

Chapter 17½

STANDARDS FOR REQUIRED IMPROVEMENTS*

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ARTICLE I. GENERAL PROVISIONS

Sec. 17½-1. Applicability and purpose of chapter.

The provisions of this Chapter shall be applicable whenever the improvements specified herein are required to be constructed as part of the development of a subdivision or a planned unit development, or as a condition of the construction of a structure pursuant to the building code, or as a condition of the establishment or maintenance of a use pursuant to the zoning ordinance. The provisions of this Chapter define the improvements required of certain developments, and establish the design and construction standards and specifications for improvements required by this Chapter and by other Ordinances of the Village. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-2. Unlawful to develop in violation of chapter.

It shall be unlawful to develop any property without the improvements required and specified herein. It shall also be unlawful to construct any of the improvements specified herein except in accordance with the standards, specifications and procedures established by this Chapter. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-3. Interpretations and variances.

Interpretations of the provisions of this Chapter shall be the responsibility of the Village Engineer with the right of appeal to the President and Board of Trustees, whose interpretation shall be final. In

* Editor's note-Ord. No. 79-07, Sec. 1, enacted Feb. 21, 1979, amended this Code by adding provisions designated Ch. 24 which provisions were redesignated Ch. 17 1/2 by the editors in order to preserve the alphabetical arrangement of chapters within the Code.

Cross references--Buildings and building regulations, Ch. 6; mobile homes and mobile home parks, Ch. 14; streets and sidewalks, Ch. 18; subdivisions, Ch. 19; water and sewers, Ch. 23.

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the case of conflict between the provisions of this Chapter and the provisions of any other Ordinance, the strictest provisions, as determined by the President and Board of Trustees, shall be applicable. Variations from the provisions of this Chapter can be granted only by the President and Board of Trustees after a hearing on the proposed variation. The President and Board of Trustees shall grant or deny a request for a variation after receiving the recommendation of the Village Engineer, and after considering the effects of said variation on the person requesting it, on other property, on Village maintenance, and on the public health, welfare and safety. (Ord. No. 79-07, Sec. 1, 2-21-79)

Secs. 17½-4--17½-10. Reserved.

ARTICLE II. STORM WATER DRAINAGE

Sec. 17½-11. Purpose.

The storm water drainage control regulations hereinafter set forth shall be applicable in conjunction with the Code and regulations of the Village to provide for orderly growth and development and to safeguard public and private property against damage from storm water runoff and flooding. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-12. Definitions.

[The following definitions shall be applicable to this article:]

- (1) *Storm water runoff*: Water that results from precipitation which is not absorbed by the soil or plant material.
- (2) *Natural drainage*: Channels formed by the existing surface topography of the earth prior to changes made by unnatural causes.
- (3) *Excess storm water*: That portion of storm water runoff which exceeds the transportation capacity of storm sewers or natural drainage channels serving a specific watershed.
- (4) *Bypass channel*: A channel formed in the topography of the earth's surface to carry storm water runoff through a specific area.
- (5) *Storm water runoff release rate*: The rate at which storm water runoff is released from dominant to servient land.
- (6) *Storm water storage area*: Areas designated to store excess storm water,
- (7) *Tributary watershed*: All of the area that contributes storm water runoff to a given point.

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- (8) *Recognized agency*: An agency or governmental unit that has statistically and consistently examined local and climatic and geologic conditions and maintained records as they apply to storm water runoff, e.g., Metropolitan Sanitary District of Greater Chicago, U.S. Weather Bureau, University of Illinois Engineering Experiment Station, Illinois State Water Survey, etc.
- (9) *Dry bottom storm water storage area*: A facility that is designed to be normally dry and contains water only when excess storm water runoff occurs.
- (10) *Wet bottom storm water storage area*: A facility that is designed to be maintained as free water surface or pond.
- (11) *Control structure*: A structure designed to control the volume of storm water runoff that passes through it during a specific length of time,
- (12) *Positive gravity outlet*: A term used to describe the drainage of an area by means of natural gravity so that it lowers the free water surface to a point below the existing grade or invert of storm drains within the area.
- (13) *Ground water recharge*: Replenishment of existing natural underground water supplies.
- (14) *Safe storm drainage capacity*: A term used to describe the quantity of storm water runoff that can be transported by a channel or conduit without having the water surface rise above the level of the earth's surface over the conduit, or adjacent to the waterway. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-13. Land drainage requirements.

All land developments and improvements within the jurisdictional control of the Village must have an adequate outlet with safe storm drainage capacity for storm water drainage as determined by the Village Engineer. If the storm water drainage outlet is not adequate, then detention facilities for storm water runoff shall be provided as determined by the Village Engineer to store the excess storm water. A combination of on-site excess storm water storage and controlled release of storm water runoff shall be provided for all of the following land uses:

- (1) Commercial and industrial building developments of two (2) acres and larger in area.
- (2) Multiple-family dwelling developments of five (5) acres and larger in area.
- (3) Single-family dwelling developments of ten (10) acres and larger in area. (Ord. No. 79-07, Sec. 1, 2-21-79)

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Sec. 17½-14. Storm water runoff release rate.

The storm water runoff release rate from all land developments and improvements required to provide detention facilities for excess storm water shall not exceed the storm water runoff rate from the area calculated for a rainfall storm of three-year frequency with a rainfall runoff coefficient of fifteen hundredths (0.15), unless the permit applicant can show by detailed calculations of an Illinois registered professional Engineer which are approved by the Village Engineer that the safe storm drainage capacity of the existing outlet serving the tributary watershed is greater. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-15. Bypass storm water flow.

The storm water drainage system for all land developments and improvements shall be designed with adequate bypass capacity to convey the storm water runoff flow from all tributary watershed areas through the land development area to the existing drainage outlet. The bypass storm water flow rate for upstream tributary watershed areas shall be computed to carry the peak rate of runoff from a one hundred-year storm with a rainfall-runoff coefficient of thirty-five hundredths (0.35). An allowance will be made for upstream detention storage when such upstream storage and runoff release rate has previously been approved by the Village and has been constructed. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-16. Excess storm water storage.

- (a) The required volume of live detention storage of excess storm water shall be calculated on the basis of the runoff from a one hundred-year frequency rainfall of any duration, as published by a recognized agency, from the fully developed watershed that is tributary to the storm water storage area less the volume discharged from the watershed during the same duration at the allowable storm water release rate. The live detention storage (LDS) required for all excess storm water flows shall be calculated by the following formula:

$$LDS = CI100T - 0.15 I3T$$

where LDS = Live detention storage in inches of depth which can be converted to acre-feet by multiplying by the drainage area in acres and by the factor of 0.0833.

C = Rainfall-runoff coefficient calculated for the ultimate development of the total tributary watershed area using the following values:

Commercial and industrial--	0.95
Residential, multifamily--	0.75
Residential, single family--	0.55
Parks, golf courses, etc.--	0.35
Undeveloped--	0.15

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I100 = Rainfall intensity in inches per hour determined by a recognized agency for a 100-year storm frequency for any and all durations.

I3 = Rainfall intensity in inches per hour determined by a recognized agency for a 3-year storm frequency for the time of concentration of the undeveloped land.

T = Time of duration in hours of the 100-year storm varied to determine the most critical runoff rate and therefore the maximum live detention storage.

- (b) Dry bottom storm water storage areas shall be designed to serve a secondary purpose for recreation, open space or other types of uses that will not be adversely affected by occasional or intermittent flooding. A method of carrying the low flow through these areas shall be provided in addition to a system of drains, and both shall be provided with a positive gravity outlet to a natural channel or storm sewer.
- (1) The combination of storage of the water from a one hundred-year storm and the design release rate shall not result in a storage duration in excess of seventy-two (72) hours.
 - (2) Maximum depth of planned storm water storage shall not exceed four (4) feet unless the existing natural ground contours and other conditions lend to greater storage depth, which shall be approved by the Village.
 - (3) Minimum grades for turf areas shall be two (2%) percent and maximum slopes shall be ten (10%) percent (ten (10) units horizontally to one unit vertically). Storage areas side slopes shall be kept as close to the natural land contours as practical and a ten (10%) percent slope or less shall be used wherever possible. If slopes greater than ten (10%) percent are necessary to meet storage requirements or area restrictions, approval shall be obtained from the Village and suitable erosion control provided in addition to the protection required to insure public health, safety and welfare.
 - (4) Outlet control structures shall be designed as simply as possible and shall require little or no attention for proper operation. Each storm water storage area shall be provided with a method of emergency overflow in the event that a storm in excess of the one hundred-year frequency storm occurs. This emergency overflow facility shall be designed to function without attention and shall become part of the "natural" or surface channel system. Hydraulic calculations shall be submitted to the Village Engineer to substantiate all design features. Both outlet control structures and emergency overflow facilities shall be designed and constructed to fully protect the public health, safety and welfare. Storm water runoff velocities shall be kept at a minimum and turbulent conditions at an outfall control structure will not be permitted without complete protection for the public safety. The use of restrictive

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fences shall be kept to a minimum and used only as a last resort when no other method is feasible.

- (c) Wet bottom storm water storage areas shall be designed in accordance with all of the requirements for dry bottom storm water storage areas except that a low flow conduit and a system of drains with a positive gravity outlet shall be eliminated. However, the following additional conditions shall be complied with:
- (1) Water surface area shall not exceed ten (10%) percent of the tributary drainage area.
 - (2) Shoreline protection shall be provided to prevent erosion from wave action.
 - (3) Minimum normal water depth shall be four (4) feet. If fish are to be used to keep the pond clean, a minimum of twenty-five (25%) percent of the pond area shall have a minimum depth of ten (10) feet.
 - (4) Facilities shall be available, if possible, to allow the pond level to be lowered by gravity flow for cleaning purposes and shoreline maintenance.
 - (5) Control structures for storm water release shall be designed to operate at full capacity with only a minor increase in the water surface level. Hydraulic calculations shall be submitted to the Village Engineer to substantiate all design features.
 - (6) Aeration facilities to prevent pond stagnation shall be provided. Design calculations to substantiate the effectiveness of these aeration facilities shall be submitted with final engineering plans. Agreements for the perpetual operation and maintenance of aeration facilities shall be prepared to the satisfaction of the Village.
 - (7) In the event that the water surface of the pond is to be raised for purposes of storing water for irrigation or in anticipation of the evapotranspiration demands of dry weather, the volume remaining for storage of excess storm water runoff shall still be sufficient to contain the one hundred-year storm runoff.
- (d) Paved surfaces that are to serve as storm water storage areas shall have minimum grades of one per cent and shall be restricted to storage depths of one foot maximum. Rooftop storage shall be designed with permanent-type control outlets and parapet walls to contain runoff on the rooftop. Emergency overflow areas shall be provided to insure that the weight of water stored will not exceed the structural capacity of the roof. If a portion of an area within a storm water storage area is to be paved for parking or recreational purposes, the paved surface shall be placed at the highest elevation within the storage area as possible. Maximum parking lot grades shall not exceed normal design parameters of three (3%) to five (5%) percent. (Ord. No. 79-07, Sec. 1, 2-21-79)

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Sec. 17½-17. Ground water recharge.

The ability to retain and maximize the ground water recharge capacity of the area being developed is encouraged. Design of the storm water runoff control system shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is paved and roofed over. Specific design calculations and details shall be provided with the final plans and specifications presented for Village approval. The use of natural gravel deposits for the lower portions of storm runoff storage areas, the flattening of drainage slopes and the retention of existing topography are examples of possible recharge methods. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-18. Construction of storm water control facilities.

- (a) Where development of a property presents the threat of flooding or damage by flash runoff to down stream residents, the facilities for storm water runoff control shall be constructed prior to any earthmoving or drainage construction on the project site.
- (b) During the construction phases of land development, facilities shall be provided to prevent the erosion and washing away of the earth. Silting of downstream areas shall be prevented through the strategic use of stilling basins, sodding of runoff channels, and by limiting the period of time during which the earth is stripped of vegetation.
- (c) The construction of the storm water control system shall be accomplished as part of the cost of land development. If the amount of storage capacity can be increased to provide benefits to the Village, negotiations for public participation in the cost of development may be feasible. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-19. Submittal of engineering design data.

Plans, specifications and all calculations for a storm water runoff as required hereunder shall be submitted to the Village Engineer for review and approval prior to the Village's approval of a final plat in the case of subdivisions and planned unit developments, or issuance of a building permit in the case of commercial or industrial construction. (Ord. No. 79-07, Sec. 1, 2-21-79)

Secs. 17½-20--17½-30. Reserved.

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ARTICLE III. STANDARDS AND SPECIFICATIONS FOR WATER MAINS, SANITARY SEWERS, STORM SEWERS, STREETS, SIDEWALKS AND APPURTENANCES

Sec. 17½-31. Applicability of provisions.

The provisions of this Article establish the standards and specifications for the design and construction of public improvements including water mains, sanitary sewers, storm sewers, streets, sidewalks, and appurtenances within the corporate limits of the Village of Fox River Grove and within the area one and one-half (1½) miles beyond the corporate limits as now or hereafter established. (Ord. No. 79-07, Sec. 1, 2-21.-79)

Sec. 17½-32. Definitions.

[For the purpose of this Article, the following words, terms and phrases shall have the meaning ascribed to them in this Section:]

- (1) *ANSI*: American National Standards Institute.
- (2) *ASTM*: American Society for Testing and Materials.
- (3) *AWWA*: American Water Works Association.
- (4) *CISPI*: Cast Iron Soil Pipe Institute.
- (5) *Building sewer*: A private sewer that conveys sewage and polluted industrial wastes from a building to the public sanitary sewer.
- (6) *Cul-de-sac*: A minor street having one open end and being permanently terminated at the other end by a vehicle turnaround.
- (7) *Development*: Any construction or any installation of site improvements.
- (8) *Distribution system*: The network of water mains by which a water supply is delivered to consumers.
- (9) *Engineer*: A professional engineer registered as such in the State of Illinois.
- (10) *Infiltration*: The quantity of groundwater that leaks into a pipe through joints, porous walls, or breaks.

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- (11) *Major street:* A street of considerable continuity which serves or is intended to serve as a major traffic artery connecting large areas.
- (12) *Minor street:* A street intended primarily as access to abutting properties.
- (13) *Owner:* Any person having legal and equitable title to the land sought to be subdivided, developed or otherwise improved.
- (14) *Ordinance:* This chapter.
- (15) *Person:* Any individual, firm, association, syndicate, corporation, trust, or any other legal entity.
- (16) *Psi:* Pounds per square inch of pressure.
- (17) *Psig:* Pounds per square inch of gage pressure.
- (18) *Public right-of-way:* A strip of public land which affords pedestrian and vehicle access to abutting private properties.
- (19) *Public sewer:* A sewer in which all owners of abutting properties have equal rights of connection and use, and is operated, maintained and controlled by the Village.
- (20) *Sanitary sewer:* A sewer that conveys sewage and polluted industrial wastes, and to which storm water, surface drainage, groundwater or unpolluted waste water are not intentionally admitted.
- (21) *Sewage:* A combination of the waste water from residential, commercial, industrial and institutional buildings together with such groundwater infiltration and surface water inflow that may be in the sewers.
- (22) *Shall:* Mandatory.
- (23) *Sidewalk:* A paved walk for pedestrians in the public street right-of-way.
- (24) *Storm sewer:* A sewer that conveys storm water runoff and surface water drainage, but excludes sewage and polluted industrial wastes.
- (25) *Storm water runoff:* That portion of precipitation which is not absorbed into the ground and which is drained from the ground surface to a natural outlet or watercourse.
- (26) *Street:* A roadway for motor vehicles in the public right-of-way.

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- (27) *Secondary street:* A street which is intended to carry traffic from minor streets to major streets and highways, including the principal entrance streets of residential subdivisions.
- (28) *Superintendent:* The Superintendent of Water and Sewers of the Village or his duly authorized deputy or representative.
- (29) *Village:* The Village of Fox River Grove, Illinois.
- (30) *Village Engineer:* The engineer duly designated or appointed by the Village President and Board of Trustees, or his duly authorized deputy or representative.
- (31) *Water main:* A pressure pipe through which water supply is delivered for domestic, industrial and fire protection uses. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-33. Water system improvements.

- (a) Water mains shall be sized as determined by a hydraulic analysis based on anticipated flow demands and pressure requirements to maintain a normal working pressure in the distribution system of not less than forty (40) psi and a minimum residual pressure of twenty (20) psi for fire protection, but the minimum size of water main shall be six-inch diameter.
- (b) All water main extensions shall be looped to avoid dead-ends and shall extend across the entire frontage of the property to be served unless otherwise recommended by the Village Engineer and/or approved by the Board of Trustees.
- (c) Water mains shall be either cement-mortar lined ductile cast-iron pipe, Class 52 conforming to the latest revision of ANSI Specification A21.51, or asbestos-cement pressure pipe, Class 150 conforming to the latest revision of AWWA Standard C400, or polyvinyl chloride Class 150 pressure pipe with a standard dimension ratio of 17 conforming to the latest revisions of ASTM D-1784 and ASTM D-2241. Fittings shall conform to the latest revision of ANSI Specification A21.10. Cast-iron pipe and fittings installed in corrosive soils containing cinders or having a high organic content shall be protected by polyethylene encasement conforming to the latest revision of ANSI Specification A21.5.
- (d) Water mains shall have a minimum depth of cover of five and one-half (5 1/2) feet over all pipe and fittings, and shall be installed in accordance with the latest revision of AWWA Standard C600 for cast-iron pipe and AWWA Standard C603 asbestos-cement pipe. A continuous and uniform bedding of gravel or crushed stone, Size No. 67, conforming to the latest revision of ASTM Specification D448, shall be placed in the trench to provide a minimum thickness of four (4) inches under and supporting the full bottom quadrant of the pipe. Backfill materials shall be placed and tamped by hand in six-inch layers around the pipe.

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to a height of twelve (12) inches over the top of the pipe.

- (e) Water mains shall be provided with gate valves at all tees and crosses, and at not more than five hundred-foot intervals in commercial districts and at not more than eight hundred-foot intervals in residential and industrial districts.
- (f) Gate valves shall be cast-iron body, bronze fitted, resilient wedge disc and seat type with non-rising stem and O-ring seals, and conform to the latest revision of AWWA Standard C509. (Ord. No. 2001-02, Sec. 1, 1-18-2001)
- (g) Gate valves under streets and driveways shall be installed inside forty-eight-inch diameter precast concrete valve vault structures complete with cast-iron steps and manhole covers marked "Water". Gate valves under dirt or grass parkways shall be installed with valve boxes extended to the finished grade ground level with covers marked "Water".
- (h) Fire hydrants shall be installed at all street intersections and at intervals of not more than three hundred (300) feet in commercial and industrial districts and four hundred (400) feet in residential districts. Fire hydrants shall be the compression type with five and one-quarter ($5\frac{1}{4}$) inch minimum size main valve assembly, O-ring seals, two and one-half ($2\frac{1}{2}$) inch hose nozzles and a four and one-half ($4\frac{1}{2}$) inch pumper nozzle with National Standard threads, a National Standard operating nut, a break-away type ground level flange, conforming to the latest revision of AWWA Standard C502, and be manufactured by Waterous Company. Each hydrant shall be provided with a six-inch auxiliary gate valve and not less than a twenty-four-inch length of six-inch pipe between the hydrant and valve. Two (2) three-quarter-inch threaded steel rods with hex nuts shall be installed to tie the auxiliary valve to the water main connecting tee. Fire hydrants shall be installed vertically so that the center line of the pumper nozzle is not less than twelve (12) inches nor more than eighteen (18) inches above the finished grade ground level. Hydrants shall be set on a precast concrete block of adequate area and thickness to provide firm support for the base, and shall be securely braced with solid concrete blocking between the base and undisturbed trench wall to counteract the reaction thrust of water pressure at the base. Hydrant barrels shall be braced in such a manner to hold them plumb during backfilling. A minimum of three-eighths ($\frac{3}{8}$) cubic yard of washed coarse stone shall be placed at and around the hydrant base for proper drainage of the hydrant barrel after use. Backfill material shall be carefully placed and compacted in six-inch layers around the hydrant and auxiliary gate valve to ensure protection and plumbness of the hydrant barrel and auxiliary valve box.
- (i) Connections to existing water mains shall be made only at a time convenient to and with the presence of the Village Superintendent. Existing gate valves shall only be operated by personnel of the Village Department of Water and Sewers.

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- (j) All new water mains, fittings, valves and hydrants shall be pressure tested and leakage tested in accordance with the latest revision of Section 13 of AWWA Standard C600.
- (k) All new, cleaned or repaired water mains, fittings, valves and hydrants shall be disinfected in accordance with the latest revision of AWWA Standard C601 and the requirements of the Illinois Environmental Protection Agency, Division of Public Water Supplies. (Ord. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-34. Sanitary sewer system improvements.

- (a) Sanitary sewers shall be designed to carry, when flowing half full, not less than the following domestic sewage flow rates, exclusive of sewage or other waste water from industrial plants, for the ultimate tributary area to be served as determined by the Village Engineer.
 - (1) Lateral sewers--Four hundred (400) gallons per capita per day.
 - (2) Main sewers--Two hundred fifty (250) gallons per capita per day.
- (b) All public sanitary sewer extensions shall extend across the entire frontage of all abutting properties to be served unless otherwise recommended by the Village Engineer and/or approved by the Board of Trustees.
- (c) Sanitary sewers shall not be less than eight-inch diameter size pipe, and shall be installed with uniform invert slope and straight alignment between manholes.
- (d) Building sewers shall not be less than six-inch diameter size pipe installed at a minimum slope of 0.125 (1/8) inch per foot, or not less than four-inch diameter size pipe in lengths of not less than ten (10) feet installed at a minimum invert slope of 0.25 (¼) inch per foot.
- (e) Sanitary sewers shall be constructed using one of the following listed materials:
 - (1) Polyvinyl chloride (PVC) sewer pipe conforming to the latest revised specification requirements of ASTM D3034, Type PSM. The pipe and fittings shall have a minimum wall thickness SDR 35. The joints shall be either the solvent weld type conforming to the latest revised specification requirements of ASTM D2564 and ASTM D2855, or elastomeric gasket type conforming to the latest revised specification requirements of ASTM D1869 and ASTM D3212. A thicker walled pipe, SDR 26, may be required by the Superintendent of Water and Sewers or the Village Engineer if a thicker walled pipe is determined to be necessary in order to protect the public health because of design and/or field conditions. The Superintendent of Water and Sewers or the Village Engineer shall state in writing the reason why design and/or field conditions necessitate a thicker walled pipe. Pipe and

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fittings shall be the products of one approved manufacturer only, and there shall not be any mixing of pipe and fittings of different manufacturers.

- (2) Acrylonitrile-butadiene-styrene (ABS) and polyvinyl chloride (PVC) composite sewer pipe conforming to the latest revised specification requirements of ASTM D2680. Couplings and fittings shall be of the same material as the pipe. ABS pipe joints shall be of the solvent weld type and shall be made in strict accordance with the manufacturer's instructions using the proper primer and cement materials. PVC pipe joints shall be either the elastomeric gasketed type conforming to the latest revised specification requirements of ASTM D3212 or solvent-weld type as specified for ABS pipe. (Ord. No. 89-04, Sec. 1, 1-18-89)
- (f) Building sewers shall be constructed using one of the following listed materials:
- (1) Polyvinyl Chloride (PVC) pipe and fittings conforming to the latest specification requirements of ASTM D3034, Type PSM. The pipe and fittings shall have a minimum wall thickness of SDR 35. The joints shall be either the solvent weld type conforming to the latest revised specification requirements of ASTM D2564 and ASTM D2855, or elastomeric gasket type conforming to the latest revised specification requirements of ASTM D1869 and ASTM D3212.
 - (2) Acrylonitrile-butadiene-styrene (ABS) solid wall sewer pipe and fittings with solvent welded joints or compression-type rubber ring gasket joints conforming to the latest revision of ASTM Specifications D2321 and D2751 for wall thickness SDR 35 installed in accordance with the manufacturer's recommendations.
 - (3) Extra heavy cast-iron soil pipe and fittings conforming to the latest revision of ASTM Specification A74 with compression-type rubber ring gasket joints installed in accordance with the latest revision of the Illinois State Plumbing Code. (Ord. No. 89-04, Sec. 2, 1-18-89).
- (g) The connection of the building sewer into the public sewer shall be made at the branch fitting, if such is available at a suitable location. If the public sewer is twelve (12) inches in diameter or less, and no properly located branch fitting is available, the owner shall, at his expense, install a branch fitting in the public sewer at the location specified and installation approved by the Superintendent of Water and Sewers. Where the public sewer is greater than twelve (12) inches in diameter, and no properly located branch fitting is available, a neat hole may be cut into the public sewer to receive the building sewer, with entry in the downstream direction at an angle of about forty-five (45) degrees. A forty-five (45) degree ell may be used to make such connection, with the spigot end cut so as not to extend past the inner surface of the public sewer. The invert of the building sewer at the point of connection, with the spigot end cut so as not to extend past the inner surface of the public sewer. The invert of

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the building sewer at the point of connection shall be at the same or a higher elevation than the invert of the public sewer. A smooth, neat joint shall be made, and the connection made secure and watertight by encasement in concrete. Special fittings may be used for the connection when approved by the Superintendent of Water and Sewers.

- (h) PVC and ABS pipe shall be installed in accordance with the latest revised specification requirements of ASTM D2321 using either compacted Class I or Class II granular embedment materials for bedding, haunching and initial backfill of twelve (12) inches over the top of pipe to provide the necessary support for the pipe so that the maximum deflection does not exceed five (5%) percent of the pipe's original internal diameter.

The contractor shall provide the necessary tools and equipment and perform the work necessary to test the deflection in the initial 1,200 feet of installed sewer and not less than ten (10%) percent of the remainder of the sewer project at random locations selected by the Engineers no sooner than thirty (30) days after backfilling has been completed. In the event that deflection exceeds the maximum limit of five (5%) percent, the contractor shall test all other new flexible pipe for deflection. Deflection shall be tested by use of either a mandrel or rigid ball having a diameter equal to ninety-five (95%) percent of the inside diameter of the pipe, and the test shall be performed without using mechanical pulling devices. Wherever the deflection limitation is exceeded, the contractor shall uncover the pipe, carefully replace compacted embedment and backfill material, and retest for deflection. (Ord. No. 89-04, Sec. 3, 1-18-89)

- (I) All sanitary sewers and building sewer branches shall be tested for watertightness by a low pressure air test to assure that infiltration will not exceed two hundred (200) gallons per inch of pipe diameter per twenty-four (24) hours per mile of sewer. The contractor shall furnish all testing equipment and personnel required for conducting the low pressure air test as directed by the Superintendent of Water and Sewers or Village Engineer.
 - (1) Prior to low pressure air testing, the sewers shall be thoroughly cleaned and dampened by passing a snug-fitting inflated rubber ball through the sewer by upstream water pressure.
 - (2) After cleaning and dampening, all sewer pipe openings shall be sealed with suitable airtight plugs and braces,
 - (3) Wherever the sewer to be tested is submerged under groundwater, a pipe probe shall be inserted by boring or jetting into the backfill material adjacent to the center of the sewer pipe. Air shall be forced to flow very slowly through the probe pipe to determine the back pressure caused by groundwater static head. The gage pressure of the groundwater static head shall be added to the standard air test pressure to compensate for the back pressure effect of groundwater static head on the low

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pressure air test.

- (4) The low pressure air test shall be made by slowly adding air to the plugged sewer sections under test until the internal air pressure reaches four (4.0) psig greater than any groundwater hydrostatic pressure, After the initial pressurization, at least two (2) minutes shall be allowed for air temperature to stabilize and adding only the amount of air to maintain the initial test pressure.
- (5) After the initial air pressure temperature has been stabilized, the air supply shall be shut off. An approved stopwatch shall be used to record the time in seconds for the internal sewer pressure to drop from three and one-half (3½) psig to two and one-half (2½) psig greater than any groundwater hydrostatic pressure. The low pressure air test of sanitary sewers shall be considered satisfactory if the total rate of air loss from any section of sewer tested in its entirety does not exceed thirty ten-thousands (0.0030) cubic feet of air per minute per square foot of internal pipe surfaces. If the low pressure air test fails to meet these requirements, the contractor shall locate and repair, or remove and replace the faulty sections of sewer in a manner approved by the Superintendent of Water and Sewers or Village Engineer, as necessary to perform a satisfactory low pressure air test upon retesting. The use of acrylamid gel sealants as a method of correcting leakage will not be acceptable.
- (j) Sanitary sewer manholes shall have an inside diameter of forty-eight (48) inches for all sewer sizes of 8-inch through 24-inch diameter, and an inside diameter of sixty (60) inches for all sewer sizes of 27-inch through 36-inch pipe diameter. Manholes shall be constructed of precast reinforced concrete sections conforming to the latest revision of ASTM Specification C478. Manhole sections shall be joined together using either flexible watertight rubber ring gaskets or preformed bituminous plastic gaskets similar to RAM-NEK made by K. T. Snyder Company, Inc., or Type CS-208 made by Concrete Sealants, Inc., or equal, approved by the Village Engineer. Top manhole sections shall be precast eccentric, or concentric type cones with a 24-inch diameter manhole cover opening. Manhole frames and covers shall be Neenah Foundry Company No. R-1077-A, or East Jordan Iron Works, Inc. No. 1022, or equal approved by the Village Engineer, with standard duty, nonrocking type, indented top solid lids marked "Sewer". Not more than eight (8) inches of grade adjusting rings will be permitted. Frames shall be set on a preformed bituminous plastic gasket to provide a watertight joint. Cast-iron steps similar to Neenah Foundry Company No. R-1980-C, or East Jordan Iron Works, Inc. No. 8501, or equal approved by the Village Engineer, shall be installed at 16-inch spacings on centers. Precast concrete bottom slabs shall be constructed as an integral part of the bottom manhole section and shall be carefully bedded on a two-inch compacted sand cushion. Gasket-type waterstop collars consisting of a meoprene collar and a stainless steel band or other approved manhole waterstop shall be installed wherever a pipe passes through the manhole walls to provide a watertight joint to prohibit infiltration into the sewer system. Each manhole shall have bottom concrete fillets shaped to provide smooth

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flow channels through manholes conforming in shape and slope to that of the sewers, with the top of the fillet sides at one-half of the outlet sewer vertical diameter dimension. An outside drop connection is required when any entering sewer invert differs by two feet or more from the manhole invert. (Ord. No. 89-04, Sec. 4, 1-16-89.)

Sec. 17½-35. Storm water drainage improvements.

- (a) Storm sewers, culverts, inlets and open ditches shall be designed to carry a rate of flow not less than the runoff rate computed by the rational method formula:

$$Q = CIA$$

Q = Runoff rate in cubic feet per second

A = Drainage area in acres

I = Rainfall intensity for a 10-year storm

C = Runoff coefficient using following values:

Commercial and industrial-- 0.95

Residential, single family-- 0.55

Residential, multifamily-- 0.75

Parks, golf courses, etc.-- 0.35

Undeveloped-- 0.15

- (b) The storm sewer sizes shall be determined on the basis of the Kutter's formula or the Manning's formula using an "n" roughness coefficient of thirteen hundredths (0.13) for smooth pipe and twenty-one hundredths (0.21) for corrugated pipe. The minimum size storm sewer shall be twelve-inch diameter pipe.
- (c) Storm sewers shall be constructed using one of the following listed materials:
- (1) Reinforced concrete pipe conforming to the latest revision of ASTM Specification C76 for Class III pipe with all joints sealed with mastic joint sealer or preformed flexible gaskets in accordance with the recommendations of the manufacturer.
 - (2) Type I asbestos-cement nonpressure sewer pipe, Class V, conforming to the latest revision of ASTM Specification C663, with plastic coupling joints installed in accordance with the manufacturer's recommendations.
- (d) Culvert sizes shall be designed to carry the ten-year storm with no head available at the culvert inlet. The minimum size culvert shall be fifteen-inch diameter pipe. Flared end sections shall be provided for all culvert pipes of twenty-four-inch diameter and larger sizes.

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- (e) Storm sewer inlets shall be located at street intersections, low points between intersections, and at sufficiently frequent intervals that gutters or ditches will not be overloaded.
- (f) Storm sewer manholes shall be located at all changes in pipe sizes, slope or alignment, at all sewer junctions, and at distances of not greater than five hundred (500) feet for sewer size of twelve (12) inches to twenty-one (21) inches, and not greater than six hundred (600) feet for sewer sizes and twenty-four (24) inches and larger.
- (g) Catch basins shall not be provided for storm sewer inlets in curbs and gutters. Catch basin type inlets shall be provided for ditch and area drains where excessive silt can be expected to be carried with the storm water runoff from unpaved areas.
- (h) Manholes, inlets and catch basins shall be standard types approved by the State of Illinois Department of Transportation, Division of Highways. (Ord. No. No. 79-07, Sec. 1, 2-21-79)

Sec. 17½-36. Street and sidewalk improvements.

- (a) Street and sidewalk improvements shall be constructed in accordance with the latest applicable provisions of the *Standard Specifications for Road and Bridge Construction* adopted by the State of Illinois Department of Transportation, Division of Highways, hereinafter referred to as the "State Standard Specifications".
- (b) Prior to the construction of public streets and/or sidewalks, all fences, walls, foundations, buildings, debris, trees and hedges within the improvement area of the public right-of-way shall be removed in accordance with Section 201 of the State Standard Specifications.
- (c) The following specifications shall govern the design, grading and surfacing of new and existing public streets, unless otherwise approved by the Village Engineer:

- (1) The minimum pavement width between backs of curbs shall be:

<i>Class of Street</i>	<i>Residential</i>	<i>Industrial or Business</i>
Major streets	49 feet	57 feet
Collector streets	45 feet	45 feet
Minor streets	30 feet	39 feet
Frontage road	24 feet	36 feet
Half street	1/2 the width of proposed street but not less than 18 feet	Not permitted
Alleys	18 feet	24 feet

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- (2) The minimum diameter of cul-de-sac pavements between backs of curbs shall be:
- Residential--Eighty (80) feet;
- Industrial or business--One hundred (100) feet;
- (3) Grades of major streets shall not exceed six (6%) percent. Grades of other streets shall not exceed ten (10%) percent. Grades for all streets shall not be less than five-tenths (0.5%) percent.
- (4) The minimum radius of center line horizontal curves shall be:
- Major streets-One thousand (1,000) feet;
- Collector streets-Three hundred (300) feet;
- Minor streets-One hundred fifty (150) feet.
- (5) Vertical curves shall be provided for all changes in center line grades of streets. The minimum length of vertical center line curves shall be:
- Major and collector streets-Three hundred (300) feet;
- Minor streets-One hundred fifty (150) feet.
- (6) The minimum stopping sight distance shall be three hundred (300) feet measured from an eye level of four (4) feet above the pavement center line with a clear view of an obstacle one (1) foot in height.
- (7) The minimum requirements for street pavement design shall be:
- Major streets:*
- Subbase four-inch gravel or crushed stone, CBR = 70;
- Base course ten-inch stabilized, MS/900 or equal;
- Surface course four-inch bituminous concrete, or Class 1, MS/1700; or
- Subbase four-inch gravel or crushed stone, CBR = 70;
- Eight-inch Portland cement concrete.
- Industrial streets:*
- Subbase four-inch gravel or crushed stone, CBR=70;
- Base course eight-inch stabilized, MS/900 or equal;
- Surface course three-inch bituminous concrete, Class I, MS/1700; or

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Seven-inch Portland cement concrete.

Collector streets:

Base course six-inch stabilized MS/900 or ten-inch gravel or crushed stone;
Surface course three-inch bituminous concrete,
Class I, MS/1700; or
Six-inch Portland cement concrete.

Minor streets:

Base course eight-inch gravel or crushed stone;
Surface course two-inch bituminous concrete, Class I, MS/1700.

- (8) Street pavements shall be constructed in accordance with Sections 200, 300 and 400 of the State Standard Specifications.
- (d) Combination concrete curbs and gutters shall be constructed along the edges of all street pavements.
- (1) Gutters and curbs shall be either Standard Type B-6.12 (barrier curb type) or M-6.12 (mountable curb type) approved by the state division of highways.
 - (2) Depressed type of entrance curbs having a width of not less than twelve (12) feet shall be provided at all private driveways.
 - (3) The outside edge of curbs and gutters shall be parallel to street lines, and radii at intersections shall not be less than twenty-five (25) feet.
 - (4) Concrete curb and gutters shall be constructed of air-entrained Class X Portland cement concrete in accordance with Section 616 of the State Standard Specifications. Contraction joints shall be provided at uniform intervals of fifty (50) feet.
- (e) Sidewalks shall be constructed of air-entrained Class X Portland cement concrete in accordance with Section 624 of the State Standard Specifications,
- (1) The minimum width of sidewalks shall be:

Residential--Four (4) feet;
Business--Six (6) feet.

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- (2) Sidewalks shall be located one (1) foot inside the right-of-way line, and not more than twelve (12) inches nor less than three (3) inches above the center line of the street.
- (3) Sidewalk thickness shall be not less than four (4) inches for pedestrian walks and not less than six (6) inches for private driveway crossings.
- (4) Sidewalks shall be constructed on a prepared subgrade of not less than a two-inch compacted layer of coarse sand or fine aggregate conforming to a gradation of one hundred (100%) percent passing a 0.375-inch sieve. (Ord. No. 79-07, Sec. 1, 2-21-79)

Secs. 17½-37--17½-48. Reserved.

ARTICLE IV. PRIVATE DRIVEWAYS, PARKING LOTS AND RIGHT-OF-WAY PARKING PADS

Sec. 17½-49. Designation of specifications for materials and construction work.

The specifications for materials and construction work required by this article shall be the most recent provisions and amendments of the *Standard Specifications for Road and Bridge Construction* adopted by the State of Illinois, Department of Transportation, Division of Highways which shall be referred to herein a "Standard Specifications." (Ord. No. 80-1, Sec. 1, 3-19-80)

Sec. 17½-50. Applicable specifications for construction work for driveways and parking lots.

A. Construction work for driveways and parking lots and right-of-way parking pads shall conform to the following applicable sections of the Illinois Department of Transportation Standard Specifications:

- (1) Earth excavation--Section 202;
- (2) Subgrade--Section 301;
- (3) Granular subbase--Section 311;
- (4) Aggregate base course--Section 351;
- (5) Hot-Mix base course--Section 355;
- (6) Hot-Mix Asphalt surface course—Sections 407 and 482;

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(7) Portland cement concrete pavement—Sections 420, 423 and 483:

(8) Concrete curbs and gutters--Section 662;

(9) Pipe culverts--Section 542.

B. Size of Right-of-Way Parking Pads

(1) Size of parking pads shall not exceed twenty-five (25) feet long and nine (9) feet wide. (Ord. No. 80-01, Sec. 1, 3-19-80; Ord. No. 11-22, Sec. 4, 9-15-11)

Sec. 17½-51. Types of pavement for residential driveways, parking areas and right-of-way parking pads.

All residential driveways, parking areas and right-of-way parking pads shall be constructed of one of the following types of pavements:

(1) Eight-inch gravel base course and two-inch hot-mix asphalt surface course.

(2) Four-inch gravel subbase and six-inch nonreinforced Portland cement concrete pavement.

(3) Four-inch gravel subbase and six-inch reinforced Portland cement concrete pavement.

(4) Brick pavers per Village approved specifications.

(Ord. No. 80-01, Sec. 1, 3-19-80; Ord. No. 11-22, Sec. 4, 9-15-11)

Sec. 17½-52. Grading of residential driveways, parking areas and right-of-way parking pads.

Residential driveways, parking areas and right-of-way parking pads shall be graded to provide drainage of surface run-off water to an adequate outlet in compliance with the County and Village's storm water drainage regulations. Drainage of surface run-off water onto adjacent property is prohibited. (Ord. No. 80-01, Sec. 1, 3-19-80; Ord. No. 11-22, Sec. 4, 9-15-11)

Sec. 17½-53. Residential driveways to extend to edge of public street pavement.

Residential driveways shall extend to the edge of the public street pavement. Existing combination concrete barrier curbs and gutters shall be removed and replaced with combination concrete depressed curbs and gutters. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-54. Residential driveways and right-of-way parking pads crossing drainage swales and ditches.

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Residential driveways and right-of-way parking pads crossing drainage swales shall either be depressed so as to provide unobstructed flow of storm water drainage or be provided with a ten (10) inch culvert pipe, or larger size where required by the Village Engineer, which extends not less than five (5) feet beyond each edge of driveway or right-of-way parking pad and has flared end selections at each end of the culvert pipe. (Ord. No. 80-01, Sec. 1, 3-19-80; Ord. No. 11-22, Sec. 4, 9-15-11)

Sec. 17½-55. Proximity of residential driveways on corner lots to intersections.

Residential driveways on corner lots shall be no closer than twenty-five (25) feet from the intersection. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-56. Types of pavement for commercial and industrial driveways and parking areas.

All commercial and industrial driveways and parking areas shall be constructed of one of the following types of pavements:

- (1) Ten-inch gravel base course and a two and one-half-inch bituminous concrete surface course.
- (2) Two-inch gravel subbase and eight-inch nonreinforced Portland cement concrete pavement.
- (3) Two-inch gravel subbase and six-inch reinforced Portland cement concrete pavement. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-57. Grading of commercial and industrial driveways and parking areas.

Commercial and industrial driveways and parking areas shall be graded to provide drainage of surface run-off water to an adequate outlet in compliance with the Village's storm water drainage regulations. Drainage of surface run-off water onto adjacent property is prohibited. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-58. Commercial and industrial drive extend to edge of public street pavement; length of driveway entrance opening.

Commercial and industrial driveways shall extend to the edge of the public street pavement. Existing combination concrete barrier curbs and gutters shall be removed and replaced with combination concrete depressed curbs and gutters. The maximum length of driveway entrance opening at the edge of the public street pavement shall be sixty (60) feet. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-59. Commercial and industrial driveways crossing drainage swales or ditches.

Commercial and industrial driveways crossing drainage swales shall be depressed so as to provide

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unobstructed flow of storm water drainage. Driveways crossing drainage ditches shall be provided with a fifteen-inch culvert pipe, or larger size where required by the Village Engineer, which extends not less than ten (10) feet beyond each edge of driveway and has flared end sections at each end of the culvert pipe. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-60. Plans for multiple-family, commercial and industrial driveways and parking areas improvements.

Complete detailed plans for multiple-family or commercial or industrial driveway and parking area improvements prepared by an Illinois registered professional engineer shall be submitted to the Village Engineer for review and approval prior to the Village's issuance of a building permit. The plans shall have a graphic scale of not more than fifty (50) feet equal to one (1) inch, and shall show, but not be limited to, the following information:

- (1) Property boundary lines.
- (2) Location, width and names of adjacent public street rights-of-way and showing pavements, curbs and gutters and sidewalks (if any).
- (3) Location, size and capacity of any existing storm sewers, culverts, ditches, catch basins, manholes and inlets.
- (4) Topographic data including existing and proposed elevation contour lines at a vertical interval of not more than two (2) feet of U.S.G.S. datum.
- (5) Typical cross-section of driveways and parking areas.
- (6) Proposed drainage plan including location, size, gradients and elevations of storm sewers, culverts, ditches, detention/retention basins, inlets, catch basins, manholes, drywells, seepage beds, etc.
- (7) Typical construction details for all pavements, concrete curbs and gutters, sidewalks, inlets, catch basins, manholes, drywells, seepage beds, etc. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-61. Proximity of commercial and industrial driveways on corner lots to intersections.

Commercial and industrial driveways on corner lots shall be no closer than ten (10) feet from the intersection. Whenever practicable, a driveway shall be no closer than twenty-five (25) feet from any adjacent drive. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-62. Time for completion of construction.

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The construction of any driveway or parking area, including the surface course, shall be completed within six (6) months after the issuance of an occupancy permit in the case of new construction and within one (1) year from issuance of building permit in the case of construction of additional facilities where the premises have been previously occupied. (Ord. No. 80-01, Sec. 1, 3-19-80)

Sec. 17½-63. Right-of-Way Parking Pad Permit.

No new residential right of way parking pad shall be constructed unless it meets all the requirements of this Article IV and first receives a permit from the Village. Any permit granted by the Village for a new residential right-of-way parking pad shall be revocable at will by the Village when the Village, in its sole discretion, determines that the public interest requires revocation of the permit.

After October 31, 2012 any existing right-of-way parking pad shall not be utilized for the parking of any vehicle unless the parking pad is constructed to meet all of the requirements of this Article IV and has received a permit from the Village. Any permit granted by the Village for any existing residential right-of-way parking pad shall be revocable at will by the Village when the Village, in its sole discretion, determines that the public interest requires revocation of the permit.

The fee for a residential right-of-way parking pad permit shall be fifty (\$50) dollars plus any applicable Village consultant fees necessary to review and evaluate any application for compliance with Village ordinances. (Ord. No. 11-22, Sec. 5, 9-15-11)