

3.5 Frames and Covers

A. Sanitary Manhole Frames and Covers (see Appendix S-1.0)

Shall be a water tight manhole frame and cover assembly as specified by the Village Department of Public Works. The word "Sanitary" in letters not less than two (2) inches high shall be stamped or cast into all sanitary sewer manhole covers. The inside diameter for clearance shall be a minimum of 24 inches.

B. Storm Manhole Frames and Covers

Shall be Neenah R-1723 with a vented cover or other approved equal. The inside diameter for clearance shall be a minimum of 24 inches.

C. Catch Basin Frames and Grates

Shall be rectangular, galvanized (ASTM A-123) and sized to fit gutter inlets or field inlets. The gutter grates shall be NYSDOT size no. 9 to fit the catch basin inside dimensions of 24" x 24". The minimum field inlet shall be NYSDOT size no. 9 to fit a field inlet of 24" x 24" inside dimension.

Catch basin manholes shall be set to allow a NYSDOT size no. 9 grate to be installed.

Frames and grates shall be as specified in NYSDOT Specification Drawing 655-6R1 and Section 655 of the NYSDOT Standard Specification Manual. All grates shall be bolted to the frames.

3.6 Water Mains

All water supply appurtenances shall meet the requirements of the Onondaga County Water Authority.

3.7 Concrete Curbs, Gutters and Sidewalks

A. Concrete

1. Shall be a minimum of 5" thick and 4000 psi (28-day strength) Class A concrete conforming to NYSDOT Specification 609.

2. Air entraining admixture conforming to ASTM Specification C-260.
3. Bituminous expansion material shall conform to NYSDOT Specification 705-07.
4. Curing and sealing compound - conforming to ASTM C-309, Type I, Class B for curing and sealing.
5. Testing is required by the Village as outlined in Section 4.

B. Granite Curbs

1. Shall match existing Village granite curb as to color, appearance and dimensions
2. Furnish curbs with sawed top, split face and ends. Straight pieces shall be a minimum of 3 feet long. Curb segments on curves with radius of 100 feet or less shall be shaped to the required curvature, with the ends split on radial lines.
3. Indicated dimensions for curb segments shall not vary more than 2 inches for depth and 1 inch for width.
4. Top and front surfaces shall be true planes at right angles to each other, as seen with a straight edge. No projection greater than 3/4 inch or depression greater than 1/2 inch on the split surfaces will be acceptable. Top surface shall not vary more than 1/8 inch.
5. Drill holes will not be permitted in exposed curb surfaces.

C. Dry Concrete for Granite Curbs:

1. One part Portland cement mixed with six parts DOT No. 1A coarse aggregate dry mix.

3.8 Road Materials (see Appendix H-2.0)

A. Sub-Base and Base Courses

1. Crusher run stone shall conform to NYSDOT Specification Section 304-2.02, Type 2.
2. Aggregate shall conform to NYSDOT Gradation Table 703-4, size as specified.

3. Crushed Stone for Underdrain. NYSDOT 703-0201 – Table 703-6, Crushed Stone, consisting of equal parts of Size 1 and 2 washed crushed stone.

B. Bituminous Pavement

1. Base course shall conform to NYSDOT Specification Section 402.378904 – 37.5 F9, Series 80 Compaction (Base Asphalt).
2. Binder course shall conform to NYSDOT Specification Section 402.198904-19 F9, Series 80 Compaction (Dense Binder).
3. Top course shall conform to NYSDOT Specification Section 402.128104-12.5 F1, Series 80 Compaction.

C. Tack Coat

Shall conform to NYSDOT Specification Section 407. The grade shall depend on the specific use intended.

D. Pre-molded Bituminous Joint Filler

Shall conform to NYSDOT Specification Section 705-07.

E. Underdrains

Shall be 4-inch perforated Schedule 80 PVC per NYSDOT Section 706-15 or Section 706-13, or perforated corrugated High-Density Polyethylene Tubing per AASHTO M-252.

Geotextile stabilization fabric is required to be provided under roadways per NYSDOT Item 207,21, Material 737.01B, unless determined otherwise by the Village Department of Public Works.

3.9 Monuments

- A. Monuments shall consist of one-half inch (1/2") diameter reinforcing rod embedded in concrete four inches (4") in diameter by thirty inches (30") deep as shown in Appendix G-2.0. Manufacturer shall be Berntsen, 3/4"x3" rod, cap marked Village of Marcellus R.O.W.
- B. All monuments shall be shown on finished plans.
- C. Monuments shall be set as a minimum at all exterior corners of the subdivision, on one side of each street and at all changes of direction in the right-of-way.

D. Maximum of 1,000 feet at one side of the right-of-way.

E. Monuments shall be set by a licensed land surveyor before the final Letter of Credit Release.

3.10 Street/ Site Lights (see Appendix H-15.0)

All lighting is to conform to the Village standard light poles and fixtures, which shall be reviewed and approved by the Department of Public Works. The fixture shall also be ordered with a photocell.

3.11 Equivalents

The mention of apparatus, articles or materials by name and such specific description of same as is made herein are intended to convey to the Developer and his Contractor an understanding of the degree of excellence required. The Village shall be the sole judge of the qualifications of the offerings and will determine all questions regarding the conformance of any offer outside the specifications.

For any project it will be assumed that the Developer will furnish the exact materials specified on the plans and specifications unless the Developer files with the Village of Marcellus prior to any use in the development, the names and complete description of each article which he proposes to substitute for approval by the Village Board of Marcellus. Any costs incurred by the Village or its representatives associated with the verification of substitute equipment and materials will be the responsibility of the Developer.

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SECTION 4 Installation

4.1 General Information

A. Meaning of Drawings

The Contractor shall abide by and comply with the true intent and meaning of all drawings and of the specifications taken as a whole. If the Contractor believes that the construction indicated on the project drawings will not, when executed, produce safe and substantial results or if it appears that there is any discrepancy in the drawings, it is his duty to immediately notify the Developer's Engineer, in writing, and to thereafter proceed only upon written order.

B. Protection of Property and Work

1. The Contractor shall conduct his operations to prevent damage to trees, garden plots, shrubbery, pipelines, conduits, buildings and other structures. The Contractor shall use all necessary precautions to protect the work and adjacent structures of all kinds during construction and shall so conduct his operations that at no time shall the work or such structures be endangered.
2. Responsibility and damage - the Developer shall be responsible for all parts of his work, temporary or permanent, until the project is complete and shall thoroughly protect all work, finished or unfinished, against damage from any cause as all work is at the Contractor's risk until the same is accepted by the Developer. The use of part or all of the work by the Village as provided for in these specifications shall not relieve the Developer of this responsibility. The Contractor shall be responsible for damage to life and property due to his operations and shall provide all necessary guards, rails, night lights, etc.

C. Construction Schedule

The Developer shall provide a construction schedule showing the order in which work will be completed at the preconstruction meeting. The schedule shall be reviewed at the preconstruction meeting and revised if necessary. No work will begin until an acceptable schedule is on file with the Village. Hours of Operation within the Village of Marcellus are the following:

1. Weekdays from 7:00 am to 9:00 pm.
2. Saturdays from 7:00 am to 9:00 pm.
3. Sundays – No work is permitted.
4. No work is permitted on Federal Holidays (New Year's Day, Birthday of Dr. Martin Luther King Jr., Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, and Christmas Day) or any other holiday observed by the Village of Marcellus.
5. The Applicant / Contractor shall provide notification for work being conducted on other Village Holidays with the Village Construction Inspector and Village CEO not less than 48 hours prior to permit scheduling.

D. Permits

1. The Developer shall secure all necessary permits from the Village including the Code Enforcement Officer, Village Department of Public Works, and/or any other agency who may have control over any work prior to the start of construction.
2. Where dedication of Village Infrastructure is required, the following are to be completed prior to the issuance of a building permit:
 - a. Roadway(s) constructed, including all gutter, curbs, or other roadway features, in accordance with the applicable Village Roadway Cross Section (see Appendix H-1.0, H-1.1, H-1.2). Top coat shall not be required if within 1 year of the initial paving.
 - b. All utilities constructed within public roadway corridor, or otherwise to be dedicated and completed as part of the current project phase. Testing is not required prior to issuance of building permits.
 - c. All easements filed with the Village Clerk and County Clerk. Copies of filing information, including all materials submitted for filing, provided to the Village Engineer and Village CEO.
 - d. The project is currently compliant with all Village MS4 requirements, SPDES general permit requirements, and SWPPP requirements, including providing the Village with copies of all inspection reports.

E. Grading

Completion of grading per the grading plan to within 1 foot of design grade shall precede any trench excavation. Such grading shall include house "pads", removal of enough material to form "box" for road base, surface drainage channels, required temporary situation basins, etc. Construction brush and debris will not be buried on the site. Wood materials shall be cut, chipped, mulched or removed from the site and deposited in a permitted construction/demolition landfill.

F. Grading Permits

Prior to issuance of a grading permit, the following items shall be provided:

1. A grading plan, and erosion and sediment control plan specific to the work to be performed under the grading permit.
2. A site-specific sequence of construction for all work to be performed under the grading permit.
3. A letter of credit, or other surety acceptable to the Village, in an amount approved by the Village Board. The letter of credit or other acceptable surety shall cover the costs of earthwork, erosion and sediment control, and any other items permitted to be completed as part of the grading permit and so identified by the Village for inclusion within the letter of credit / surety.
4. An approved grading permit SWPPP or overall project SWPPP, with a signed MS4 SWPPP Acceptance Form.
5. For sites where total land disturbance activities exceed 5 acres: a letter from the Applicant's Design Engineer requesting issuance of a 5-Acre Waiver, and a signed 5-Acre Waiver Form; or, a phasing plan demonstrating how the project will remain under 5-acres of disturbed area. Note: the Village may require a phasing plan be provided for any project, including those with an approved 5-Acre Waiver.
6. The NYSDEC Acknowledgement Letter for coverage under the NYS SPDES General Permit for Stormwater Discharges from Construction Activity.
7. A Pre-Construction Meeting is to occur. An additional Pre-Construction Meeting, and all items on the Pre-Construction Meeting Checklist, will be required to be completed prior any additional work being permitted.

G. Pre-Construction Meeting / Site Construction Activity

A pre-construction meeting is required and scheduled through the Village Office prior to the start of construction of a development. The Developer, site Contractor and Design Engineer shall meet with all utility representatives, Village Department Heads, Village Engineer and project observers to discuss the overall project, its impacts and schedules. A project construction sequence shall be presented in writing and discussed at this meeting.

The following are required to be completed prior to the scheduling of a preconstruction meeting and/or site construction activity taking place:

1. Final Subdivision / Site Plans approved and signed, copies and PDF provided to the Village.
2. Final SWPPP approved and acceptance form signed by the Village MS4 Official.
3. NOI and SWPPP Acceptance Form submitted to NYSDEC. NYSDEC acknowledgement letter provided to Village Office.
4. 5-Acre Waiver request (if so required) submitted to CEO and approved.
5. Village of Marcellus Stormwater Maintenance Agreement completed and forwarded to Village Office, CEO, and Village Engineer.
6. The Easement Package as outlined within this manual (section 5.07) is to be provided to the Village Construction Inspector for review. The Easement Package is to be forwarded to the Village Attorney for review.
7. All agency approvals and/or permits required have been forwarded to the Village Office.
8. A Surety Estimate has been approved by the CEO and Village Engineer, and approved by the Village Board, and provided to the Village Clerk. Letter of Credit is established and evidence provided.

H. Existing Utilities or Structures

Before construction begins near any existing utility or structure, the Contractor shall notify the appropriate Owner of his intention and their instructions as to the protection of their property must be followed. Before

commencing work, the Contractor shall determine the exact location of any structure or underground utility in order that the Contractor's project will not damage or disrupt these facilities.

The Contractor shall maintain site as needed to prevent entry of mud, debris, etc. into existing utilities or onto streets near the site as required under Section 4.09 (e).

All existing underground facilities shall be checked for damage before backfilling. In the event a facility is damaged, the Owner of that facility shall be notified by the Contractor so as to insure an acceptable repair and/or replacement.

I. Facilities for Observation

The Contractor shall furnish all reasonable facilities and aid to the construction observers for safe and convenient footways, scaffolds, ladders, etc., that may be needed for the examination and review of any part of the work. The Village of Marcellus may stop work when the Contractor has no responsible agent on the project or if the Village feels that the Contractor is not performing the work in the best interests of the Municipality.

Disorderly, intemperate and incompetent persons shall not be allowed on the project. The employees who neglect or refuse to follow the construction observer's instructions shall be permanently removed from the project by the Contractor. Failure to conform to these controls may warrant refusal of the Municipality to consider the development for dedication.

J. Layout

It shall be the responsibility of the Developer to have the work carefully laid out by qualified surveying or engineering personnel in a manner that will assure accurate completion of the work.

K. Defective Work

The review of the work shall not relieve the Developer of any of his obligations to comply with the specifications. Any defective work shall be made good and any unsuitable materials which have been previously overlooked by the Village or its representatives shall be removed and replaced. If the work or any part thereof shall be found defective at any time before the final acceptance of the project, the Developer shall make good such defect in a manner satisfactory to the Village.

4.2 Trench Excavation

A. Excavation

Under this term will be included all excavation in trenches and pits, together with all backfilling and embankments that may be needed for the laying of the utilities and appurtenances or that may be necessary for the laying, changing and construction of any water, sewers, conduits, culverts, drainage ditches or water courses, or for any other incidental work that may be required or ordered by the Village or its representative.

It is the Contractor's sole responsibility to make sure that all work shall be conducted in strict accordance with the Federal Safety Standards of OSHA.

B. Width of Trenches

The trenches shall be of such width as may be required by the Design Engineer to insure proper laying and handling of the pipes and appurtenances, proper tamping and backfilling operations. In all cases, trenches should be kept as narrow as possible. The Contractor shall be responsible to provide sheeting/bracing or other requirements to insure the safety of his workmen in conjunction with the proper installation of the pipe.

C. Depth of Trenches

In general, the trenches shall be excavated to such a depth to properly install utilities to the grade established in the field by the Design Engineer. The depth of the excavation shall allow the proper bedding material to be placed under the pipe.

Any extra excavated depth by the Contractor shall be filled with compacted crushed stone to the proper grade required.

The trenches for water pipe shall be per Onondaga County Water Authority and Department of Health requirements.

D. Tunneling/Boring

Work shall generally be conducted in open trenches or excavations, with proper protection. Tunneling/ Boring shall be done only in areas specifically called for by the design plans with design details approved by the Village.

E. Blasting

Whenever necessary to resort to blasting for making the excavations, the trench shall be covered in a form to prevent fragments of rock from being thrown out. Only experienced, licensed workmen shall be employed in the handling and uses of explosives. All blasting operations shall be conducted in strict accordance with existing ordinances, regulations and specifications relative to rock blasting, storage and use of explosives.

F. Bailing and Draining

The Contractor shall furnish a sufficient pumping plant and shall provide and maintain, at his own expense, satisfactory drainage whenever needed in the trench and other excavations during the progress of the work and up to final inspection. No structures shall be laid in water. Water shall not be allowed to flow or rise upon any concrete or other masonry or flow on adjacent lands. All water pumped or bailed from the trench or other excavation shall be conveyed in a proper manner to a suitable point of discharge and may require temporary siltation traps. No discharge to the sanitary sewer system is allowed.

G. Bottom of Trench

The bottom of the trench shall be carefully graded and formed according to the directions of the Design Engineer, before any structures are laid thereon. When other instructions or design are not indicated, all trenches shall be excavated in a straight line. The excavation shall extend at least 6 inches below the bottom of the pipe and a carefully compacted bed of crushed stone screenings placed in the bottom of the trench up to the level of the spring line of the pipe. See Appendix S-5.0 for specific material bedding requirements.

It is the intention of this specification to achieve not less than Class "B" pipe bedding.

H. Suitable Bedding and Safety Backfill Material

It shall be the responsibility of the Contractor to generally utilize material excavated from the trench in order to provide the required backfill to meet the listed specifications unless crossing an existing or proposed road. Should the nature of the soil be such that the Contractor is unable to meet the above requirements by selecting, with reasonable care, from the excavated material, he shall provide the following materials, if so ordered by the Village.

Additional twelve (12) inches of crushed stone or concrete cradle when the trench bottom does not provide sufficient bearing capacity or when specification requires specific bedding for certain utilities.

Sand encasement shall be ordered by the Village when the trench is excavated in rock, boulders, or hard pan and none of the material above this level is suitable for backfilling the pipe.

4.3 Pipe Installation

A. Line and Grade

All pipes and appurtenances of whatever character shall, when set, conform to the alignments and grades required by the Design Engineer. All of the required special castings and other fixtures that are indicated upon the plans, or that may be required during the progress of the work, shall be installed in their proper positions. Saddle connections on sanitary sewer shall be concrete cradled. Wye connections may be stone encased with the approval of the Village of Marcellus.

B. Laying Pipe and Castings

The Contractor shall use suitable tools and appliances for the safe and convenient handling and laying of all utilities and appurtenances. All pipes and castings shall be carefully examined by the Contractor for defects and no pipe or casting which is known to be defective shall be laid. All PVC pipe shall be glossy with the manufacturer's marks legible. If defective pipe or castings should be discovered after being laid, these shall be removed and replaced with sound pipe or castings. The pipes shall be cleaned before they are laid and shall be kept clean until they are accepted with the completed work. All ends of the pipes shall be watertight capped to exclude water and debris from entering the pipes except during the actual pipe laying.

Sewers shall be built to the lines and grades between manholes as shown on the project drawings. The Contractor shall provide sufficient grade control to properly install the pipe and appurtenances. Sewer pipe shall be laid upgrade with spigots placed in the direction of flow. All pipes shall be fitted together to form a smooth, even invert. Pipes disturbed after laying shall be removed and re-laid.

After the pipe has been placed and adjusted to line and grade, the bed shall be shimmed to support the pipe for its entire length. Material used for bedding shall be thoroughly compacted under the bottom and the haunches of the pipe. The trench shall then be backfilled to above the top of the pipe and carefully compacted to hold the pipe in position.

C. Cutting Pipe

Whenever it may be necessary to cut any straight pipe for any purpose, cutting shall be done to the satisfaction of the Engineer by skilled workmen with proper tools, in such manner as will not cause any cracking of the pipe.

4.4 Manhole Construction

A. General

Manholes shall be constructed of the size, type and at the locations shown on the Plans, or as designated by the Design Engineer in the field.

The manhole bed shall be excavated level and include a minimum of 6 inches of crushed stone.

Manhole risers and flat slab covers shall be precast reinforced units. Manhole bases may be precast "Monobase" or field poured with 4,000 concrete psi.

Eccentric cone sections may be used on the top of manhole riser sections if the inside height dimension from the bench wall to the bottom of the eccentric section exceeds 8 feet.

Interior and exterior concrete surfaces shall be sealed by the supplier and touched up or recoated by the Contractor with like material.

Any pipe entering a manhole shall be neatly cut with proper sharp tools before installation in the manhole. Pipe shall not be "chipped off" after installation.

All openings and joints in the manhole sections shall be completely filled once the sections are set, with approved caulk and enhanced with Xypex Admix, sealed with 2 coats of approved bitumastic coal tar sealer.

*NOTE: When PVC is used all openings around pipes shall be completely filled with 100 percent epoxy non-shrink grout.

Before each barrel of the manhole is set, the joint shall be cleaned and the barrel correctly aligned, so that the steps form a continuous ladder. The first step shall be a maximum of 32 inches below finished grade and continue to the top of the bench wall.

It is the intent of these specifications to construct first-class manholes, which will exclude all ground water, by means of carefully constructed

foundations, tight barrel joints and the coating of the inside and outside of the manholes.

B. Frames and Covers

The frames shall be firmly set in a bed of not less than one full inch of cement mortar and adjusted to the finished grade. The manhole frame may be set directly on the concrete roof slab, providing the top will be at the proper grade; otherwise, precast concrete spacers or bricks shall be mortared to the roof slab to raise the frame to the proper grade. A maximum of three courses of spacers or bricks shall be used to adjust the frames and grates to the proper grade.

C. Inverts

Inverts shall be constructed in all manholes. The inverts may be constructed of the mainline pipe or brick (Grade SS) and shall be the depth of the pipe. When PVC material is used, all brick, concrete or other masonry material that interfaces with the PVC shall be adhered to the PVC with 100 percent epoxy non-shrink grout. Manholes with 2 or more inverts shall have a smooth transition of flow.

D. Drop Manholes (see Appendix S-6.0)

Wherever the invert of the entering sewer is more than 2 feet above the invert of the outlet sewer, it shall be connected with a vertical outside drop with a clean-out pipe half bricked up. When drops are placed, the entire excavation around the drop pipe shall be filled with stone encasement extending not less than 2 feet along the main sewer.

The clean-out opening in the barrel of the manhole shall be cut in after the manhole wall pipe is in place and the joint between the clean-out pipe and the manhole wall shall be thoroughly sealed with cement mortar on the inside and bituminous joint material on the outside.

E. Sealing of Manholes

All manholes shall be sealed with two (2) coats of approved bitumastic coal tar sealer as applied by the manhole manufacturer to the entire interior and exterior surfaces in minimum dry thickness of 11 mils per coat. Application shall be in accordance with the coating manufacturer's recommendations and shall be certified thereto by the suppliers. Before placement in the field, abraded areas shall be touched up with two coats by the Contractor. Covers and other exposed surfaces shall also be coated in the field. Improper materials or mil thickness shall be cause for rejection of manhole sections.

4.5 Catch Basins

Catch basins shall be constructed as shown in the Appendix ST-5.0 or as shown on the plans for special conditions. Catch basins shall be constructed of precast concrete. Adjustments to finished elevation shall be made with cast-in-place concrete; bricks, blocks and grout are not allowed.

All catch basins shall be coated inside and outside with two coats of heavy-duty coal tar sealer.

4.6 Sewer Laterals (see Appendix S-3.0)

Sewer laterals shall be installed to the right-of-way (or easement) line for all lots. Each service shall be located with a two-inch by four-inch (2"x 4") hardwood or pressure-treated stake extending a minimum of three feet (3') above finished grade. The stakes shall be color coded in conformance with Industrial Code 53 to denote the type of service they represent.

Sanitary Sewer connections on new sewer main installations shall be made with wye fittings only. Connections to an existing sewer mains and HDPE storm sewers shall be made with approved saddles.

Select backfill shall be provided for all service trenches. Bedding and backfill quality shall be at the discretion of the Village representatives at the site.

4.7 Backfilling and Finishing

A. General

Trenches shall be immediately backfilled following the installation of utilities unless specifically changed in writing by the Design Engineer. The roadways and sidewalks shall be left unobstructed, with their surface in a safe passable condition. The trench shall be tamped sufficiently to prevent settlement of or damage to existing or newly installed structures.

B. Backfill Immediately After Approval

Utilities shall have a minimum of six (6) inches crushed stone bedding and a minimum of twelve (12) inches of crushed stone on each side and over top. Crushed stone shall be NYSDOT 703.02 #1 & #2 or #1 & #1A. The material must not be thrown down from above faster than the workmen below can properly distribute and compact it.

C. Restrictions as to Materials

No rock or frozen materials shall be placed in trenches within existing or proposed streets. Such material may be used in fields where immediate

compaction is not necessary and at least 2 feet of select fill has been placed over the pipe.

D. Backfilling Pavement Crossings

All utility lines or laterals that cross existing or proposed streets shall be backfilled with crusher run stone conforming to NYSDOT 304-2.02 Gradation Type 2. Crushed or screened gravel may be used with the approval of the Village.

Material shall be compacted in lifts of 1 foot maximum to the elevation of the road subgrade. From there the backfill shall conform to the material specifications for individual road sections.

In no instance shall spare native material be used for backfill to be excavated at a later date for crusher run stone backfill.

Backfill shall be compacted in accordance with 4.7.

E. Cleaning Up

All roadways, intersections, gutters, and sidewalks shall be routinely cleaned of accumulated debris, sediment and tools throughout the construction process.

As the work progresses or as directed by the Design Engineer, all rubbish or refuse, unused materials and tools, shall be removed at once from along and near the trench line construction.

Rough clean up along the route shall immediately follow installation procedures. Large spoil banks will not be permitted in developed areas.

Final clean up and landscaping shall proceed immediately after the installation, testing and approval of the facility.

Erosion control measures must be maintained throughout the construction process and removed only upon the approval of the Village.

In all cases, the project site shall be restored to a condition equal to or better than that, which previously existed.

4.8 Compaction

Compaction densities specified herein shall be the percentage of the maximum density obtainable at optimum moisture content as determined and controlled, in accordance with ASTM D1557. Field density tests shall be made in accordance with ASTM D6938.

Each layer of backfill shall be moistened or dried as required and shall be compacted to the following densities, unless otherwise specified.

A. Select Fill

Under all existing or proposed roads, driveways, parking areas: 95% maximum modified Proctor dry density (ASTM D1557).

All other areas: 92% maximum modified Proctor dry density (ASTM D1557).

B. Methods and Equipment

Methods and equipment proposed for compaction shall be subject to the approval of the Village, however the minimum equipment for roadways shall be a 10 ton dual drum vibratory roller (for roadway subbase/ asphalt compaction) in conjunction to a commercial mainline asphalt paver with a vibratory screed capable of producing a compacted asphalt mat meeting the approval of the Village Department of Public Works. Compaction by rolling or operating heavy equipment over fill areas shall be conducted in a manner by which injury to existing utilities and structures shall be avoided. Any pipe or structure damaged thereby shall be replaced or repaired as directed by the Village at the expense of the Developer.

C. Testing

1. Field density tests may be ordered by the Village as necessary and will be paid for by the Developer.
2. The Developer shall furnish all necessary samples for laboratory tests and shall provide assistance and cooperation during field tests. The Developer shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.
3. A qualified testing agency should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations in the completed subgrade.
4. Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least

one test for every 5,000 square feet of compacted fill in open areas and every 50 linear feet of compacted utility trench backfill.

5. Any areas found to be below required compaction densities shall be removed and replaced with new material at the Developer's expense. The methods of operation and/or the backfill materials shall be changed to meet required compactions.
6. Inadequate compaction shall be cause for the Village to issue a stop work order on a project.

4.9 Testing of Underground Utilities

A. General Information

Upon the satisfactory completion of the installation of the underground utilities, the Contractor shall proceed to test each of the installed facilities as herein specified. These tests shall be conducted in the presence of the Village. No test will be accepted unless witnessed by the Village. Records and date of these tests shall be submitted to the Municipality as part of the record drawing information.

Water used by the Developer during any testing procedures will be paid for by the Developer - all hydrants for water supply or testing use shall be operated by the Onondaga County Water Authority.

B. Sanitary Gravity Sewers

1. All sewers shall be flushed clean by the Contractor.
2. All flexible pipe shall be tested for deflection. The deflection test shall be conducted after the final backfill has been in place at least 30 days to permit stabilization of the soil-pipe system.
 - a. No pipe shall exceed a deflection of 5 percent. If deflection exceeds 5 percent, replacement of the defective sewer will be required.
 - b. The required mandrel test for deflection will be supplemented with a new required videotaping.
 - c. The contractor shall flush all new sewer mains and video tape all mains. Digital copy of each section clearly labeling manhole to manhole with digital references showing the exact location of each sanitary wye. Digital media shall be provided in MJPEG or AVI format.

- d. The mandrel test shall be conducted after the final backfill has been in place at least 30 days. After testing, the Engineer will make a complete visual inspection of the system.
3. Each manhole shall be subjected to an infiltration or exfiltration test as determined by the Village.
- a. Vacuum Testing - Each manhole shall be subjected to a vacuum of 10 inches of Hg for one minute with an allowable loss of 1 inch of Hg.

Manhole Depth	Diameter	Time to Drop 1" Hg
10' or less	4'	60 Seconds
10' to 15'	4'	75 Seconds
15' to 25'	4'	90 Seconds

- b. For manholes 5' in diameter, add an additional 15 seconds, and for manholes 6' in diameter, add an additional 30 seconds to the time requirements listed in the above table. Conduct all "final" tests in the presence of the Engineer, and in accordance with ASTM Standards. Engineer shall be notified 24 hours in advance.

C. Sanitary Gravity Sewer

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

1. The test shall be conducted between two (2) consecutive manholes.
2. 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. 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.
4. 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.

5. A second air hose shall be connected between the air compressor and the air control equipment.
6. 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.
7. 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.
8. 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 not be less than the time shown in the following table:

Pipe Diameter	Minutes
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

9. A test 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.
10. 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.
11. 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.

D. Sanitary Pressure Sewer

Pressure tests shall be made only after the completion of backfilling operations and at least 36 hours after the concrete thrust blocks have been cast.

The duration of pressure tests shall be one hour, unless otherwise directed by the Village. Test pressure shall be 100-psi minimum or a pressure of 2-1/2 times the maximum system operating pressure, whichever is greater. All tests are to be conducted in the presence of the Village. Allowable leakage shall be as specified in shall be AWWA standards for water main pipe.

The pipeline shall be slowly filled with water. The specified pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Village.

During the filling of the pipe and before applying the specified pressure, all air shall be expelled from the pipeline by making taps at the point of highest elevation. After completion of the test, the taps shall be tightly plugged at the main.

E. Storm Drains

All storm sewers shall be flushed clean by the Contractor and in the presence of the Village of Marcellus Construction Inspector or Approved Designee the lines shall be lamped.

F. Defective Areas

In any areas where satisfactory results of applied tests cannot be obtained, the defective portion of the system shall be located and replaced with new material.

That portion of the system shall then be retested until satisfactory results are obtained. Use of repair clamps will not be permitted by the Village.

4.10 Surface Improvements

A. General Information

The Contractor shall not proceed to construct any surface improvements, including roads, gutters and/or sidewalks until the underground system has been installed, tested and approved by the Village.

Careful attention shall be given by the Contractor to obtain the necessary compaction densities as specified. In general, the soils in Marcellus preclude ultimate compaction in a short period of time due to the high clay content in the soil. Therefore, paving of the top road surface may be delayed by order of the Village of Marcellus for a period of one (1) year or at least until a winter season has passed since the completion of the road binder course.

4.11 Roads/Streets

A. Subgrade

The subgrade shall be graded to remove all unsatisfactory or unstable material. Where material is removed below the subgrade elevation, suitable granular material shall be used to bring the road to proper subgrade. Where ground water or poor soil conditions exist, the Developer shall be required to install perforated underdrain and crushed stone weeps to drain the base. The entire subgrade surface shall be thoroughly compacted according to NYSDOT Specification 203-3.12. Proof-rolling shall be completed in the presence of the Department of Public Works. Replacement unsatisfactory subbase materials may be needed based upon the judgement of the Village.

Geotextile shall be required by the Village to stabilize the base or subbase before the Contractor proceeds with installation. This requirement may be waived by the Village Department of Public Works upon submission of appropriate subsurface soil test results to prove that this fabric is unnecessary.

No movement shall be observed in the subgrade material as the roller passes.

When the subgrade is completed, the Contractor shall notify the Department of Public Works and the Village Engineer for a base determination. Upon the review and written approval of the subgrade by the Department of Public Works and the Village Engineer, the base material may be placed.

B. Base Material

Approved base materials shall be uniformly deposited and compacted in layers with a roller, according to NYSDOT Specifications. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement of the course ahead of the roller. After compaction, the top surface of this course shall not extend above the theoretical elevation for this course and when tested with a straightedge 16 feet in length, any bump or depression over 1/4 inch from the

theoretical grade line shall be satisfactorily eliminated. When the base has been prepared to the satisfaction of the Department of Public Works, the Developer may place the binder course. If base conditions are changed as determined by the Department of Public Works before the binder is placed, they may order the Developer to seal the stone with a rapid sealing liquid asphalt emulsion as specified in NYSDOT Section 702-10 or 702-11 with 0.5 gallons per square yard as determined by the conditions and not more than 24 hours prior to placement of binder asphalt.

C. Bituminous Pavement

1. Binder shall be placed and compacted to a minimum finished layer thickness of as indicated in above with a self-propelled asphalt spreader and rolled according to NYSDOT Specifications 401-3.06 and 401-3.12. Before applying the upper course, any irregularities in the base or binder course shall be eliminated but at no time will "cold patch" or "winter mix" be allowed on the base or binder for repair work.
2. Before the surface course is placed, the binder will be cleaned by the installer and inspected by the Department of Public Works to determine the condition of the pavement. It shall be necessary to apply a tack coat at the rate of 0.1-gallon/square yard before placing the surface unless this requirement is waived by the Department of Public Works.
3. Surface Course shall be placed and compacted to a minimum finished layer thickness of 1-1/2 inches with a self-propelled asphalt spreader and rolled in accordance with NYSDOT Specifications 401-3.06 and 401.3.12.

D. Temporary Road Construction

Where construction sequences preclude the specified road construction items and these requirements for Certificates of Occupancy, a temporary road consisting of the specified road section less top surface course may be constructed.

This temporary road shall be reviewed by the Department of Public Works and approved in writing prior to the issuance of any Certificate of Occupancy. The Village may accept dedication of the road if sufficient monies remain in the financial guarantee to top the road the next year.

E. Continuation of Existing Village Roads

When construction of a road is continued from an existing road or previous developed section, the pavements shall be joined with a triangular cut of at least 15 feet from edge of the pavement to the centerline of the old pavement. The intent of this provision is to eliminate any grade difference and make a smooth riding transition.

All pavement joints shall receive a tack coat before placing the binder or top course.

Village Roads within approved subdivisions are to be constructed to the furthest extent possible, whether it be the property line or phase boundary, and shall terminate with an approved Village Turnaround.

F. Underdrains

Underdrains shall be installed in conformance with NYSDOT Specification 605 and underdrain filter Type 1 per NYSDOT Specification 605-2.02. The underdrain shall be laid on four inches (4") of compacted stone and require six inches (6") of stone above and around the pipe.

4.12 Concrete Gutters and Sidewalks

A. Concrete Gutters

1. Concrete gutters shall be a minimum of 8 inches in depth at the invert and constructed true to the shape, line and grade on a thoroughly compacted base. The gutters may be constructed using a slip form method or in-place formwork.
2. Joints between sections shall be placed every 10 feet at right angles to the flow line and must be "wet struck" 1/8-inch-wide and 3/4 inch deep. Full depth bituminous expansion joints shall be placed every 50 feet and at all structures or inlets.
3. Gutters shall be broom finished before the joints are struck and the finish shall be consistent throughout the project.
4. Gutters shall be cured and sealed by spraying with an approved curing and sealing compound at the rate recommended by the manufacturer.
5. One coat of curing and sealing compound shall be applied when the work is complete and another coat after the gutters have set for 48 hours.

6. The use of burlap or coverings for curing or protection is not acceptable until after the concrete has been sprayed and set.
7. Prior to final paving, the gutters shall be flooded and checked for horizontal and vertical line and grade and finish. If any gutters are found to be constructed in an unacceptable manner by the Department of Public Works, they shall be removed and replaced. They shall also be backed up with select fill (no cobbles greater than 3 inches) to help prevent any movement during paving.
8. Gutter replacements shall conform to the existing gutter regarding finish and color.

B. Concrete Sidewalks

1. Shall be designed to meet the Americans with Disabilities Act (ADA) requirements.
2. Minimum 5 inches in depth and constructed true to shape, line and grade. Sidewalks installed through driveways shall be 5 inches thick and be reinforced with 6" x 6" wire mesh (10 gauge). Concrete shall be minimum 4000 psi, Class A, air entrained.
3. Minimum width shall be 5-feet.
4. The base shall be thoroughly compacted crusher run stone with a thickness of 4 inches. The base material shall extend 6 inches outside each edge of the concrete sidewalk.
5. A cross slope of 1/4 inch per foot shall be maintained for positive drainage toward street level.
6. Construction joints shall be wet struck at 5-foot increments and be 3/4 inch deep. Full depth bituminous expansion joints shall be placed every 50 feet and at all castings.
7. Sidewalks shall be broom finished and have troweled edges with a corner radius of 1/4 inch. The finish shall be consistent throughout the project.
8. Two coats of approved curing and sealing compound shall be applied. One coat immediately following the finish work and the second coat 48 hours later.
9. A 10-foot sidewalk easement may be required.

10. Crosswalks and signage shall be in accordance with sections 4.16, 4.17, and 4.18.

C. Testing

1. The Contractor shall obtain in accordance with ASTM C-31 two samples from every other truck delivering concrete to the site and have the samples compression tested by an independent testing laboratory.
2. Results of these tests shall be submitted to the Department of Public Works.

4.13 Monuments

The monuments shall be installed at those locations shown on the approved final plan and as located in the field by a Licensed Land Surveyor. They shall be installed to a depth of at least 30 inches below finished grade with the top surface to be flush with finished grade. Upon the installation of the monuments the location shall be certified to the Village by a Licensed Land Surveyor as to their accuracy.

4.14 Final Grading

Upon satisfactory completion of the utilities and roads, the entire area within the right-of-way shall be raked, graded and hydroseeded according to the approved plans.

The site Contractor shall be responsible for all work within the right-of-way while also maintaining the erosion control. In those areas where home building has started, clean up and site maintenance will then become the responsibility of the builder.

Debris and spoil banks created during the development (not home building) of the site shall be entirely removed and/or disposed of from the site. No burying of debris or material shall be allowed on approved or proposed building lots.

4.15 Final Cleaning

During the time period between initial installation and testing and acceptance for dedication, debris and/or sediment may accumulate in the utility systems. The Developer shall be responsible to flush and remove this debris from the system prior to the final inspection for dedication.

4.16 Signs

Street and traffic signs shall be supplied by the Developer and installed by the Village in accordance with standards outlined in the Manual of Uniform Traffic

Control Devices (MUTCD) including the most current New York State Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (NYS Supplement) (State of New York, Department of Transportation, Division of Traffic and Safety).

Signs and posts shall be ordered by the Village Department of Public Works for consistency throughout the Village. Upon receipt of signs, they shall be placed in the field by the Department of Public Works with sign post and installation cost the responsibility of the Developer.

4.17 Crosswalk Requirements

Crosswalks, and all other pedestrian crossings of vehicular travel ways, are to comply with MUTCD and NYS Supplement requirements. Pedestrian crossing features such as signs and signals shall be as ordered by the Village Department of Public Works or Authority Having Jurisdiction (AHJ).

4.18 Pavement Marking Requirements

All pavement markings for Village roads, private roads, and any other travel ways identified by the Village Department of Public Works, are to comply with MUTCD and NYS Supplement requirements. The Applicant's Design Engineer shall include pavement marking plans and details within the Subdivision / Site Plan Set if so requested by the Village Department of Public Works or Village Engineer. All pavement markings on Village roads shall meet NYSDOT specifications.

SECTION 5 Requirements for Dedication and Project Acceptance

5.1 General

All construction within the right-of-way or on lands to be dedicated to the Village shall be complete with final site reviews and written approvals of the construction by the following:

- Department of Public Works
- Code Enforcement Officer
- Village Engineer

In addition to the field review, the Village Attorney shall notify the Village in writing that all legal aspects of the project have been satisfied.

5.2 Monuments

Monuments shall have been set in their required locations and certified to the Village by the applicant's licensed Land Surveyor.

5.3 Grading

Final grading, seeding, and mulching to achieve full stabilization shall be completed within the right-of-way and all spoil removed from the site.

5.4 Street Signs

All street and traffic signs, including street identification numbers, shall be properly set in their designated locations.

5.5 Certificates of Occupancy

All requirements of the dedication process, including Village Board acceptance of items to be dedicated, are to be completed prior to the issuance of a Certificate of Occupancy (C/O), or at the discretion of the Village Code Enforcement Officer.

5.6 Record Drawing Requirements

Record drawings and all testing results shall be supplied to the Village Building Department and are subject to its review and approval at least 15 calendar days prior to any dedication procedures.

Record maps shall be prepared by a licensed professional. Upon approval, a reproducible, mylar version, along with a digital copy, shall be submitted to the Village's Building Department. The digital copy shall contain files usable in the

Village's GIS/GPS system for locating dedicated infrastructure in the field. The record drawings shall contain, at a minimum, the following information:

- a. The horizontal and vertical position of new utilities to be dedicated to the Village of Sweden shall be related to the New York State Plane Coordinate system Central Zone, North American Datum, 1983 horizontally and North American Vertical Datum 1988. The coordinate positions (x,y,z) shall be clearly delineated on the record drawings. Positions requiring coordinates shall include, but not limited to, all manholes, drainage inlets, end sections, clean outs, valves, curb boxes, hydrants, pump stations, points of utility connection to existing, and dead ends. Maximum horizontal positional error to be no greater than $0.5'\pm$, vertical error shall be no greater than $0.10'\pm$.
- b. The locations, sizes, elevations, lengths, slopes and invert and top elevations of all structures in storm and sanitary sewer systems.
- c. The elevations of any drainage swales and drainage structures to be dedicated to the Village.
- d. The locations including ties to all valves, curb boxes and hydrants to permanent structures.
- e. Finished Elevations and slopes of road surfaces and gutters, including road name and curve table.
- f. The location of any right-of-way monument.
- g. Locations and finished elevations of all stormwater management facilities and outfall structures, and all other stormwater management practices. Record Drawings shall be required to include a stage storage table comparing design elevations and volumes to as-built conditions.
- h. Locations of all light poles, sidewalks, street signs, and guiderail.
- i. Liber/page number of any easements or right-of-way and including floodplain numbers.
- j. Any other significant details affecting the operation or maintenance of any system by the Village or districts.

5.7 Maintenance Guarantee

Upon satisfactory completion of the roads, utilities, stormwater management practices/facilities, and appurtenances, a final site inspection and approval is to be provided by the Village Department Heads and Village Engineer (upon request by the Village). Once a satisfactory final inspection has been

completed, and all required record drawing and GIS information has been provided and approved, the letter of credit will be reduced to 10% of the estimated construction cost. This amount will be retained by the Village Board for a period of one (1) year.

5.8 Final Release of Funds

The Village Board, upon signature recommendation of the Design Engineer, Owner, Village Engineer and Village Fiscal Officer, receipt of the Village Attorney's written opinion of legal status, receipt of two-year Maintenance Bond, record drawings accepted by the Village Departments and a final field review report, shall then authorize release of monies retained in the Letter of Credit.

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Appendices