

Appendix D Design Standards Construction Methods

Section 1. Road Design Standards ^[1]

- A. Current editions of all reference publications or design standards shall be used.
- B. All streets shall be designed and construction certified to conform to the requirements set forth in this Appendix by a Professional Engineer licensed in New York State. The referenced individual specifications are contained in Appendix E.
- C. No variation from these standards will be allowed without the approval of the Village Engineer and the Village of Lansing Planning Board. The Village Engineer may modify these standards when in his/her judgement the situation warrants it.
- D. All Primary Roads will be individually designed in accordance with the current edition of the NYSDOT Highway Design Manual by a Professional Engineer licensed in New York State and require the approval of the Village Engineer. In no case will a design be accepted that is less restrictive than the specifications for Secondary Roads. Curbs may be required with a minimum pavement width of 32 feet between curbs.
- E. All minimum maintenance road designs will be evaluated and approved by the Village Engineer and Village of Lansing Superintendent of Public Works. The design standards are Manual Guidelines for Rural Town and County Roads.
- F. Table 1 Design Standards for Street Designs with Shoulders [**Amended 12-20-1993 by L.L.No. 18-1993**] ^[2]
- G. Table 2 Design Standards for Street Design with Concrete Gutters ^[3]
- H. Typical road cross-sections shown in Figures 1 and 2 shall be used for all roads. ^[4]
- I. The following New York State Department of Transportation Publications – Highway Design Manual, Standard Specifications, and Standard Sheets
- J. Publications referenced in Tables 1 and 2 and Appendix E
- K. American Association of State Highway and Transportation Officials Geometric Design Guide of Very Low-Volume Local Roads (ADT[400])

TABLE 1
DESIGN STANDARDS FOR ROADS WITH SHOULDERS
(See Figure 1)

Requirements for (1)	Dead Ends, & Roads Not Defined Elsewhere	Local Service & Access Roads ADT[400]	Secondary Roads
Design Speed (2)	30 MPH	30 MPH	30 MPH
Minimum Width of Right-of-Way (3) & (6)	60 Feet	60 Feet	60 Feet

Requirements for (1)	Dead Ends, & Roads Not Defined Elsewhere	Local Service & Access Roads ADT[400]	Secondary Roads
Minimum Radius of Horizontal Curves (4)	125 Feet	230 Feet 125 Feet (4)	300 Feet
Minimum Length of Vertical Curves	100 Feet but in no case less than 20 feet for each 1% difference of grade	100 Feet but in no case less than 20 feet for each 1% difference of grade	100 Feet but in no case less than 20 feet for each 1% difference of grade
Minimum Length of Tangents Between Curves	40 feet	100 Feet	200 Feet
Maximum Grade	8%	7%	6%
Minimum Grade	0.5%	0.5%	0.5%
Maximum Super-elevation	4%	4%	4%
Minimum Sight Distance (5)	150 Ft.	200 Ft.	300 Ft.
Sidewalks (7)	Where Required	Where Required	Required

Utilities	No. 1 Appendix E	No. 1 Appendix E	No. 1 Appendix E
Turnaround	No. 2 Appendix E		
Culverts	No. 3 Appendix E	No. 3 Appendix E	No. 3 Appendix E
Subgrade	No. 4 Appendix E	No. 4 Appendix E	No. 4 Appendix E
Ditch line	No. 6 Appendix E	No. 6 Appendix E	No. 6 Appendix E
Dimension A Fig. 1 (7)	12-inches	15-inches	18-inches
Dimension B Fig. 1	Varies 6 Appendix E	Varies 6 Appendix E	Varies 6 Appendix E
Dimension C Fig. 1 (7)	Varies – 3.5' Minimum	Varies – 3.5' Minimum	Varies – 4' Minimum
Dimension D Fig. 1 (7)	No. 6 Appendix E	No. 6 Appendix E	No. 6 Appendix E
Dimension E Fig. 1 (7)	10 Feet	10 Feet	12 Feet
Dimension F Fig. 1 (7)	3-inches	3-inches	4-inches
Dimension G Fig. 1 (7)	1 ½-inches	1 ½-inches	2-inches
Dimension H Fig. 1 (7)	4 Feet	5 Feet	5 Feet
Guiderail	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards

See notes (1) to (7) after Table 2

TABLE 2
DESIGN STANDARDS FOR ROADS WITH CONCRETE GUTTERS
(See Figure 2)

Requirements for (1)	Dead Ends, & Roads Not Defined Elsewhere	Local Service & Access Roads ADT[400	Secondary Roads
Design Speed (2)	30 MPH	30 MPH	30 MPH
Minimum Width of Right-of-Way (3) & (6)	60 Feet	60 Feet	60 Feet

Requirements for (1)	Dead Ends, & Roads Not Defined Elsewhere	Local Service & Access Roads ADT[400	Secondary Roads
Minimum Radius of Horizontal Curves (4)	125 Feet	230 Feet 125 Feet (4)	300 Feet
Minimum Length of Vertical Curves	100 Feet but in no case less than 20 feet for each 1% difference of grade	100 Feet but in no case less than 20 feet for each 1% difference of grade	100 Feet but in no case less than 20 feet for each 1% difference of grade
Minimum Length of Tangents Between Curves	40 feet	100 Feet	200 Feet
Maximum Grade	8%	7%	6%
Minimum Grade	0.5%	0.5%	0.5%
Maximum Super-elevation	.04%	.04%	.04%
Minimum Sight Distance (5)	150 Ft.	200 Ft.	300 Ft.
Sidewalks (7)	Where Required	Where Required	Required
Utilities	No. 1 Appendix E	No. 1 Appendix E	No. 1 Appendix E
Turnaround	No. 2 Appendix E		
Culverts	No. 3 Appendix E	No. 3 Appendix E	No. 3 Appendix E
Drainage Inlets	No. 7 Appendix E	No. 7 Appendix E	No. 7 Appendix E
Subgrade	No. 4 Appendix E	No. 4 Appendix E	No. 4 Appendix E
Dimension A Fig. 2 (7)	12-inches	12-inches	15-inches
Dimension B Fig. 2	D + G + 1'	D + G + 1'	D + G + 1'
Dimension C Fig. 2 (7)	No. 6 Appendix E	No. 6 Appendix E	No. 6 Appendix E
Dimension D Fig. 2 (7)	9 Feet	10 Feet	12 Feet
Dimension E Fig. 2 (7)	3-inches	3-inches	4-inches
Dimension F Fig. 2 (7)	1 ½-inches	1 ½-inches	2-inches
Dimension G Fig. 2 (7)	30-inches	30-inches	30-inches
Dimension H Fig. 2 (7)	4-inch	4-inch	4-inch

Guiderail	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards	Rustic Box Beam where required in accordance with the NYSDOT Guiderail Standards
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NOTES: Applicable to Tables 1 and 2

The requirements set forth in these tables shall only apply to and be imposed upon all streets or roads newly constructed from the effective date of this chapter forward.

- (1) Standards of the American Association of State Highway and Transportation Officials shall govern in determining safe operating speeds and signing requirements.
- (2) In front of areas zoned and designed for commercial use, or where a change of zoning to a zone which permits commercial use is contemplated, the street width shall be increased by such amount on each side as may be deemed necessary by the Planning Board to assure the free flow of through traffic without interference by parked or parking vehicles, and to provide adequate and safe parking space for such commercial district.
- (3) Radius of horizontal curves shall be measured along the centerline of the street. The 125-foot radius may be allowed on residential roads with little anticipated truck traffic.
- (4) Sight distance shall be measured between two (2) points along the center line of the street on a straight line entirely within the street right-of-way and clear of obstructions, one (1) of the points to be at the surface of the street and the other four and one-half (4 1/2) feet above the surface.
- (5) Widening of existing street right-of-way. Where a subdivision adjoins an existing street which does not conform to the minimum right-of-way width given in these Regulations, the developer shall dedicate whatever additional right-of-way width is necessary to provide, along the development side of the normal street center line, a width which is equal to at least one-half (1/2) of the minimum standard width for the respective type of street.
- (6) Refer to Appendix E for additional material design and installation standards or specifications.

Section 2. Street Intersections. ^[5]

- A. Intersections with primary roads shall be held to a minimum and spaced at least one thousand (1,000) feet apart, and intersections with secondary roads by other roads shall be at least eight hundred (800) feet apart. Between offset intersections there shall be a distance of at least one hundred fifty (150) feet. Within fifty (50) feet of an intersection, streets shall be approximately at right angles and in no case shall the angle of intersection be less than seventy-five degrees (75°) without additional channelization. Minimum edge of pavement radii shall depend on the intersecting street types, and shall be as follows:
 - (1) Any road with secondary road: thirty-five (35) feet.
 - (2) Any road with other than a secondary road: thirty (30) feet.
- B. Access streets into the subdivision from a primary road shall have minimum edge of pavement radii of forty (40) feet. All property corners at street intersections shall be rounded with a radius of twenty (20) feet, or have comparable cutoffs or chords, as the Planning Board determines. Within triangular areas formed by the intersecting street lines, for a distance of seventy-five (75) feet from their intersection, and the diagonals connecting the end points of these lines, visibility for traffic safety shall be provided by exclusions of plantings or structures and regrading as necessary.
- C. Grades within the intersection should not exceed one percent (1%). They should not exceed one and one-half percent (1 1/2%) for a distance of fifty (50) feet from the intersections. From fifty to one hundred-feet (50 to 100), the grades should not exceed three percent (3%), and in no case shall they exceed ten percent (10%).
- D. Triangles, circles or other traffic channeling islands may be required at intersections where present or anticipated traffic conditions indicate their advisability for traffic control or safety.

Section 3. Street Grading and Shoulders.

- A. Areas within street rights-of-way shall be graded as necessary to eliminate any slopes steeper than one (1) foot vertical in three (3) feet of horizontal distance.
- B. Where a one on three slopes is not practicable, the Village Engineer will determine if a closed drainage system or guiderail are necessary.
- C. Street shoulders shall not exceed a slope of six percent (6%) at right angle to the street centerline. Shoulder width is defined in Table 1 or Table 2.
- D. Unpaved areas within the street right-of-way shall be treated with topsoil and seeded to grass except where noted differently on the typical road cross section.

Section 4. Watercourses.

- A. Where a watercourse separates a proposed street from abutting property, provision must be made for access to all lots not accessible from other public streets by means of culverts or other structures designed per MS4.

- B. Where a watercourse, drainageway, channel or stream traverses a subdivision, there shall be provided a stormwater easement or drainage right-of-way as required by the Village Engineer, and in no case less than twenty (20) feet in width.

Section 5. Monuments.

- A. Permanent survey monuments shall be set in the boundary of rights-of-way at intersecting streets, point of curvature (PC) and point of tangency (PT) of curves, though the point of intersection (PI) of short curves may be used instead, where such is practical, at the discretion of the Village.
- B. Monuments shall be placed on both sides of the street and at all corners of the intersecting streets. Adjacent monumented points shall be visible from each other.
- C. Monument locations shall be shown on the plat; field notes of ties to monuments or a tie sheet shall be submitted to the Village after installation of monuments.
- D. Monuments shall be concrete and not less than four (4) inches in diameter or square, and not less than forty-two (42) inches long or from the top of underlying rock. Concrete monuments shall be reinforced with steel rods and a plug, brass plate or pin shall serve as the point of reference.

Section 6. Street Construction.

- A. All materials shall conform to the New York State Department of Transportation Standard Specifications, unless the same are altered by specific requirements under any itemized specification or by modifying notes shown upon the plans. ^[6]
- B. Suitable on site material may be used for the construction of embankments with the approval of the Village Engineer.
- C. In order to assure the structural integrity of the subgrade and foundation course the following general rules shall apply:
- (1) Underground utilities (Refer to No. 1 in Appendix E). ^[7]
 - (2) Subgrade preparation (Refer to No. 4 in Appendix E). ^[8]
 - (3) If, in the opinion of the Planning Board and Village Engineer, it is necessary to intercept and carry away groundwater to protect the stability of the subgrade underdrains will be required.
 - (4) Foundation courses for permanent streets must not be used for access streets in wet weather, or at such times when the subgrade could become pumped into the foundation course.
 - (5) Where pavements must be placed in an embankment condition the entire height of embankment must be constructed with the use of standard and appropriate compaction equipment. This equipment shall consist of sheepsfoot rollers, vibratory roller or similar equipment. The entire embankment area shall be compacted to ninety-five percent (95%) of maximum density at 62% of optimum moisture content defined by a modified proctor test. The developer shall provide results of certified compaction tests undertaken by a competent soil-testing laboratory.
- D. All stumps, brush, trees and other rubbish shall be disposed of in a manner in conformance with NYSDEC regulations.
- E. Sod and topsoil shall be stored for later use.
- F. Excess material and material not suitable for placement under pavements can be used in other areas of the embankment with the prior approval of the Village Engineer.
- G. Road Subbase.
- (1) The subbase shall be placed on a graded, crowned and compacted subgrade, free of ruts and disturbed earth.
 - (2) Geotextile fabric shall be installed over the subgrade prior to installing subbase material.
 - (3) Refer to Appendix E for additional material design and installation standards.
 - (4) Special care should be taken during this operation not to harm the concrete gutters, i.e., scraping with grader blade or hitting with roller wheels. Special attention should also be paid to obtaining good compaction next to the gutter.
- H. Optional types of shoulder and ditch construction.
- (1) All roads with the exception of roads classified as Primary may be constructed either with concrete gutters as shown in Figure 2 or with swales to handle drainage as shown in Figure 1. ^[9] The choice of construction type shall be made in consultation with the Village Planning Board and the Village Engineer. ^[10]
 - (2) If construction with swales for drainage is used, special care should be taken to ensure that the swales drain properly and are free of low spots where puddles will develop. Swales will be graded with three (3) to one (1) slope or flatter and seeded so that they can be mowed and maintained.
 - (3) Refer to Appendix E for additional material design and installation standards.
- I. Bituminous concrete pavement.
- (1) The contractor shall furnish and construct a two-course bituminous concrete pavement laid to conform to the required thickness and cross section as shown on the plan and on the typical road cross section.
 - (2) Refer to Appendix E for additional material design and installation standards.
 - (3) Before starting the laying of the asphalt pavement the base shall be graded and compacted between the concrete gutters or ditches according to the plan. Also, manholes should be adjusted to the proper grade to meet the crown and slope of the finished pavement.
 - (4) The asphalt shall be applied in two (2) courses consisting binder course and a top course. The top shall be laid in

the year following the installation of the binder.

- (5) Before applying the top course, any irregularities found in the binder course will be eliminated. At no time will cold patch or winter mix be used for any purpose.
- (6) Protection of new pavement shall be provided until properly set. This protection is necessary on subdivisions where the traffic is mostly by cars starting and stopping or by heavy trucks.
- (7) The finished pavement shall be level with or slightly above [maximum three-eighths (3/8) inch] concrete gutters, manholes, drainage inlets and water valve boxes and at no time shall it be below.
- J. Sidewalks where required shall be a minimum of 5-feet wide and constructed with portland cement concrete. (Refer to Appendix E for additional material design and installation standards.)
- K. Curbs where required shall be granite. (Refer to Appendix E for additional material design and installation standards.)

Section 7. Drainage

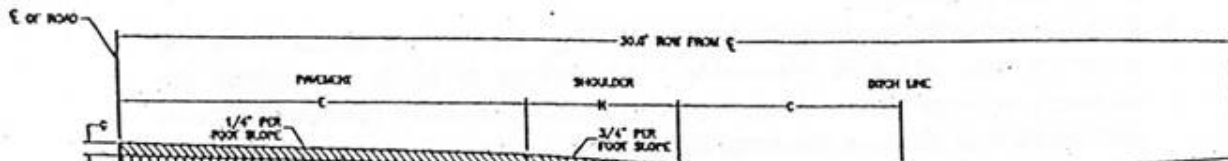
- A. In general the preservation of natural watercourses in the drainage design is preferable to the construction of drainage channels, and wherever practicable such natural watercourses should be preserved. Attention is called to the possibilities of using easements for natural watercourses to satisfy the open space requirements of developments under Chapter 145, Zoning. Storm sewers, subdivision drainage facilities and open watercourses shall be based upon a design flow with a minimum return interval as follows:

DESIGN RETURN INTERVALS	
Drainage Way	Recurrence Interval (years)
Existing watercourse channels	100
Culverts on existing watercourses	100
Other road cross culverts	50
Storm Sewers	50
Driveway	25

- B. Where the developer's engineer can justify a lower design return interval, the Planning Board may allow such design.
- C. The developer must comply with the current NYSDEC MS4 criteria, SPDES General Permit for Stormwater Discharges from Construction Activities and Appendix G Stormwater Management whichever is most restrictive.
- D. Drainage structures which are located on State or County highway rights-of-way shall be approved by the State or County Highway Engineer's office, and a letter from said office indicating such approval shall be provided to the Village Planning Board.
- E. The subdivider's engineer shall also study the effect of each subdivision on the existing downstream drainage facilities outside the area of the subdivision; the Village Engineer shall review this study. Where it is anticipated that the additional runoff incident to the development of the subdivision will overload an existing downstream drainage facility during a twenty-five-year storm, the Planning Board shall not approve the subdivision until the subdivider has made provisions to reduce the anticipated flow rate to the level prior to his proposed development.

**SUBDIVISION OF LAND
Appendix D**

**Figure 1
Half Section of Road With Shoulders**



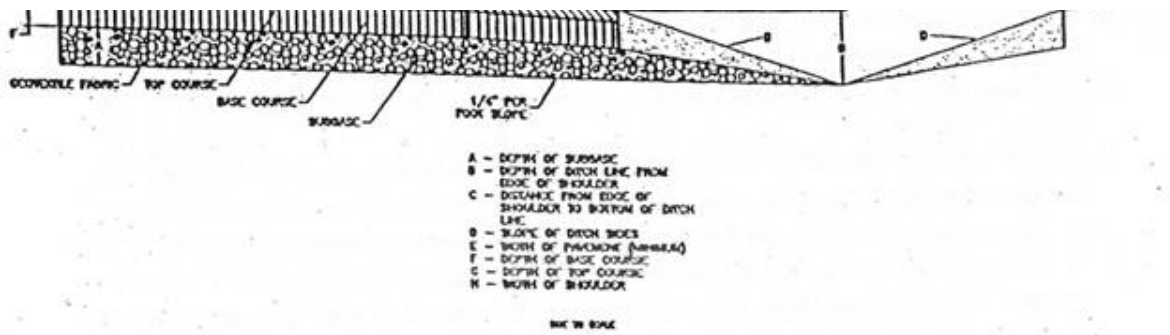
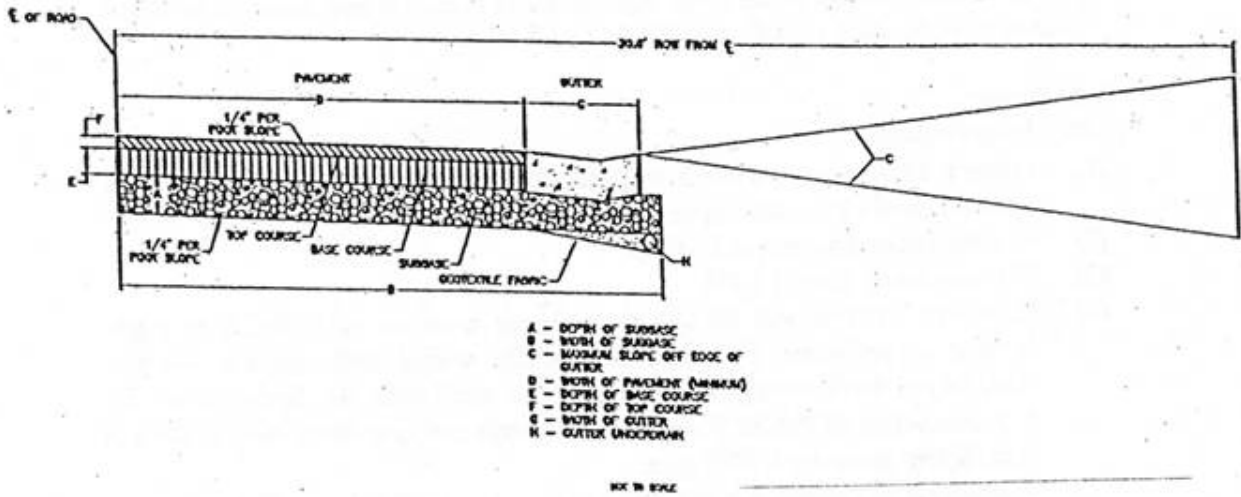


Figure 1
Half Section of Road With Concrete Gutters



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- [1] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.
- [2] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.
- [3] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.
- [4] Editor's Note: Figures 1 & 2 are included at the end of the chapter.
- [5] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.
- [6] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.

[7] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.

[8] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.

[9] Editor's Note: Figures 1 and 2 are located at the end of this chapter.

[10] Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.