

SUBSECTION 13.5 ROAD DESIGN CRITERIA

13.5A ROAD CLASSIFICATION

1. Proposed Roads shall be classified as defined in Section 2.19 and based on the following criteria:

	Average Daily Traffic (Vehicles per Day)	Number of Lots Served
a) Arterial Street	Over 2000	Over 200
b) Residential Collector Street	501 - 2000	51 - 200
c) Residential Subcollector Street	251 - 500	26 - 50
d) Residential Access Street	101 - 250	11 - 25
e) Residential Lane	1 - 100	1 - 10

13.5B PAVEMENT AND RIGHT-OF-WAY WIDTH

1. Road Width

The minimum pavement width of roads, as measured from face to face of curbs (or to the edge of pavement where curbs are not required) shall be as follows:

a) Arterial Street	36 feet
b) Residential Collector Street	30 feet
c) Residential Subcollector Street	26 feet
d) Residential Access Street	24 feet
e) Residential Lane	22 feet

2. Right-of-Way

For every road, the right-of-way lines on each side of the road shall be parallel or shall be concentric arcs and all intersections of right-of-way lines shall be rounded by a curve having a radius equal to the required curb line radius, but not less than 25 feet. Minimum right-of-way widths shall be as follows:

a)	Arterial Street	60 feet
b)	Residential Collector Street	60 feet
c)	Residential Subcollector Street	50 feet
d)	Residential Access Street	50 feet
e)	Residential Lane	50 feet

13.5C GRADIENT

1. General

Roads shall be designed so as to avoid excessive cuts and fills and to avoid a combination of steep grades and sharp curves.

2. Minimum

The minimum gradient on any road shall be 1%, except turnarounds which shall be 1.35%.

3. Maximum

Maximum gradients at pavement centerline shall be as follows:

a)	Arterial Street	8%
b)	Residential Collector Street	10%
c)	Residential Subcollector Street	10%
d)	Residential Access Street	10%
e)	Residential Lane	10%
f)	Turnarounds	5%

g) Intersections - The maximum gradient shall be 3% for a distance a of not less than 100 feet for arterial and collector streets and 50 feet for all other streets, as measured from the gutter line of the intersected road to any change in gradient.

13.5D STOPPING SIGHT DISTANCE

1. Minimum

The horizontal and vertical alignment of all roads shall be based on the following criteria:

	<u>Design Speed (MPH)</u>	<u>Stopping Sight Distance (feet)</u>
a) Arterial Street	45	400
b) Residential Collector Street	40	300
c) Residential Subcollector Street	30	200
d) Residential Access Street	25	150
e) Residential Lane	20	125

2. Determination

Sight distances shall be determined based on driver eye-height of 3.5 feet and height of object at 0.5 feet.

3. Vertical and Horizontal Curves

Where crest vertical curves and horizontal curves occur at the same location, sight distance shall be provided to assure that the horizontal curve is visible as drivers approach.

13.5E HORIZONTAL ALIGNMENT

1. Curve Tangent and Radius

For all roads, the minimum tangent length between horizontal curves, and the minimum radius of centerline curvature shall be as follows:

	<u>Radius (FT)</u>	<u>Tangent (FT)</u>
a) Arterial Street	500	100
b) Residential Collector Street	400	100
c) Residential Subcollector Street	200	100

d)	Residential Access Street	150	50
e)	Residential Lane	125	50

2. Sight Distance

The horizontal alignment of the roadway shall be such as to meet the requirements for sight distance specified in Section 13.5D.

13.5F VERTICAL ALIGNMENT

1. Gradient Transition

Parabolic vertical curves for transition between roadway gradients shall be provided on all roads to insure adequate sight distances in accordance with the minimum requirements specified in Section 13.5C and to provide a rate of change of gradient that assures safe vehicle operation and does not cause discomfort to vehicle occupants.

2. Curve Length

The required length of vertical curve shall be based upon criteria identified in Section 13.5D, with the following requirements being the minimum acceptable K VALUES (Length of vertical curve (ft) per percent change in A, where A is equal to the algebraic difference in grades.):

		<u>Type of Vertical Curve</u>	
		<u>Crest</u>	<u>Sag</u>
a)	Arterial Street	90	90
b)	Residential Collector Street	70	70
c)	Residential Subcollector Street	30	36
d)	Residential Access Street	25	30
e)	Residential Lane	20	20

3. Minimum Curve Length

Vertical curves shall have a minimum length of 100 feet.

4. Maximum Curve Length at Low Points

Where a sag vertical curve results in a low point, the maximum length of vertical curve shall be equal to the minimum length of vertical curve, based on the criteria identified in Section 13.5F.2 and 13.5F.3.

13.5G INTERSECTIONS

1. General

The following standards shall apply to all intersections:

- a) No more than two roads shall intersect at any one location.
- b) Cross (four-cornered) intersections shall be avoided, where possible, except at important and high volume traffic intersections.
- c) Spacing of intersections, as measured between centerlines, shall be at least 200 feet for Residential Access Streets and Lanes, and at least 350 feet for Arterial, Collector and Sub-collector Streets.
- d) Wherever possible, roads shall intersect at a 90 degree angle, or as close thereto as is practical. In no event however, shall an intersection be allowed where the angle of intersection is less than 75 degrees within 100 feet of the intersection.
- e) The minimum radii of curb lines at intersections shall be as follows:
 - i. Arterial Street 50 feet
 - ii. Residential Collector Street 35 feet
 - iii. Residential Subcollector Street 35 feet
 - iv. Residential Access Street 25 feet
 - v. Residential Lane 25 feet

The Commission may require greater radii where the angle of intersection is less than 90 degrees.

- f) The visibility at intersections (intersection sight distance) shall be such as to allow a stopped vehicle on the intersecting roadway, located 10 feet back from the gutter line, to see, and to be seen from a vehicle

approaching from either direction (based on a height of eye and object of 3.5 feet) along the intersected roadway for the following distances:

Where the Town Engineer deems it necessary, he may require the subdivider to determine the actual 85th percentile speeds on the intersected road as a basis for determination of required sight distance.

Intersection sight distances as noted above shall be required for all major commercial or industrial driveways. In addition, a subdivider should make every reasonable effort to provide the required Intersection Sight Distance (ISD) for driveways providing access to multiple residential lots.

	<u>Intersection Sight Distance</u>
i. Arterial Street	635 feet
ii. Residential Collector Street	505 feet
iii. Residential Subcollector Street	310 feet
iv. Residential Access Street	310 feet
v. Residential Lane	235 feet
g) Sufficient clearing and regrading shall be accomplished to meet the sight distance visibility requirements of Subparagraph (f) of this subsection and no structures, fences, walls, hedges, rock, shrubs, trees or other landscaping shall be permitted to obstruct such visibility.	
h) Permanent sight line easements shall be provided on all private property as needed so as to maintain the sight line requirements established in this subsection. In addition, no objects of any kind, that are located on private property outside the limits of a permanent sight line easement, shall be permitted to extend or protrude within the plane of such easement. In the case of trees, all foliage shall be trimmed up to a minimum height of six feet as measured from the top of curb or edge of pavement adjacent to the nearest road.	

13.5H TURNAROUNDS

1. General

All dead end roads (cul-de-sacs), permanent and temporary, shall be provided with a circular right-of-way at the terminating end.

2. Layout

The layout of the turnaround shall be in accordance with the Standard Detail Drawing Plate #7 or Plate #8.

3. Snow Storage Reserve Area

An open unrestricted area shall be reserved at the end of all turnarounds for the storage of snow. Such area shall be located at the end of the turnaround between the curb and the right of way line for a distance of 25 feet on each side of the extended road center line. This area, which shall be delineated on the Record Subdivision Map, shall be free from all obstructions including, but not limited to, driveways, mailboxes, landscaping and fences. This area may be relocated at the discretion of the Director of Public Works.

4. Length

The maximum length of a dead end road shall be 2,000 feet as measured from the gutterline of the intersected roadway to the center of the turnaround.

5. "T" or "Y" Turnarounds

Where "T" or "Y" turnarounds are approved as part of any estate subdivision, they shall be designed to accommodate "SU", single unit type vehicles, i.e. school buses and emergency vehicles.

13.5I SHOULDERS AND SLOPES

1. General

For all roads, a shoulder area extending from the back of the curbing to the right-of-way line shall be excavated to a depth of at least 6 inches, and then backfilled and final graded with not less than 6 inches of topsoil, as hereinafter specified.

2. Grading of Shoulder Areas

The shoulder areas shall be graded so as to slope toward the centerline of the road where the road is in cut, and away from the centerline of the road where

the road is in fill. In either case, the cross slope of the shoulders shall be 1 inch per foot.

3. Grading Beyond Shoulder Areas

Areas outside of the shoulders shall be graded up or down to existing grades, at a slope not to exceed two feet horizontal to one foot vertical. In rock cuts, slopes of one foot horizontal to not more than six feet vertical shall be allowed, but care shall be taken to insure that all exposed rock is stable and free from faults, cracks or other infirmities which might lead to collapse or flaking.

4. Special Conditions

The Town Engineer may require additional measures to be taken to maintain the stability of slopes, and to control groundwater seepage, under prevailing soil conditions encountered during construction. These measures may include, but not necessarily be limited to, a decrease in the amount of slope, stabilization blankets or grids, stone slope protection, plantings, wedge drains, underdrains, terracing, drainage swales or retaining structures. In cases where the exposed face of a cut slope consists of decomposed, flaking, highly fractured or unstable rock, slopes shall be flattened so as to protect public safety and minimize future maintenance.

5. Limits

No cut or fill slopes shall extend beyond the limits of the right-of-way onto private property unless appropriate slope rights are acquired which provide a perpetual right, running with the land in favor of the owner of the road, to enter upon said private property for purposes of constructing, maintaining and repairing such slopes. In the absence of such slope rights, appropriate retaining structures shall be constructed to prevent encroachment on adjoining private property.

6. Trees

If, in the opinion of the Commission, a slight modification of the shoulder or slope would result in the saving a valuable shade tree, the Commission may in its discretion allow such variation.

13.5J CURBING

1. General

Curbs shall be constructed along the edge of street pavement in accordance with the dimensions and details shown in the most current Standard Detail Drawings.

13.5K UTILITIES

1. General

All utilities within the right-of-way of a road shall be located underground.

13.5L PROTECTIVE BARRIERS

1. Guide Rails

Protective barriers, consisting of guide railing shall be installed wherever necessary to minimize the risk of personal injury or property damage resulting from vehicle departure from the right-of way. In general, guide rails shall be installed at the following locations:

- a) Embankments - Such protective barriers shall be required on any roadway section constructed on an embankment which places the roadway surface five (5) feet or more above the existing ground surface at the toe of the embankment slope. This requirement may be waived by the Town Engineer where the embankment slopes are not steeper than four (4) feet horizontal to one (1) foot vertical.
- b) Culvert Endwalls - Such protective barriers may be required at culvert endwalls, depending on the height of the endwall and its proximity to the edge of the road.
- c) Roadside Obstacles - Such protective barriers may be required to shield natural or man-made fixed object hazards including, but not necessarily limited to, trees, rock outcrops, ditches, retaining walls, bridge abutments and permanent bodies of water.

Where marginal situations occur with respect to the placement or omission of a guide rail, or where it is determined that a vehicle striking a guide rail could potentially be more severe than an accident resulting from hitting an unshielded roadside obstacle, the Public Works Department may approve the use of an object marker in accordance with Section 13.5Q.4.

13.5M FENCING

A securely anchored PVC coated chain link fence shall be installed wherever necessary to minimize the risk of personal injury.

In general, fencing may be required at the following locations as directed by the Town Engineer:

1. Rock Cuts - along the top of slope where a rock cut exceeds five (5) feet in height.
2. Culvert Endwalls - at the top of any endwall that exceeds five (5) feet in height.

13.5N ROAD LIGHTING

1. Places

Road lighting shall be provided if required by the Commission at any location where illumination in darkness is necessary to minimize the risk of accident involving vehicles or pedestrians or to assure safe and convenient vehicle and pedestrian passage. In general, when required, the placement of lighting should be limited to intersections.

2. Nature

Lighting standards and luminaries shall conform to the most current utility company standards and shall be of a Colonial type design with fiberglass poles, unless otherwise approved by the Commission. They shall be so located as to safeguard against discomfort glare and disability glare and avoid adverse effects from illumination upon the use, enjoyment and value of adjacent property.

13.5O MONUMENTS

1. General

All new roads shall be accurately monumented to allow the ready determination of points along all rights-of-way lines. Monuments shall be placed at all points of tangency and points of curvature and elsewhere as required to permit seeing from one monument on a line to another on the same line.

13.5P ROAD NAMES AND SIGNS

1. General

Road name signs shall be installed at all intersections. Such signs shall be erected in such places as to assure clear legibility by vehicle operators. Size, color, material and physical details shall be as required by the Director of Public Works.

13.5Q TRAFFIC CONTROL DEVICES

1. General

Traffic control devices, including signs, pavement markings and object markers, shall be provided in such places as may be necessary to minimize the risk of accident involving vehicles or pedestrians and to assure safe and convenient vehicle and pedestrian passage.

2. Signs

The design and placement of regulatory, warning and guide signs (Stop, Speed Limit, No Outlet, etc.) shall conform to the most current edition of the Manual of Uniform Traffic Control Devices.

3. Pavement Markings

The location, type, color, width and patterns of pavement markers and object markers, shall conform to the most current edition of the Manual of Uniform Traffic Control Devices. In general, pavement markings shall include stop lines. Longitudinal pavement markings (center lines), to delineate the separation of traffic flows in opposing directions, shall only be required on Arterial and Residential Collector Streets.

4. Object Markers

The design and placement of Type 2 Object Markers shall conform to the most current edition of the Manual of Uniform Traffic Control Devices.

13.5R SIDEWALKS

1. General

The Commission may require the installation of sidewalks along roads and in pedestrian easements. In general, when required, the installation of sidewalks should be limited to the vicinity of schools and other public or semi-public buildings, playgrounds, parks, shopping areas, transit stops, high density

residential areas and at other locations where the expected or probable volume of pedestrian traffic makes sidewalks necessary or appropriate in the interest of public safety and convenience.

2. Location and Dimensions

Sidewalks shall be a minimum of four (4) feet in width and shall be located within the street right-of-way line, as shown on the Standard Detail Drawings.

3. Handicap Ramps

Curb cuts shall be provided at all pedestrian cross walks to provide access for the safe and convenient movement of physically handicapped persons. Such curb cuts shall conform to the most current State Statutes and the Americans with Disabilities Act Accessibility Guidelines.