

City of Norwalk
Connecticut
Department of Public Works



Roadway Standards
May 1982 - Amended March 2021

**CITY OF NORWALK, CONNECTICUT
DEPARTMENT OF PUBLIC WORKS**

ROADWAY STANDARDS

DESIGN MANUAL

AND

CONSTRUCTION DETAILS

May 1982

Amended October 1991, January 2017 and March 2021

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FORWARD

1. This Manual has been prepared to establish guidelines for engineers engaged in the design of roadway and driveways facilities to be constructed or reconstructed in the City of Norwalk. The scope of this Manual is applicable to design generally encountered in roadway and driveway projects carried out by the City of Norwalk, Department of Public Works, as well as for public and private streets, driveways, condominium developments, commercial sites and other projects designed by consulting engineers.
2. The Roadway Standards are based on modern civil engineering practice and have been found to be the most applicable in Norwalk, Connecticut. Much of the data presented herein has been adapted from manuals of the American Association of State Highway and Transportation Officials (AASHTO), Connecticut Department of Transportation (CT D.O.T.), Institute of Transportation, Institute of Transportation Engineers (ITE), American Public Works Association (APWA), Highway Users Federation for Safety and Mobility, American Society of Civil Engineers (ASCE), National Association of City Transportation Officials (NACTO), Urban Land Institute, and the National Association of Home Builders.
3. The most important consideration of these Roadway Standards is the safeguarding of public safety, welfare and convenience. Proper regard has been given to other factors which bear upon establishing satisfactory designs.
4. Definitions are provided for important terms used in these Roadway Standards. The purpose for establishing design criteria for specific design features and the criteria themselves are presented. These are followed by tabulations of the Design Standards for each class of street and drawings of standard Construction Details which shall be employed.
5. Existing conditions may indicate modification of these standards. Where a modification is so indicated, the effect of the proposed modification on all other standards should be considered. For example, where design speed is affected by a proposed modification to the standards, all other standards affected by the change in

design speed should be reviewed and the design of the project amended, if necessary, to reflect the new design speed.

6. Related standards for the design of access drives within lots and parking layouts are contained in the Zoning Regulations of the City. Driveways and streets intersecting with State highways must comply with Connecticut Department of Transportation Encroachment Permit Regulations within the State right-of-way. Driveways serving gas stations must comply with the requirements of the Connecticut Department of Motor Vehicles.
7. All street and driveway construction, reconstruction or pavement replacement shall be in compliance with the Roadway Standards, unless approved, in writing, by the Chief of Operations and Public Works.
8. Any construction affecting City-owned street rights-of-way requires the issuance of a permit in accordance with Chapter 96 of the Norwalk Code, entitled "Excavations and Encroachments in Public Streets and Grounds".
9. The following regulations and standards set forth in the City of Norwalk shall govern:

City of Norwalk, Connecticut - Planning Commission – Subdivision and Re-subdivision Regulations – Approved September 8, 1998, as amended.

City of Norwalk, Connecticut - Department of Public Works Drainage Manual, as amended.

City of Norwalk, Connecticut - Department of Public Works Traffic Calming Guidelines January 24, 2002.

City of Norwalk, Connecticut – Department of Public Works – Standard Details.

City of Norwalk, Connecticut City Code – Chapter 91 Public Sewers.

City of Norwalk, Connecticut City Code – Chapter 95 Street and Sidewalks.

City of Norwalk, Connecticut City Code – Chapter 96 Excavation & Encroachments in Public Streets and Grounds.

City of Norwalk, Connecticut City Code – Chapter 98 Vehicles and Traffic.

City of Norwalk, Connecticut City Code– Chapter 101 – Scenic Roads.

INTRODUCTION

The streets of the City of Norwalk have been classified into systems that each have a specific function and purpose. The systems are: major arterial streets; minor arterial streets; collector streets; urban local streets; and residential local streets. They are defined in the Roadway Classification Map maintained by the City of Norwalk Department of Public Works.

Driveways are classified into two groupings, major driveways and minor driveways.

Streets and driveways shall be designed and constructed with regard to their functional classification. Streets shall also be designed with regard to their relationship to surrounding land use. "Urban Area Districts," "Business Areas," "Village Districts" and "Historic District Areas," etc. are defined in the Design District Standard Location Map maintained by the City of Norwalk Department of Public Works.

All streets and driveways shall provide for the safe and efficient movement of those types of vehicles for which they are intended, as well as emergency vehicles such as fire apparatus and snow removal equipment. This shall include not only motorists, but pedestrians, bicyclists and transit riders of all ages and abilities.

Streets should be laid out so as to have as many of the adjacent building sites as possible above the elevation of the street and above any proposed or future sidewalks. For residential local streets, curvilinear arrangements shall generally be used in preference to gridiron patterns. Combinations of steep grades, sharp curves and/or intersections shall be avoided.

DEFINITIONS

1. **Expressway System** - That system of highways which provides for the expeditious movement of large volumes of through traffic between areas and across the City. Access is limited to grade-separated interchanges with arterial streets.
 2. **Arterial Street System** - That system of streets which is used primarily to carry traffic between communities or large sections of the City.
 3. **Collector Street System** - That system of streets which collects traffic from local streets and which carry through traffic from surrounding areas to the arterial system.
 4. **Local Street System** - That system of streets which serves, primarily, only those properties having frontage on them, and which does not carry through traffic from surrounding areas.
 5. **Scenic Roads** - A scenic road must be free of intensive commercial development and intensive vehicular traffic. The portion of road designated scenic road must be at least one-half (1/2) mile in length and must meet at least one (1) of the following criteria:
 - Unpaved
 - Bordered by mature trees or stone walls
 - Travelled portion may not be more than twenty (20) feet in width
 - Offers scenic views
 - It blends naturally into the surrounding terrain
 - It parallels or crosses over brooks, streams, lakes or ponds
- For a road to be designated as a scenic road, it must meet the requirements set forth in Chapter 101 of the Norwalk City Code.
6. **Design District Streets** - That system of streets which serves, primarily, only those buildings, properties or sites that have been designated by one of several entities on different levels as historically or architecturally significant.
 7. **Street** - Any public or private way permanently dedicated to the movement of vehicles and pedestrians and providing the principal means of access to abutting property.

8. **Complete Streets** - Complete Streets are safe, comfortable and convenient transportation systems that serve everyone of all ages and abilities, regardless of how they choose to travel, whether that is by walking, bicycling, riding transit or driving.
9. **Street Line** - The property line separating a street right-of-way from the abutting properties. For design district streets the property line shall be back of curb.
10. **Street-Right-of-Way** - The area between street lines reserved for a street. Included in this area may be the travelled way, shoulder, median, bicycle facilities, planting strip, footpaths and sidewalks. Right-of-Way width shall be measured at right angles to or radial to the center line of the street.
11. **Travelled Way** - The portion of the street reserved for the movement of vehicles, exclusive of shoulders.
12. **Shoulder** - The portion of the street adjacent to the travelled way, on either side, for the accommodation of stopped vehicles, for drainage, for emergency use, and for lateral support of pavement base and surface courses.
13. **Median** - That portion of a divided roadway separating the travelled ways reserved for traffic moving in the opposite directions.
14. **Traffic Lane** - That portion of the travelled way used for the movement of a single line of vehicles.
15. **Auxiliary Lane** - That portion of the travelled way intended for purposes supplementary to through traffic movement.
 - (a) Left Turn Lane - An auxiliary lane for left turn movements.
 - (b) Right Turn Lane - an auxiliary lane for right turn movements.
 - (c) Separate Turning Lane - An auxiliary lane for traffic in one direction which has been physically separated from through traffic by a traffic island.
16. **Driveway** - The area of public or private property reserved for the movement of vehicles between a street or other driveways shall be classified, major or minor, in accordance with the type and/or volume of traffic which they serve.

a) Major Driveways:

- (1) All driveways serving industrial land uses.
- (2) Driveways serving commercial uses which require a Special Permit in accordance with the Zoning Regulations.
- (3) Driveways serving residential uses which require a Special Permit in accordance with the Zoning Regulations.

b) Minor Driveways: All other driveways.

17. **Intersection** - The crossing or meeting without crossing, of a street or driveway with one or more other streets or driveways.
18. **Sight Distance** - The length of travelled way visible to a driver. There are four different kinds of sight distance:
 - (a) **Stopping Sight Distance** - The distance required by the driver of a vehicle, travelling at a given speed, to bring the vehicle to a stop before reaching an object on the travelled way, after the object has become visible.
 - (b) **Passing Sight Distance** - The minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely and comfortably on a two-lane street without interfering with the speed of an oncoming vehicle, travelling at the design speed, should the oncoming vehicle come into view after the maneuver is started.
 - (c) **Intersection Sight Distance** - The minimum sight distance that must be available to the driver of a vehicle stopped on a street or driveway, on the approach to an intersection, in order that the stopped vehicle may safely enter and proceed through the intersection.
 - (d) **Driveway Sight Distance** - At a major driveway, intersection sight distance shall be provided in accordance with the Intersection Sight Distance standards contained in subparagraph (c) above. At a minor driveway, no planting or other obstruction in excess of two (2) feet high shall be permitted within a triangle measuring 10 feet along the centerline of the driveway from the edge of the travelled way and 30 feet along the edge of travelled way of the street from the centerline of the driveway, in both directions.

DESIGN FEATURES

Street Right-of-way

Street right-of-way width should be not less than that required for the necessary cross section and drainage elements. Attention should be given to the possibility of future expansion of facilities within the right-of-way, such as the addition of one or more lanes or the installation of sidewalks.

Major and Minor Arterial Streets – Number and Width of Traffic and Auxiliary Lanes

In accordance with *A Policy on Geometric Design of Highways and Streets* (AASHTO “Green Book”), as amended, Section 7.3.3.2, for Arterials in Urban Areas – Lane Width, “Lane widths on through-travel lanes may vary from 10 to 12 feet [3.0 to 3.6 m]. Lane widths of 10 feet [3.0 m] may be used in more constrained areas where truck and bus volumes are relatively low and speeds are less than 35 mph [60 km/h]. Lane widths of 11 feet [3.3 m] are used quite extensively for urban arterial street designs. The 12 feet [3.6 m] lane widths are desirable, where practical, on high-speed, free-flowing, principal arterials.”

The number of traffic lanes, travel lane widths and auxiliary lanes for major and minor arterial streets shall be determined from traffic engineering analyses and shall be approved by the Chief of Operations and Public Works.

A traffic engineering analysis, study, etc. shall be required to demonstrate adequate roadway **safety** and **capacity** for a proposed travel lane width of ten (10) feet. The traffic engineering analysis shall include the following (based on AASHTO “Green Book”, as amended, Section 7.3.3.2):

1. Demonstration of “Relatively Low” Truck and Bus Volumes (obtained via traffic databases, traffic counts, etc.).
2. Vehicular Speed Data indicating that the 85th percentile vehicular speed is less than 35 mph.
3. Roadway capacity modeling and analysis of present and future traffic flows performed with an acceptable roadway capacity modeling computer software such as Synchro, Vissim, HCS, etc.
4. Evaluation of the roadway geometry (horizontal and vertical curvature).

Major and Minor Arterial Streets - Shoulders

Shoulders are necessary on arterial streets to accommodate stopped or disabled vehicles and permit traffic to pass with minimum encroachment on the opposing, or parallel, traffic lane.

Collector Streets - Minimum Width

For collector streets, the minimum width of pavement is that required to provide free movement in each direction in the presence of stopped vehicles.

Attention should be given to the need for auxiliary lanes on the approaches to intersections and to the need for parking lanes in urban areas.

Urban Local Streets - Minimum Width

For urban local streets, the minimum width of pavement is that required to provide free movement in one traffic lane in each direction of travel and alternating flow in the presence of stopped vehicles.

Attention should be given to the need for auxiliary lanes on the approaches to intersections and to the need for parking lanes. Where trucks or emergency vehicles are required to maneuver into or out of driveways or other streets, and intersection geometrics cannot be provided in accordance with these Roadway Standards, travelled way width in excess of the minimum may be required.

Residential Local Streets - Minimum Width

For residential local streets the minimum width of pavement is that required to provide free movement in one traffic lane in each direction of travel and alternating flow in the presence of stopped vehicles.

Attention should be given to the need for emergency vehicles and trucks to maneuver into and out of driveways and other streets.

Design District Streets - Minimum Width

For design district streets the minimum width of pavement is that required to provide free movement in one traffic lane in each direction of travel and alternating flow in the presence of stopped vehicles. On-street parking is permitted in designated areas outside the travel way. Raised speed tables are permitted within the street right of way.

Complete Streets

“Complete Street” policies shall be implemented where they can be reasonably implemented without undue hardship in accordance with all City Ordinances, State Statutes and Federal Laws.

Bicycle Facilities

Bicycle Facilities shall be designed in accordance with the Guide for the Development of Bicycle Facilities as published by the American Association of State Highway and Transportation Officials, as amended and the State of Connecticut Department of Transportation Highway Design Manual, as amended.

Cross Slopes

Minimum cross slopes are necessary in order to provide for drainage. The entire right-of-way shall be designed to drain onto public property in urban areas. For residential local streets, off-street drainage may be permitted, subject to engineering analysis and the approval of the Chief of Operations and Public Works.

Curbs

Curbs deter vehicles from leaving the pavement, control drainage and aid in the orderly development of the roadside. Curbs shall be provided on all arterial streets; on collector streets; residential local streets; and design district streets where the slope of the street is five percent or greater; and on collector streets; residential local streets; and design district streets on the side(s) where sidewalks are provided.

Standard Curb and Sidewalk Materials

The materials for the curbs and sidewalks within the City of Norwalk shall be in accordance with the requirements of that particular Design/Business/Historic/Village District/etc. as indicated below, unless the Chief of Operations and Public Works authorizes the use of another type of material in writing prior to the installation of curbs and sidewalks. The boundaries of the districts are defined in the Design District Standard Location Map maintained by the City of Norwalk Department of Public Works.

Urban Area District – Granite curbs and concrete sidewalks.

Village District – Granite curbs, Brick Paver/Concrete sidewalks, Historic street lights.

Historic District – Granite curbs, Brick Paver/Concrete sidewalks, Historic street lights.

Extensive Business Area – Granite curbs, Brick Paver/Concrete sidewalks, street lights installed by the electric company provider in that area of the City.

Intensive Business Area – Granite curbs, Brick Paver/Concrete sidewalks, Historic Street lights.

Neighborhood Business Area - Granite curbs, Brick Paver/Concrete sidewalks, Historic Street lights.

Transit-Oriented Development (TOD) Redevelopment Plan Areas – Granite curbs, Brick Paver/Concrete sidewalks, Historic Street lights.

State Roads - Granite curbs, Brick Paver/Concrete sidewalks, street lights installed by the electric company provider in that area of the City.

Notes:

1. On Residential Local and Urban Local streets where concrete curbs and/or sidewalks currently exist on the street, the Chief of Operations and Public Works shall have the authority for the purposes of consistency, to require the use of concrete curbs when reconstruction work is being done that would require the replacement of curbs and/or sidewalks.
2. If a particular street, or portion of a street is in a designated "Historic/Village District," the Chief of Operations and Public Works shall have the authority to require the use of materials for curbs, sidewalks and brick paver sidewalks that would be in accordance with the standards for that particular "Historic/Village District" or portion of that "Historic/Village District."
3. These requirements are based off of guidelines that are set forth in Planning & Zoning Department and Redevelopment Agency documents such as the Norwalk Business District Guidelines dated September 1987, the Norwalk Waterfront Design Guidelines dated April 1988, the Urban Renewal Plan For The Reed Putnam Area, Norwalk, Connecticut, modified October 2015, etc. as amended and applicable.

Guide Rails

The necessity for, and the design of Guide Rails shall be in accordance with the AASHTO Roadside Design Guide and the State of Connecticut Department of Transportation Highway Design Manual, as amended.

Lateral Clearance

Lateral clearance standards are necessary to provide the driver with a safer and more comfortable ride. Signs, poles and other obstacles placed near the roadway may become hazards to vehicles which run off the roadway or which move near to the curb. The minimum lateral clearance shall be one foot six inches on streets with curbs and seven feet on streets without curbs. Clearance shall be measured from face of curb or edge of travelled way to face obstacle.

Notwithstanding the general need for lateral clearance mail boxes may be installed closer to the edge of travelled way than the minimums specified above, provided that they are located in accordance with U. S. Postal Service Regulations and have supports which will bend or break away upon vehicle impact.

Vertical Clearance

No signs, barriers, decorations, etc., are permitted within 17'-6" of the highest point in the roadway.

Minimum and Maximum Grade

A minimum longitudinal grade is required to provide for drainage. In selecting greater than minimum grades, optimum rather than maximum conditions should always be considered by the designer. Topography, aesthetics and cost, as well as noise pollution considerations, should be borne in mind.

Horizontal Curvature

Horizontal Curvature is directly related to design speed and has an important effect on safety, driving characteristics, and the appearance of the street. Minimum center line radii are specified for major and minor arterial streets; collector streets; urban local streets and residential local streets. These are related to design speeds, acceptable side friction factors, and to superelevation.

Sight Distance

Control of grade and curvature, and of obstructions in the vicinity of intersections, is necessary to provide adequate sight distance for safe vehicular operation. The three forms of sight distance, passing sight distance, stopping sight distance and intersection sight distance, involve different design considerations.

- (a) Stopping sight Distance - This distance shall be calculated on the basis of the driver's ability to see a 2 foot high object when his eye level is assumed to be 3.50 feet above the travelled way surface. Minimum stopping sight distance shall be measured along a line from the center of the lane nearest the right-hand shoulder, curb or edge of travelled way to a point on that lane, at the shoulder, curb or edge of travelled way.
- (b) Intersection Sight Distance - This distance shall be measured from the center line of the street or major driveway, at all points up to 15 feet behind the edge of the travelled way of the through street. Minimum intersection sight distance shall extend to a point in the center of the right lane of the through street(s) approaching from the left, and to a point in the center of the lane nearest the center line or median of the through street(s) approaching from the right. Height of the driver's eye is to be assumed to be 3.50 feet and the height of the object to be 3.50 feet.

Vertical Curvature

A minimum length of vertical curve is necessary to ensure that adequate stopping sight distance is provided and to assure satisfactory drainage of the travelled way.

Parabolic curves shall be used to connect vertical tangents. A length of transition vertical curve shall be constructed where the change in grade equals or exceeds 0.5 percent. Parabolic curves are defined through 'K' values for crest and sag curves. The 'K' value is to be multiplied by the algebraic difference in grades to produce the length of vertical curve to be provided. Where the change in grade is less than 0.8 percent the transition area may be roll graded in the field.

Superelevation

Superelevation is necessary to counteract outward drift on curves and to improve passenger comfort. It shall be calculated according to horizontal curvature, side friction factors and design speed. To prevent inward drift by slower moving vehicles the maximum level of superelevation specified shall not be exceeded.

Corner Geometry

To provide safe vehicular and pedestrian movement at intersections, intersecting streets shall be laid out with tangents at right angles to each other for a distance of at least 50 feet, measured along the center line from the right-of-way line of the intersected street. For a distance of at least 30 feet, measured in the same way, the approach gradient shall not exceed three percent, up or down.

A minimum curb or edge-of-travelled way radius shall be provided at street intersections in accordance with the classification of the major street, as follows:

Arterial - 25 feet
Collector - 20 feet
Local - 15 feet

Along bus routes, a 30 foot radius shall be provided where buses make right turns.

At the corners of street intersections, street right-of-way lines shall be so located as to provide for continuity of required cross section and drainage elements included in the Right-of-Way of both streets. The Right-of-Way at each corner shall be so graded and landscaped as to provide adequate intersection sight distance. If necessary, additional land shall be included in the street Right-of-Way at the intersection to permit such grading and landscaping.

Sidewalks and Footpaths

Sidewalks are necessary to accommodate pedestrians safely along both sides of all streets in urban areas, along walking routes to schools and wherever large numbers of pedestrians may be expected to use the street, such as in the vicinity of parks, beaches, churches, local business, industrial plants, etc.

Walks to schools in residential areas may be provided by footpaths. Foot

paths are walks which may depart from the alignment of the roadway to avoid trees or topographical features, or to make shortcuts. Footpaths shall be paved in asphalt and shall have a minimum unobstructed width of three feet.

In extensive business areas; sidewalks shall have a minimum width of seven feet and shall extend from curb to street line. They shall be paved in concrete. In intensive business areas, sidewalks shall have a minimum width of seven feet and shall extend from curb to face of building. In historic areas, sidewalk width and paving material shall conform to an overall plan for the historic area and shall be approved by the Chief of Operations and Public Works. Elsewhere sidewalks shall have a minimum of four feet from the face of curb to provide for overhead utilities, snow storage and, where appropriate, landscaping.

The snow strip, between the curb and the sidewalk, shall generally be grassed in residential areas and paved to match the sidewalk in urban areas. In urban areas sidewalks shall be concrete. In residential areas they may be asphalt or concrete.

Driveway Location and Size

No minor driveway shall be located within twenty-five (25) feet of the intersection of two (2) or more streets, measured from the street line of the nearest intersected street to the center line of the driveway, along the street line of the street entered by the driveway. No major driveway shall be located within fifty (50) feet of the intersection of two (2) or more streets, measured in the same way.

- (a) Where more than one (1) driveway is constructed serving the same premises, the minimum distance between the center lines of minor driveways shall be fifty (50) feet, and the minimum distance between major driveways shall be seventy-five (75) feet.
- (b) The minimum widths of driveways, measured at the street line, shall be the following:

Type	One-Way (feet)	Two-Way (feet)
Minor driveway	10	12
Major driveway	16	22

(c) The maximum widths of driveways, measured at the street line, shall be the following:

Type	One-Way (feet)	Two-Way (feet)
Minor driveway	12	20
Major driveway	24	40

The right is reserved by the Chief of Operations and Public Works to require changes, additions and relocations as, in his opinion, may be necessary for the relocation, reconstruction, widening or maintenance of the roadway or to provide protection to life and property on or adjacent to the roadway.

Shared Driveway Standards:

One driveway can only provide access to/serve a maximum of two building lots (different parcels) of the size permitted in the zone wherein the driveway and building lots are located. Once a single driveway provides access to/serves three building lots (different parcels) or more, that driveway is classified as a Private Road and shall be constructed in conformity with City Roadway Standards and specifications that are in effect at the time that Permits are issued. Acceptance of that Private Road as a City Street shall have to be mutually agreed upon by both the City and the residents of that Private Road.

Dead End Streets and Cul-de-Sacs

All dead end streets shall be provided with a turnaround, to permit maneuvering of emergency vehicles and snow removal equipment.

For dead end streets constructed or extended after the date of adoption of these Roadway Standards, turnarounds shall be in the form of rotary with a minimum outside radius of 50 feet. The pavement shall have a crown along the center line to facilitate drainage.

Dead end streets approved for construction prior to the date of adoption of these Roadway Standards may have alternative provision for turnarounds, subject to traffic engineering analysis.

When dead end streets are extended, the previously existing turnaround shall be removed and that portion of the roadway reconstructed in accordance with these Roadway Standards.

The width of any Cul-de Sac shall not be less than 24 feet.

Utility Structures in Public Highways

All utilities, both public and private, proposed new installations and relocations within the street right-of-way shall be constructed at a location approved by the Chief of Operations and Public Works.

In order to facilitate maintenance, new underground utility structures should be constructed within the travelled way.

Where existing underground utility structures are located outside of a curbed travelled way excluding sidewalks, all modifications thereto shall be designed to carry passenger car and light truck loads. Structures located in other areas shall be designed to carry street loading, with allowance for impact. All structures within the City Right-of-Way shall be designed to carry HS20 Truck Loads.

All underground utility structures located in sidewalk areas, including sidewalk reserve areas, shall be constructed to prevent differential frost heave between sidewalk and structure.

Street Acceptance and Construction

In accordance with the Norwalk Code, § 95-23, no newly constructed highway, road or street, together with any curbs and sidewalks adjacent thereto and the drainage systems, guardrails and street signs installed in conjunction therewith, shall be laid out, altered, enlarged, changed or constructed, except in conformance with the standards set forth in the City of Norwalk, Department of Public Works, Roadway Standards, and Standard Construction Specifications, Drainage Manual, and zoning subdivision requirements as approved and amended by the Public Works Committee to the Common Council.

Any street, highway, or road, or any curb or sidewalk adjacent thereto, or any drainage system, guardrail or street sign installed in conjunction therewith that shall be in whole or in part or manner, laid out, altered, changed or constructed other than in accordance with the standards set forth in the above paragraph in the determination of the Chief of Operations and Public Works, shall not be accepted as a public street of the city.

Street Lighting

Illumination standards for artificially lit streets shall conform to all applicable standards of the Connecticut Department of Transportation and the Federal Highway Administration. In certain circumstances, street lights shall be installed on building faces at a height, frequency and location which provides the necessary illumination at the surface of the roadway. In no circumstance shall the bottom of any fixture be placed less than 8'-6" above the existing grade or sidewalk.

Signage

All regulatory signs shall meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD), with respect to color, format, size, mounting, reflectorization, height of verbiage. Materials other aluminum sheet may be allowed. The proper function of any regulatory sign shall take precedence over any other consideration.

Fences and Walls on Residential Property

1. Height

- (a) Fences may be installed by homeowners or their agents, up to a maximum nominal height of six (6) feet above lowest adjacent ground level without a Building Permit.
- (b) Masonry walls (stone, brick or concrete) may be installed up to a maximum nominal height of four (4) feet above lowest adjacent ground level without a Building Permit.
- (c) For any new or replacement fence taller than 6 feet, or masonry wall taller than 4 feet, a Building Permit must be obtained from the Code Enforcement Department. SEE NUMBER 5 UNDER THIS SECTION.
- (d) No portion of any new or replacement fence or wall shall block the required light and ventilation of any residential building window. If there is a question regarding this you should check with the Building Official for the proper requirements. This requirement does not apply to fence distances from detached accessory structures such as sheds, free-standing garages and swimming pools, etc.

2. Location

- (a) The entire fence or wall, including posts, braces or pilasters, must be

located entirely on owner's side of property line. No minimum setback distance from the property line is specified in City Code. SEE NOTE 2d AND 3a BELOW.

- (b) Two abutting neighbors can agree in writing through an agreement to place a fence or wall directly on the property line between them if that written agreement is filed on the Land Records for both abutting neighbors at the Town Clerk's Office, together with updated Class A-2 Surveys of the involved properties. SEE NOTE 2d and 3a BELOW.
- (c) Any new or replacement fence or wall that will extend along the side of a property near a driveway must either terminate ten (10) feet from the edge of the roadway; or any section of such fence or wall within ten (10) feet of the edge of the roadway cannot exceed a height of thirty (30) inches above that driveway surface, in order to ensure adequate sightline for a motorist backing out of that driveway. SEE NOTE 3a BELOW.
- (d) A current Class A-2 Survey of your premises (which must be prepared by a Connecticut-licensed Land Surveyor) is the accepted reference standard for accurately determining the location of property lines.

3. Street Side Fencing and Walls

- (a) All fencing or walls to be constructed by homeowners or their agents along the street front face(s) of their properties must be situated entirely behind the legal property line.

NOTE: The City's legal right-of-way along a street usually extends beyond the street edge or curbing and sidewalks. Owner should follow his/her Class A-2 Survey prior to installing any street side fence or wall.

The City maintains the legal right to remove any fence or wall built within its street right-of-way, at the expense of the Owner.

- (b). On any residential property situated at the corner of two streets, no portion of a street side fence or wall within thirty (30) feet of that lot's street corner can exceed thirty (30) inches in height, in order to ensure adequate sightlines for motorists approaching that intersection.

4. Fence Style

- (a) No fence on residential property is allowed to be electrified, nor can any fence or wall be fitted with barbed wire or razor ribbon.
- (b) In the case of a picket or stockade fence, the owner can arrange to so-called “good side” to face whichever direction he or she chooses.

5. Fence and Wall Permits

For any new or replacement fence taller than 6 feet or masonry wall taller than 4 feet, owner or owner’s contractor must provide a design drawing or such proposed fence or wall installation to the code enforcement for a Building Permit. This drawing must bear the seal and signature of a Connecticut registered Architect or Licensed Professional Civil Engineer, and must include calculations proving structural resistance to wind loads mandated by the State Building Code.

This requirement may be waived by the Chief Building Official if he feels the detailed drawings and calculations meet the requirements of the State Building Code.

Alleys

Alleys provide for accessibility and service to each individual land parcel. They are characterized by a narrow right-of-way and range in width from 16 to 20 ft in residential areas and up to 30 ft in industrial areas.

Alleys should be aligned parallel to or concentric with the street property lines. It is desirable to situate alleys in such a manner that both ends of the alley are connected either to streets or to other alleys. Where two alleys intersect, a triangular corner cutoff of not less than 10 ft along each alley property line should be provided. Dead-end alleys should be provided with a turning area in accordance with the Figure on Page 44.

Curb return radii at street intersections may range from 5 ft in residentially zoned areas to 10 ft in industrial and commercial areas where large numbers of trucks are expected.

Alleys should have grades established to meet as closely as possible the existing grades of the abutting land parcels. The longitudinal grade should not be less than 0.20.

Alley cross sections may be V-shaped with transverse slopes of 2.5 percent toward a center V gutter. Runoff is thereby directed to a catch basin in the alley or to connecting street gutters.

CONSTRUCTION STANDARDS

Specifications

Construction shall conform to the Standard Specifications established by the Department of Public Works.

Where no Standard Specification is applicable, or where special conditions exist, elements of construction shall conform to sound engineering practice and shall be approved in writing by the Chief of Operations and Public Works.

Standard Construction Details

All designs for roadway and driveway construction, reconstruction or pavement placement shall be in accordance with the Construction Details contained in this Manual.

Drainage

The design of roadway and driveway drainage shall conform to the Norwalk Drainage Manual and shall have the written approval of the Chief of Operations and Public Works.

Sanitary Sewers

The design and construction of sanitary sewers shall conform with the Design and Construction of Sanitary and Storm Sewers, ASCE - Manuals and Reports on Engineering Practice No. 37, WPCD Manual of Practice No. 9, prepared by a joint committee of the American Society of Civil Engineers and the Water Pollution Control Federation, as amended and TR-16 Guidelines For The Design Of Wastewater Treatment Works, as amended. Construction shall conform to the Standard Specifications established by the Department of Public Works, and the regulations of the Norwalk Water Pollution Control Authority (WPCA).

DESIGN STANDARDS

DESIGN STANDARDS: DESIGN DISTRICT STREETS

DESIGN SPEED		30 MPH
POSTED SPEED		25 MPH
PAVEMENT WIDTH	WITH CURBS	26.0 FT (MIN)
	WITHOUT CURBS	24.0 FT (MIN)
CURB HEIGHT		0.5 FT
LATERAL CLEARANCE	WITH CURBS	1.5 FT (MIN)
	WITHOUT CURBS	6.0 FT (MIN)
LONGITUDINAL GRADES	MINIMUM	0.5%
	MAXIMUM URBAN	11.0%
	MAXIMUM RESIDENTIAL	11.0%
CROSS SLOPE	PAVED AREAS	¼ IN/FT (MIN)
SUPERELEVATION		NONE
HORIZONTAL CURVATURE (RADIUS)		375 FT (MIN)
STOPPING SIGHT DISTANCE		200 FT (MIN)
INTERSECTION SIGHT DISTANCE		335 FT (MIN)
VERTICAL CURVATURE	'K' FACTOR – SAG	37
	'K' FACTOR - CREST	19
	MINIMUM LENGTH	90 FT
MAXIMUM EARTH SLOPE	HORIZONTAL : VERTICAL	2:1

DESIGN STANDARDS: URBAN AND RESIDENTIAL LOCAL STREETS

DESIGN SPEED		35MPH
POSTED SPEED		25 MPH
PAVEMENT WIDTH	URBAN WITH CURBS	26.0 FT (MIN)
	URBAN WITHOUT CURBS	24.0 FT (MIN)
	RESIDENTIAL WITH CURBS	22.0 FT (MIN)
	RESIDENTIAL WITHOUT CURBS	20.0 FT (MIN)
CURB HEIGHT		0.5 FT
LATERAL CLEARANCE	WITH CURBS	1.5 FT (MIN)
	WITHOUT CURBS	6.0 FT (MIN)
LONGITUDINAL GRADES	MINIMUM	0.5%
	MAXIMUM URBAN	11.0%
	MAXIMUM RESIDENTIAL	11.0%
CROSS SLOPE	PAVED AREAS	¼ IN/FT (MIN)
SUPERELEVATION		NONE
HORIZONTAL CURVATURE (RADIUS)		530 FT (MIN)
STOPPING SIGHT DISTANCE		250 FT (MIN)
INTERSECTION SIGHT DISTANCE		390 FT (MIN)
VERTICAL CURVATURE	'K' FACTOR – SAG	49
	'K' FACTOR - CREST	29
	MINIMUM LENGTH	105 FT
MAXIMUM EARTH SLOPE	HORIZONTAL : VERTICAL	2:1

DESIGN STANDARDS: COLLECTOR STREETS

DESIGN SPEED		40 MPH
POSTED SPEED		30 MPH
PAVEMENT WIDTH	WITH CURBS	26.0 FT (MIN)
	WITHOUT CURBS	24.0 FT (MIN)
CURB HEIGHT		0.5 FT
LATERAL CLEARANCE	WITH CURBS	1.5 FT (MIN)
	WITHOUT CURBS	6.0 FT (MIN)
LONGITUDINAL GRADES	MINIMUM	0.5%
	MAXIMUM URBAN	11.0%
CROSS SLOPE	PAVED AREAS	¼ IN/FT (MIN)
SUPERELEVATION		¾ IN/FT (MAX)
HORIZONTAL CURVATURE (RADIUS)	WITHOUT SUPERELEVATION	715 FT (MIN)
	WITH MAXIMUM SUPERELEVATION	510 FT (MIN)
STOPPING SIGHT DISTANCE		305 FT (MIN)
INTERSECTION SIGHT DISTANCE		445 FT (MIN)
VERTICAL CURVATURE	'K' FACTOR – SAG	64
	'K' FACTOR – CREST	44
	MINIMUM LENGTH	120 FT
MAXIMUM EARTH SLOPE	HORIZONTAL : VERTICAL	2:1

DESIGN STANDARDS: MINOR ARTERIAL STREETS

DESIGN SPEED		40 MPH
POSTED SPEED		30 MPH
LANE WIDTH		10.0 FT - 12.0 FT
PAVED SHOULDER WIDTHS	WITH PARKING	8.0 FT
	WITHOUT PARKING	2.0 FT
CURB HEIGHT		0.5 FT
LATERAL CLEARANCE		1.5 FT (MIN)
LONGITUDINAL GRADES	MINIMUM	0.5%
	MAXIMUM	8%
CROSS SLOPE	PAVED AREAS	¼ IN/FT (MIN)
SUPERELEVATION		¾ IN/FT (MAX)
HORIZONTAL CURVATURE (RADIUS)	WITHOUT SUPERELEVATION	715 FT (MIN)
	WITH MAXIMUM SUPERELEVATION	510 FT (MIN)
STOPPING SIGHT DISTANCE		
INTERSECTION SIGHT DISTANCE		305 FT (MIN)
		445 FT (MIN)
VERTICAL CURVATURE	'K' FACTOR – SAG	64
	'K' FACTOR – CREST	44
	MINIMUM LENGTH	120 FT
MAXIMUM EARTH SLOPE	HORIZONTAL : VERTICAL	2:1

DESIGN STANDARDS: MAJOR ARTERIAL STREETS

DESIGN SPEED		40 MPH
POSTED SPEED		30 MPH
LANE WIDTH		10.0 FT - 12.0 FT
PAVED SHOULDER WIDTHS	WITH PARKING	8.0 FT
	WITHOUT PARKING	4.0 FT
CURB HEIGHT		0.5 FT
LATERAL CLEARANCE		1.5 FT (MIN)
LONGITUDINAL GRADES	MINIMUM	0.5%
	MAXIMUM	8%
CROSS SLOPE	PAVED AREAS	¼ IN/FT (MIN)
SUPERELEVATION		¾ IN/FT (MAX)
HORIZONTAL CURVATURE (RADIUS)	WITHOUT SUPERELEVATION	715 FT (MIN)
	WITH MAXIMUM SUPERELEVATION	510 FT (MIN)
STOPPING SIGHT DISTANCE		
INTERSECTION SIGHT DISTANCE		305 FT (MIN)
		445 FT (MIN)
VERTICAL CURVATURE	'K' FACTOR – SAG	64
	'K' FACTOR – CREST	44
	MINIMUM LENGTH	120 FT
MAXIMUM EARTH SLOPE	HORIZONTAL : VERTICAL	2:1

NOTES

- 1 Rock Ledge – Slope to be determined by engineering analysis
- 2 Earth Slope - Slope to original ground surface. Where disturbed slope extends beyond R.O. W. line, retaining walls shall be required unless slope rights are obtained.
- 3 Desirable
- 4 Sidewalks:

Bituminous Concrete
2" Class 2 for sidewalks and minor driveways
3" for major driveways
6" Processed Aggregate Base

Portland Cement Concrete
5" Class "C" Concrete
6" For Driveways
6" Processed Aggregate Base
Expansion Joints Approximately 12'-0"
- 5 1 ½" HMA S0.375" Level 2 Surface Course
1 ½" HMA S0.375" Level 2 Binder Course
- 6 12" Processed Aggregate Base
18" in Rock Cut
Must be inspected and approved by Department of Public Works
- 7 6" Topsoil and seed
- 8 Guide Rail
- 9 Rock Excavation Line
- 10 Varies according to Drainage Requirements
- 11 Underdrainage as Required by Department of Public Works
- 12 1 ½" HMA S0.375" Level 2 Surface Course
1 ½" HMA S0.375" Level 2 Binder Course
- 13 6" HMA S1.0" Level 3 Base Course
- 14 12" Processed Aggregate Base
18" in Rock Cut

* See Superpave Design Level Information

Superpave Level shall be as indicated unless directed otherwise by the Chief of Operations and Public Works.

- 15 2" HMA S0.50" Level 3 Surface Course
2" HMA S0.50" Level 3 Binder Course
- 16 14" Processed Aggregate base
18" in Rock Cut
- 17 Shoulder to be constructed to arc of circle average cross slope ½"/FT.
- 18 Minimum cross slope ½"/FT otherwise continuous roadway cross slope.
- 19 Shoulder at high side of superelevated section must be at least 4'-0" wide.
- 20 Minimum Median Width – 4'-0" Minimum
Turf Median Width – 6'-0" Maximum Turf
Median Width – 10'-0"
- 21 Bituminous Concrete Curbing
- 22 Granite or Concrete Curb
- 23 1 1/2" HMA S0.375" Level 2 Surface Course
2" HMA S0.50" Level 2 Binder Course
- 24 3" HMA S1.0" Level 2 Base Course

* See Superpave Design Level Information

Superpave Level shall be as indicated unless directed otherwise by the Chief of Operations and Public Works.

CONSTRUCTION DETAILS