

Highway Standards for Low-Volume Roads in New York State



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New York State LTAP Program
Cornell Local Roads Program

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Preface

What road standards should be applied to a particular road? This is a question we are asked regularly here at the New York State LTAP Center-Cornell Local Roads Program. There is no short or simple answer, and the subject is a very important one. Until this publication was produced, there were four alternative standards available to municipalities in New York State:

Manual: Guidelines for Rural Town and County Roads, 1992,
Local Roads Research and Coordination Council

A Policy on Geometric Design of Highways and Streets, 2001,
AASHTO, otherwise known as the AASHTO “Greenbook”

Guidelines for Geometric Design of Very Low-Volume Local Roads, 2001,
AASHTO

Locally-developed municipality-specific standards

However, having provided training on road standards, and having discussed the various standards with Highway Officials in the state, the consensus between NYSLTAP-CLRP and the various officials was that more was still needed to help small municipalities in New York adapt or develop realistic standards that met a balance between being either too restrictive or non-enforceable.

That is why this document was prepared. This publication, along with the original Guidelines, can be ordered from NYSLTAP-CLRP and used by municipalities throughout the state to develop realistic highway standards that fit the needs of the individual agencies and their roads. As with all materials produced here at the New York State LTAP Center-Cornell Local Roads Program, comments or suggestions are welcome.

We recently updated the drainage standards to harmonize these standards with the New York State Department of Transportation (NYSDOT) in conjunction with the new Community Risk and Resiliency Act (CRRA). There are a wider range of drainage options that are still reasonable for local agencies.

David Orr
Ithaca
February 2017

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1–Introduction

THE CASE FOR ADOPTION

It is a common myth that municipalities do not need to adopt standards for constructing and maintaining their roadways, and for accepting new roads into the town highway system. While there is no legal requirement to do so, not having a set of reasonable standards for new and existing roads puts a municipality at risk for costly lawsuits and unnecessary expenditures. The information in this publication was created to assist local governments in developing a set of standards and laws specifically appropriate to their individual needs.

The standards described in this document come from several documents produced by agencies other than the Cornell Local Roads Program. Those standards are referred to in the pertinent sections. As those standards change, the information in this publication will change automatically, through the citations to the “most recent” version of the referenced standards. The primary source was the *Manual: Guidelines for Rural Town and County Roads*, which was produced by the Local Roads Research and Coordination Council in 1992.

The main advantage of adopting standards is the establishment of practical roadway regulations which are based on current state and national standards, with customization to meet the specific needs of individual municipalities. If standards are not adopted, municipalities may be held to more stringent construction and maintenance requirements designed for roads with higher traffic volumes. The template provided here directly addresses the kind of low-volume roads more commonly found across New York State. In addition, these ‘model’ standards are easily fine-tuned to match the physical and practical needs of any given municipality. Ultimately, this ensures optimal roadway performance and safety while avoiding the extra costs associated with over-designed roads.

The fiscal benefits of adopting reasonable standards extend past construction costs. There is no cost to the municipality for putting them into law, and because the standards require adherence to the “most recent” editions of prevailing standards, rather than specific editions, it is not necessary to revise them as design practices evolve. In addition to establishing design specifications, the standards also offer a clear process and a specific set of definitions for roadway classification that allows for better management and prioritization of road maintenance and distribution of funds.

Included in the classification system is a provision for designating a road as “minimum maintenance.” Such roads have especially low traffic volumes, they carry primarily seasonal traffic, and often provide only agricultural or recreational access. The minimum maintenance designation allows a municipality to save money by preventing the need for impractical or unnecessary levels of maintenance.

Finally, in the absence of a clearly-defined set of standards, a municipality may find difficulty defending itself in court. In the face of a lawsuit, municipalities without specifications will most likely be held to stricter ones established by publications like the AASHTO “Greenbook,” which do not reflect the as-built condition of their roads. In view of all this, it is not hard to see that adoption of reasonable standards is a win-win situation.

Guidelines and Standards for Roads and Streets

Municipalities should have a set of realistic road construction standards to; reduce liability, improve planning and scheduling, and provide consistent information to the motoring public. Four alternative standards are available to municipalities in New York State:

- *A Policy on Geometric Design of Highways and Streets*, AASHTO
- *Manual: Guidelines for Rural Town and County Roads*
- *Guidelines for Geometric Design of Very Low-Volume Local Roads*, AASHTO
- Locally developed municipal-specific standards

A Policy on Geometric Design of Highways and Streets, 2004, AASHTO “Greenbook”

The American Association of State Highway Transportation Officials (AASHTO) “Greenbook” is a set of national standards for geometric design and construction of all types of roadways from freeways to local roads and streets. The standards were developed for a national audience and portions may not be applicable for every municipality. The “Greenbook” provides good information and details about design and construction of the geometry of all roadways, but particularly for roads with an average daily traffic (ADT) of more than 400 vehicles per day. The New York State Department of Transportation’s *Highway Design Manual* has many of the same requirements as the “Greenbook.”

Manual: Guidelines for Rural Town and County Roads, NYS Guidelines

The *NYS Guidelines* are an alternative set of standards for classification and management of low-volume roads (i.e., less than 400 ADT). Developed specifically for New York State by the Local Roads Research and Coordination Council, the *NYS Guidelines* establish appropriate standards for speed, construction and maintenance consistent with the needs and uses of these roads. A new designation, the *Minimum Maintenance Road*, allows reduced maintenance on certain classes of roads and may allow better utilization of tax dollars. The *NYS Guidelines* also provide an easy mechanism for judging existing conditions, determining needs, and establishing priorities.

Guidelines for Geometric Design of Very Low-Volume Local Roads, AASHTO LVR Guidelines

The *AASHTO LVR Guidelines* is a national standard for geometric design of very low-volume (<400 ADT) local roads. Developed under a national committee, the *AASHTO LVR Guidelines* examine the challenge of designing for very low traffic volumes and address “the unique needs of such roads and the geometric designs appropriate to meet those needs.” Many of the recommendations in the *AASHTO LVR Guidelines* are similar to the *NYS Guidelines* but more details are provided on geometric aspects of road design. Also included is guidance for very low-volume urban streets.

Locally developed municipal-specific standards

A municipality may elect to develop its own standards and adopt them as the official municipal policy. They should be defensible in court. The municipality should have its standards developed by a Professional Engineer and reviewed by the municipal attorney. A municipality may elect to use portions of the above three standards but need to be sure to decide, clarify and specify which standard to follow when two documents conflict each other.

The standards included in this document combine information from the three other references listed above into a single set of requirements that can be adopted by a municipality. More than a dozen municipalities have adopted these standards after making modifications for their own unique situations.

STANDARDS FOR NEW ROADS

The standards included here were prepared by the Cornell Local Roads Program to provide municipalities with reasonable highway requirements that could be adopted quickly and easily. The standards included have been reviewed by a Town Attorney for completeness and correct language, but should be reviewed by any adopting municipality's own attorney prior to adoption.

The *Sample Road Standards* can be adopted by a municipality by resolution or by local law. If the concept of *Minimum Maintenance Roads* will not be used, the adoption can be done by resolution of the municipal board. Consult with the municipal attorney for the best method and procedure needed to adopt the standards or the model law. The model local law (see page 19) was originally prepared by the Commission on Rural Resources to be a companion to the *Manual: Guidelines for Rural Town and County Roads*. The version presented in this document contains some minor changes, made by the Cornell Local Roads Program in order to provide consistency with the standards included here.

Before adoption, replace the underlined items with the municipality names and other critical information. Some of the design items that local governments may wish to adjust are also underlined. These are minimum recommendations, but they should be reviewed and changed as necessary before adoption.

In addition to the main standards, there are several optional items that may be included in the municipal standards. Notes explaining these items, as well as some of those already in the standards, begin on page 11.

By adopting and following these standards for all road rehabilitation done by the municipality, and for new roads, the level of liability is reduced, the public is given a clearer idea of the level of service provided, and communication is improved.

For electronic copies of anything in this manual, additional questions concerning these standards, or if more information is desired, please contact the Cornell Local Roads Program by phone at (607) 255-8033, via email at clrp@cornell.edu, or visit us on the web at clrp.cornell.edu.

AFTER ADOPTION

The adoption of standards for new roads by resolution or a local law is just the beginning. In order to make full benefit of the advantages offered by these standards, the following steps should be taken after formal adoption:

- Classify all local roads by performing an inventory, obtaining traffic data, and identifying adjacent land use.
- Determine the existing conditions of road surfaces, pavement and shoulder width, drainage, signs and adjacent history.
- Identify work to be done in terms of rehabilitation, maintenance and traffic control in order to comply with the new regulations.
- Rank the needs and prioritize the work.
- Develop an action plan.

By following the above steps, municipalities will reduce liability and improve communication with the public.

2–Sample Roadway Standards

Town of Anytown

Supervisor—John Q. Public

Clerk—Jane Doe

1 Town Lane

Anytown, NY 12345

Highway Superintendent Tim Taylor

2 Town Road

Anytown, NY 12345

Standards for New Roads – Town of Anytown

General

1. The Town of AnyTown, herein referred to as the Town, has adopted these standards for construction of new roadways to be dedicated as part of the Town road system.
2. All roadways to be taken over by the Town shall be certified they are in compliance with these standards by a Professional Engineer licensed to practice in New York State, herein referred to as the Project Engineer.
3. Before the roadway is to be taken over by the Town, a set of as-built plans approved by the Project Engineer shall be submitted to the Town Clerk and the Highway Superintendent at the addresses shown on the top of these standards. Approval by the Highway Superintendent that the project meets the standards shall be required prior to acceptance by the Town board. Both the Highway Superintendent and the Town Board must accept the roadway before it is accepted as a part of the Town road system. The Town reserves the right to not accept a roadway, notwithstanding that all portions of these standards have been met.
4. All applications for the dedication of a roadway shall be accompanied by a proposed warranty deed conveying said highway to the Town, with all necessary releases from mortgages or other claimants. All deeds and plans must meet requirements for filing with the County Clerk.

In addition, there should be a complete release of all liens arising out of the construction of the dedicated improvements, or receipts in full lieu thereof, and if required in either case, an affidavit that so far as the Developer has personal knowledge or information, the releases and receipts include all labor and materials for which a lien could be filed.

5. For a subdivision, the plans must be submitted prior to start of construction. A construction plan showing erosion control and other pertinent information must be supplied for subdivisions.
6. For disturbances of 1 acre or more, a Stormwater Pollution Prevention Plan must be in place which is consistent with the requirements and standards of the New York State Department of Environmental Conservation.

7. As a minimum, the plans for the roadway shall provide the following:
- The design criteria used
 - The names of all streets approved by County Department of Emergency Services
 - A location and alignment survey performed by a licensed Surveyor that includes:
 - The original and finished grades
 - The layout and locations of all roads and streets and their metes and bounds
 - The location of any property lines and their metes and bounds
 - The location of the Town's right-of-way
 - The location of other rights-of-way and easements including a statement of their allowable uses
 - The location of all drainage structures
 - The location of any utilities in the right of way
 - The names of adjacent property owners to the roadway
 - A maintenance plan for the roadway
 - The locations of all signs and traffic control devices
 - A cross section of a typical tangent section
 - A traffic study determining the Average Daily Traffic and types of traffic for all roads and streets. The traffic study shall also describe all methods used to collect data
 - The Functional Classification of all roads and streets based on the criteria presented in the *AASHTO Guidelines for Geometric Design of Very Low-Volume Roads (ADT \leq 400)* or the *AASHTO Policy on Geometric Design of Highways and Streets*. Where there exists a conflict between two or more of the defined classifications, the classification having the most stringent design guidelines shall be indicated
8. Clarification of exceptions to these standards shall be approved, in advance, by the Town Highway Superintendent in writing. Oral responses by the Town Highway Superintendent will not be considered as approved.

Design and Construction

1. The roadway shall be certified to meet the requirements of the most recent edition of the following documents, listed here in order of precedence:
 - a. *Manual Guidelines for Rural Town and County Roads*, Local Roads Research and Coordination Council.
 - b. *Guidelines for Geometric Design of Very Low-Volume Local Roads*, American Association of State Highway and Transportation Officials.
 - c. *Standard Specifications for Construction and Materials*, New York State Department of Transportation.
 - d. *Highway Design Manual*, New York State Department of Transportation.
 - e. *Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials.

2. The requirements listed in these specifications are for low volume roads and streets with a maximum Average Daily Traffic (ADT) of 400 vehicles per day.
 - a. Any roadway that does not meet the definition of a low volume roadway will require standards that are more stringent than those defined in these specifications. In such a case, the entire design must be approved before construction.
 - b. All new bridges shall meet the criteria in Chapter 5 of the AASHTO *Policy on Geometric Design of Highways and Streets*. Existing bridges will be certified free of safety issues.
 - c. All design criteria shall be listed on the roadway plans and any criteria not listed in the two publications listed above shall be determined using current engineering practice.
 - d. The plans shall designate the source of any design assumptions.
3. In addition, as a minimum, the road shall meet the following criteria:
 - a. A design life of not less than 20 years with routine maintenance.
 - b. A minimum design speed of 45 mph.
 - c. A right-of-way of not less than 60 feet.
 - d. A total roadway width of not less than 20 feet.
 - e. A total driving lane width of not less than 18 feet.
 - f. Drainage facilities designed to handle the design flood frequencies in Table 1 on the next page. The minimum size opening of any pipe is 18 inches in diameter or equivalent.
 - g. The combined thickness of the base and surface courses shall be at least 18 inches.
4. The Highway Superintendent may specify additional right-of-way where deep cuts and fills exist, in areas adjacent to drainage structures, and otherwise with discretion and consideration for the terrain.
5. Should the road terminate short of the adjacent property line, the right-of-way shall be extended to the adjacent property line. The additional right-of-way shall meet the specifications in sections 3.c and 5.
6. Dead-end road designs will terminate with tee turn-a-rounds designed in accordance with Figure A (see optional section).
7. All proposed roads shall be a minimum of 500 feet in length.

Table 1. Design Flood Frequencies (in Years) for Drainage Structures and Ditches¹

Road type or Functional Class	Culvert Under Highway ²	Storm Drainage Systems	Driveway Culverts	Ditches ⁴
Interstates and Other Freeways	50	10 ⁵	n.a.	25
Principal Arterials	50	10 ⁵	25	25
Minor Arterials	50 ⁶	10 ⁷	10	10
Major Collectors	50 ⁶	10 ⁷	10	10
Minor Collectors	25 ⁹	10 ⁷	10	10
Local Roads & Streets w/ AADT>400	25 ⁹	10 ⁷	10	10
A or B type highways (AADT <400) ⁸	10 ^{7,9}	5 ⁷	10	10
C type highways (AADT <50) ⁸	7	7		

¹ The values in this table are typical. The selected value for a project should be based upon an assessment of the likely damage to the highway and adjacent landowners from a given flow and the costs of the drainage facility. Note: 100-year requirements must be checked if the proposed highway is in an established regulatory floodway or floodplain.

² The check flow, used to assess the performance of the facility, should be the 100-year storm event.

³ Relocated natural channels should have the same flow characteristics (geometrics and slope) as the existing channel and should be provided with a lining having roughness characteristics similar to the existing channel. Infrastructure crossing streams may have to conform to stream bank flow width as per ACOE or NYSDEC requirements.

⁴ Including lining material (All ditches should have a lining material and not be left untreated).

⁵ As per 23CFR650A, and Table 1-1 of HDS 2, a 50-year frequency shall be used for stormwater design at the following locations where no overflow relief is available:

- a. sag vertical curves connecting negative and positive grades.
- b. other locations such as underpasses, depressed roadways, etc.

⁶ A design flood frequency of 10 or 25 years is acceptable if documented in the Design Approval Document, and when identified after design approval, in the drainage report.

⁷ Use a 25-year frequency at the following locations where no overflow relief is available:

- a. sag vertical curves connecting negative and positive grades.
- b. other locations such as underpasses, depressed roadways, etc.
- c. dead end highways.

⁸ Existing structures are considered acceptable unless there are known flooding issues which require a more detailed design. In such a case, the A/B standard should be followed. The A/B/C standard is taken from the Manual: Guidelines for Rural Town and County Roads, Local Roads Research and Coordination Council, 1997 and available from the Cornell Local Roads Program

⁹ If NYSDOT designs the culverts, then 50 year design flood criteria shall apply unless modified by note 6 above

8. Definitions of design criteria:
 - a. Design life: the time in years from original construction until the present serviceability index has dropped to 2.0.
 - b. Present serviceability index – p (also known as the terminal serviceability index – p_t): the ability of a roadway to handle traffic as defined by the AASHTO *Guide for the Design of Pavement Structures*.
 - c. A right-of-way: the width of land owned or controlled by a highway agency for the purpose of maintaining or constructing roads and streets.
 - d. A __-year storm: a runoff event with a probability of occurring in a given year equal to the inverse of the value of the year. A 50-year storm would have a 1 in 50 (2%) chance of occurring in a given year.
 - e. A 18” diameter equivalent opening: an area of 254 in².
 - f. Design speed: the typical operating speed on a roadway. Also, the speed used to determine the various design features of a roadway based on terrain, traffic volume, and roadway classification.
 - g. Stopping sight distance: the sum of the brake reaction distance (the distance traversed by a vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied) and the braking distance (the distance needed to stop a vehicle from the instant brake application begins).
 - h. Traveled way: The portion of the roadway for the movement of vehicles, exclusive of shoulders.
 - i. Roadway: the portion of a highway, including shoulders, for vehicular use.
9. All materials and all work shall meet the requirements of the latest revision of the New York State Department of Transportation *Standard Specifications for Construction and Materials*, including any Engineering Instructions or Bulletins, unless alternatives are approved by the Town Highway Superintendent in writing, in advance.
10. The Right-of-Way shall be kept clear of shrubbery, trees, and other elements of landscaping which would obstruct visibility or become potential obstacles or fixed hazards.

NOTES AND OPTIONAL ITEMS

Minimum Design Speeds for Low-Volume (ADT<400) Roads

Table 2. Minimum design speeds in MPH

Rural Low-Volume Road Classification	Type of Terrain		
	Level	Rolling	Mountainous
Major Access	45	45	45
Minor Access	45	45	30
Industrial/Commercial	30	30	30
Agricultural	30	20	20
Recreational/Scenic	30	20	20
Resource Recovery	30	20	20

Stormwater Pollution Prevention Plan

For projects covering an area of one acre or more, a Construction Permit Notice of Intent (NOI) must be filed with the New York State Department of Environmental Conservation (DEC) in order to obtain a General Permit GP-02-01 (Phase II permit). The NOI shall include a Stormwater Pollution Prevention Plan consistent with criteria found in the *New York State Stormwater Management Design Manual* in addition to any other components indicated as necessary by the *Instruction Manual for Stormwater Construction Permit*. Both documents are available electronically at www.dec.ny.gov.

Roadway, Traveled Way, Lanes, Shoulders, and Total Roadway Width

When developing standards for new roads, minimum specifications for the width of roads may be defined in different ways depending on the goals and priorities of the municipality.

The easiest way to specify the minimum dimensions of the roadway surface is to establish a minimum width for the entire roadway, or “total roadway width.” This dimension is the total distance from one edge of the pavement to the other.

However, some communities will find it necessary or preferable, especially with new construction, to provide more discerning measurements. The most detailed way to specify the minimum total width of a roadway is to break it down into parts, as shown in Figure 1. With this approach, a minimum width would be provided for road shoulders, and either the traveled way (the distance across all lanes of the roadway) or individual lanes. Lane width is more precise than a width of the traveled way, and covers a larger number of lane configurations. A minimum total roadway width is not required with either of these arrangements, since it is already implied by the other two measurements. See Figure 1 for a visual comparison of these measurements.

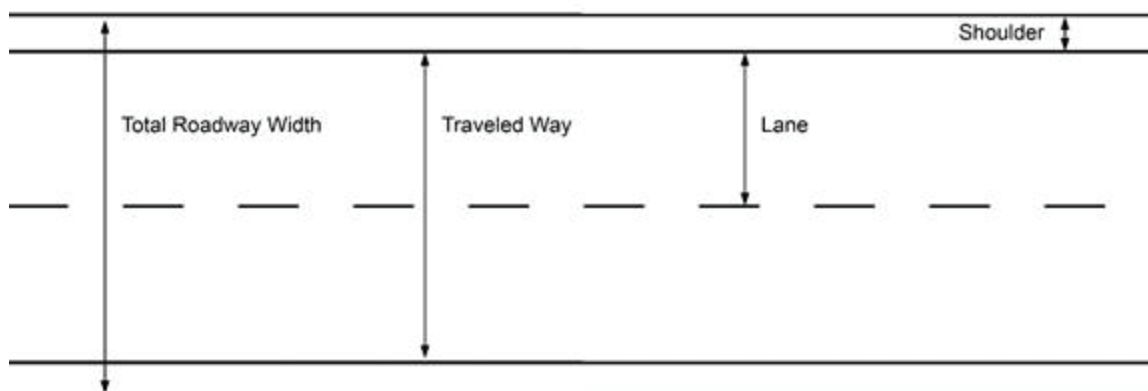


Figure 1. Measurements of roadway width

Municipalities which have developed programs to integrate bicycle and pedestrian facilities should consider adding minimum dimensions for bike lanes and possibly sidewalks. A simple and relatively inexpensive way to increase the safety of pedestrians in rural areas is to specify greater minimum widths for road shoulders.

Extended Right-of-Way

Where roadside drainage (ditches, culverts, etc.) is a feature of a roadway it is important to consider the angle at which the terrain slopes down from the road surface, or foreslope, and the angle at which it meets the existing terrain, or backslope.

The maximum recommended grade for both the foreslope and backslope is 2:1 or 50%, so that along a horizontal distance of 2 feet, for example, elevation increases or decreases by 1 foot. A safer slope, however, is 3:1 and this is desirable whenever possible. Depending on existing conditions, deep cuts or fills may be required to obtain acceptable grading so that the backslope meets the terrain at the appropriate angle.

The right-of-way should extend far enough to include roadside drainage features for the purposes of construction and maintenance. In some cases, however, the recommended slopes will require more space than is afforded by the minimum right-of-way indicated in the standards. When this is the case, it is important to have a clause in the standards which allows the municipality to obtain additional right-of-way, most often at the discretion of the local Highway Official.

Figure 2 shows an example of a deep cut used to provide the recommended grading. Notice that the backslope extends beyond the minimum right-of-way to the point at which it intersects the natural elevation of the terrain. The town's right-of-way should also extend to that point of intersection as shown in the diagram.

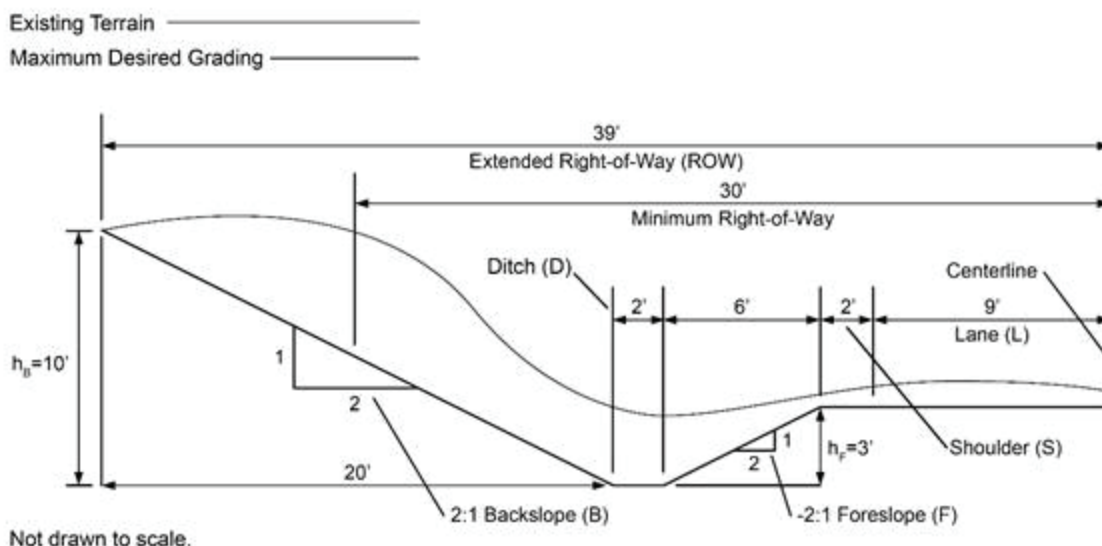


Figure 2. Calculating the extended right-of-way

The necessary right-of-way (ROW) width from the centerline of the road can be calculated by adding the lane width (L), the shoulder width (S), the foreslope (F) multiplied by its height (h_F), the width of the ditch or swale (D), and the backslope (B) multiplied by its height (h_B) as shown in the equation below.

$$ROW = L + S + F \times h_F + D + B \times h_B$$

In the example, the values would be:

$$ROW = 9 + 2 + 2 \times 3 + 6 + 2 \times 10 = 39$$

Turnarounds

Road standards may also include a section requiring turnarounds for roads that dead-end, or specifying minimum dimensions. Adding this to a set of standards can ensure a higher level of usability for drivers. Dimensions for turnaround are most easily presented in a diagram. Two of the most common types of turnarounds are cul-de-sacs and T-type turnarounds (Figure 3).

T-type turnarounds are named for their shape and require drivers to make a three-point, or “k,” turn. These are preferable where space is at a premium, or where traffic volumes are especially low. Where the approaching roadway meets the perpendicular section of the turnaround, the inside corners may be either curved or cut diagonally. The standard width of a T-type dead-end is 60 feet, with the width of the roadway maintained throughout. This width is needed to accommodate emergency services vehicles such as fire trucks and snow plows.

Cul-de-sacs offer the ability for drivers to turn around without having to reverse or make unnecessary turning movements, but require a larger area of land. The minimum diameter of a cul-de-sac should be no less than 60 feet.

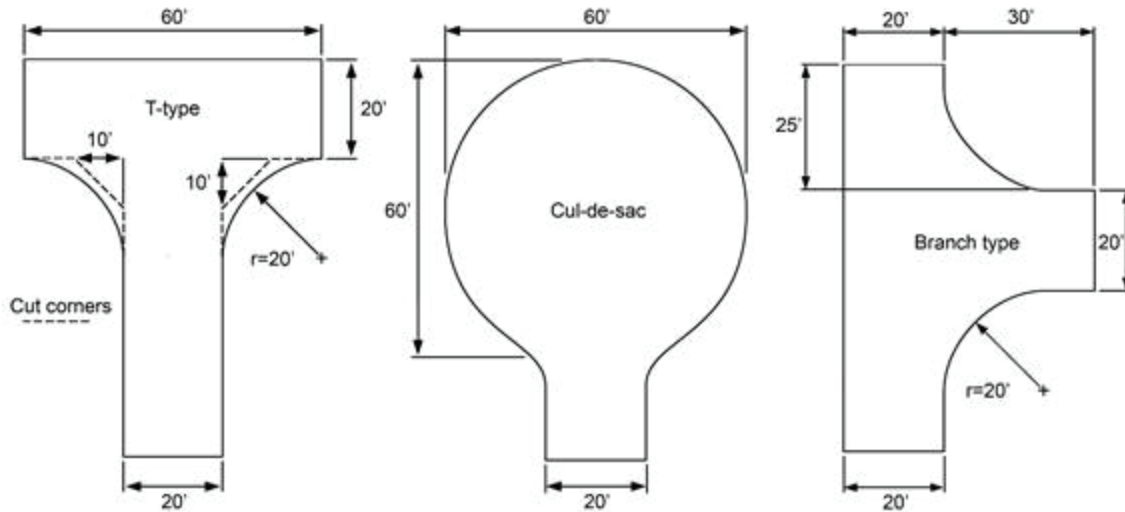


Figure 3. Three examples of turnarounds

For even smaller areas, branch type turnarounds may be used, and have largely the same advantages as T-type turnarounds. The perpendicular sections should extend at least 30' from the edge of the roadway, and the roadway should continue 25 feet past that. The width of the roadway should be maintained throughout all sections of the turnaround.

Traffic Volume Study

Purpose

Traffic volume studies are useful in determining appropriate design criteria for a roadway. The data obtained from such studies allow for the selection of a design speed which reflects the actual, day-to-day usage of a highway and can also help forecast future traffic loads due to proposed development and expansion of the roadway system. For existing roads, traffic volume studies are used to determine classification and to evaluate how well the existing design and condition of the pavement handles its typical traffic load. With this information, discrepancies between the use and design/condition of a road can be identified. Requiring a traffic study in a *Standards for New Roads* document assures the municipality an opportunity to address such deficiencies before they become the town's responsibility to correct.

Data Types

A well-conducted traffic study can provide the following information about a roadway:

- Average Daily Traffic (ADT)—The average number of vehicles per day that travel on a given section of road.
- Annual Average Daily Traffic (AADT)—The average of ADT numbers over the course of an entire year.
- Peak Flow Periods—The points in an average day or year when traffic volumes are at their maximum.

- **Vehicle Type**—The kind of vehicles which make use of a roadway. For a traffic study, commonly included vehicle types include cars (passenger cars, motorcycles, vans, pickups, etc.), trucks (trucks and buses), school buses, and special equipment (usually farming and industrial equipment).
- **Turning Movements**—The typical behavior of motor vehicles, bicycles, and pedestrians at intersections and midblock crossings, useful in optimizing signal timing and traffic control devices, as well as evaluating safety factors on the road.

Counting Methods

There are two main types of traffic counts, manual and automatic. Depending on what kind of study is needed or desired, one may be more useful or cost-effective than the other, and there are several different methods that may be employed to conduct studies of each type.

Automatic counts use either electronic devices with pneumatic tubes that stretch across a roadway and record the number of vehicles that pass over them or they use videotape. Some pneumatic counters are even able to determine the class of passing vehicles based on their weight and number of axles.

Manual Counting Methods

Manual counts are preferable for applications which require small samples of data, when the cost and effort of automatic counting is not justified, and when automatic equipment is not available for use.

Typically, a manual count lasts less than a day and data is recorded in 5, 10, or 15 minute intervals over the course of a few hours. Counts are usually performed midweek — Tuesday, Wednesday, and Thursday — so as to avoid introducing data from Monday morning and Friday afternoon rush hour when traffic volume is irregularly high.

There are three methods for conducting manual traffic counts; tally sheets, mechanical counting boards, and electronic counting boards.

- ***Tally Sheets***
Tally sheets are the simplest way of collecting traffic data. Data is recorded onto a prepared field form and a watch or stopwatch is used to measure the count interval.
- ***Mechanical Counting Boards***
Mechanical counting boards have push-button counters which record data for each turning movement being studied. Generally, a manual board can record traffic volumes for between three and five different vehicle or pedestrian classifications for each turning movement. As with the tally sheet method, intervals must be timed manually.

This approach is limited by the number of buttons available for use on a given counter, which means that the process may need to be repeated if the study requires more information than may be collected on the board. Mechanical boards often tend to be bulky and awkward for users.

- *Electronic Counting Boards*

Electronic boards are similar to mechanical boards but offer several advantages to those who can afford or have access to them. Battery-operated and hand-held, these devices are lighter, smaller, and therefore much easier to handle than their less sophisticated mechanical counterparts. They also feature built-in clocks which automatically separate data collected into user-defined intervals. The recorded information can be downloaded to a computer and imported into traffic software programs.

Automatic Counting Methods

Automatic counts require no personnel during the period of data collection, but instead use portable counters, permanent counters, or videotape. Because of this, automatic counts are generally performed over longer periods of time. Since this equipment is probably not readily available to local municipalities, coordination with NYSDOT or an engineering consulting firm is an option that should be explored.

When using pneumatic counters, street sweeping crews should be notified, in order to avoid damage to the equipment.

- *Portable Counters*

Generally used for 24 hour counts, these pneumatic devices serve the same basic purpose as manual counts, but since they do not require personnel they may prove more cost effective, depending on the availability of the equipment. Independent of the cost factor, portable counters greatly increase the practicality of a longer study. Some electronic counters can download data to a computer for analysis.

- *Permanent Counters*

Permanent counters are appropriate for long-term counts, and may be employed to study traffic patterns on a roadway for upwards of an entire year. For most local projects, this equipment is neither cost effective nor practical.

- *Videotape*

When a traffic count is performed by videotaping traffic, data is collected by watching the tape and counting vehicles and pedestrians. In most situations this is not a cost-effective solution. This method can require fewer people, but obtaining and installing equipment so that it is not vandalized or stolen may prove too much of a financial burden.

Gravel Roads

If a municipality determines it to be worthwhile, it may establish standards for gravel or “non-paved” roads. In most cases, maintenance is by far the most important consideration when it comes to non-paved surfaces. If standards already require a maintenance plan to be provided in order for roadways to be absorbed into a town’s road system, the maintenance question has already been covered, but to assure that the road is in good condition when integrated, specific design criteria can be provided.

Highway Standards for Low-Volume Roads in New York State

The recommended cross slope for an unpaved road is 6%, with 10% being the maximum acceptable grade. Having the proper cross slope will ensure that water is moved off of the roadway and into drainage facilities.

If the condition of an unpaved road has deteriorated severely, it may be in the town's best interest to require that it be reconstructed or paved. For advice on when to pave an unpaved road, as well as other information pertaining to such facilities, reference the *Gravel Roads Maintenance and Design Manual* which is available in print and online at www.epa.gov/nps/gravel-roads-maintenance-and-design-manual.

3–Local Law

This chapter presents a model local law which will be useful to municipalities that would like to classify certain roads as minimum maintenance. As the law explains, ‘minimum maintenance’ does not mean NO maintenance. It provides the municipality with criteria to identify and LIMIT the upkeep of roads that see especially low volumes of traffic or which are only used seasonally, for such purposes as agricultural or recreational access. Originally prepared by the Commission on Rural Resources to be a companion to the *Manual: Guidelines for Rural Town and County Roads*, this version contains some minor changes, made by the Cornell Local Roads Program in order to provide consistency with the standards included in this document.

While the minimum maintenance classification may be adopted by regulation or resolution, in the same manner as the Standards for New Roads introduced in the previous chapter, it is strongly recommended that they be passed as law. Since the minimum maintenance classification is presently included in neither New York State nor Federal legislature, in order to be as protected as possible from legal actions resulting from the lowering of service to a roadway designated as such, *minimum maintenance* should be included in local law.

As with any piece of legislature, a public hearing must be held prior to enactment. Additionally, the law should be reviewed for completeness and proper language by the municipal attorney. After the law is passed by local government, it must be submitted to the State. Instructions and necessary forms for filing local laws are available online from the New York State Department of State at their website, www.dos.state.ny.us. For more information the municipality may also contact the Cornell Local Roads Program.

MODEL LOCAL LAW

Section 1. Legislative purpose. The Town of _____ hereby enacts this local law for the purpose of reducing the cost of maintaining and rehabilitating low volume rural town roads while providing that such roads when used in a manner consistent with the road classification will be safe for the users thereof. While there are generally accepted standards for the design, maintenance and rehabilitation of high volume roads, there are no such comparable standards for roads over which a relatively low volume of traffic passes. In the event there can be a savings in the cost of maintaining or rehabilitating a road that has relatively few vehicles traveling over it, the money saved could be spent on more intense maintenance of roads over which travel is greater. The result could be greater overall safety for the general public. Since the town resources to be expended for highways is limited, it is incumbent upon the town to utilize such limited resources in a manner which targets expenditures on the most heavily traveled roads. It is for such purposes that this local law is enacted.

Section 2. Legislative findings. In 1986, the New York State Legislature created the Local Road Classification Task Force (Chapter 708 of the Laws of 1986). Such task force was charged with developing alternative guidelines for classifying town and county roads in rural areas according to principal uses and traffic volume. The task force consisted of the Commissioner of Transportation or his designee, the Dean of the College of Agriculture and Life Sciences of Cornell University or his designee, four rural town highway superintendents, three rural county highway superintendents and three rural business people. Such task force after considerable discussions and upon hearing many experts prepared local road classification guidelines and issued a report in December of 1988. In December of 1989 the task force issued "*A Manual: Guidelines for Rural Town and County Roads*" to facilitate the use of the local classification by local officials. In July of 1990, the Legislative Commission on Rural Resources worked with the Senate, Assembly, State Department of Transportation and the Governors office to establish a New York State Local Roads Research and Coordination Council (see Article 16-B Executive Law and Chapters 565 and 652 of the laws of 1990). The Council was empowered to work with the Department of Transportation to:

1. Promote the training of municipal officials and employees to encourage the utilization of innovative and cost cutting procedures as well as more efficient highway maintenance and consolidation methods;
2. Encourage the coordination of local road maintenance and storage facilities;
3. Encourage towns and counties to contract with each other for the maintenance of local roads and bridges;
4. Develop a minimum maintenance road classification addressing repair and service standards for low volume rural roads, as well as procedures to be followed by local governments for designing minimum maintenance roads within their communities. Accordingly, the Council revised the 1989 Local Roads Classification Task Force Report and published it for use by rural towns and county governments December 30, 1992.

Based upon additional resources developed since 1992, the Cornell Local Roads Program developed a more comprehensive set of standards to cover design areas not included in the *Guidelines*.

Section 3. Classification. The town superintendent of highways, in the event he (or she) finds it to be in the best interests of the town, may classify one or more roads or portions thereof as one of the following types of roads: low volume collector; residential access; farm access; resource/industrial access, agricultural land access; recreational land access or minimum maintenance road. However, no road shall be finally determined to be a minimum maintenance road until so designated by the town board by local law. The classification of any road or designated portion thereof shall be consistent with the definitions of such type of road as set forth in section ten of this local law. Upon the classification of any road or portion thereof by the town superintendent such designation shall be filed in the office of the town clerk and a copy shall be presented to each member of the town board by the town clerk within 10 days of such filing. Such designation shall be accompanied by a finding by the town superintendent, which shall contain the information upon which the highway superintendent relied when designating such road or portion thereof. The town board may at a town board meeting following the filing of such designation adopt a resolution accepting such designation except that the designation of a minimum maintenance road shall be by local law as provided in section four of this local law. Upon the adoption of such resolution, the road or portion thereof shall be classified as determined by the town highway superintendent and such town highway superintendent shall take into consideration the guidelines for maintaining such road or portion thereof as set forth in section ten of this local law.

Section 4. Minimum maintenance road classification. Notwithstanding the provisions of section three of this local law no road or portion thereof shall be designated as a minimum maintenance road except after following the procedure set forth in sections four through six, inclusive.

- a. The town superintendent of highways shall submit to the town board a recommendation that a road or portion thereof should be designated as a minimum maintenance road. No road or portion thereof shall be recommended as a minimum maintenance road by the town superintendent of highways unless the traffic volume is less than 50 vehicles per day as determined by the town superintendent of highways and such road or portion thereof is an agricultural land access road or a recreational land access road, and that such road or portion thereof does not provide farm centers of operation and/or year-round residences with principal motor vehicle access to goods and services necessary for the effective support of such farms and/or year-round residences.
- b. The town upon the approval of such recommendation shall by local law designate such road or portion thereof as a minimum maintenance road.
- c. At least ten days before the public hearing on such local law, written notice of such hearing shall be served by certified mail upon every owner of real property, as determined by the latest completed assessment roll, abutting such road or portion thereof to be designated a minimum maintenance road.
- d. No local law designating a minimum maintenance road shall be effective until signs pursuant to sections six and eleven of this local law are first posted advising the public that such road is a minimum maintenance road.
- e. No road or portion thereof, once designated a minimum maintenance road shall be determined to have been abandoned pursuant to the provisions of subdivision one of section two hundred five of the highway law until at least six years have elapsed since the termination of the designation of said road or portion thereof as a minimum maintenance road.

- f. Prior to any public hearing relating to the adoption of a local law designating a low volume road or portion thereof as a minimum maintenance road, the town board shall issue findings that such road or portion thereof should be designated a minimum maintenance road. Such findings shall include but not be limited to:
1. the volume and type of motor vehicle traffic on such road;
 2. a determination that the property owners of land abutting the road shall continue to have reasonable access to their property.
 3. a determination that the users of the road or portion thereof traveling at a reasonable and prudent speed, under the circumstances, shall not be placed in a hazardous situation; and
 4. a determination that such road, or portion thereof, does not constitute a farm access as defined pursuant to section ten of this local law.
 5. a determination that such road, or portion thereof, does not constitute access to a year-round residence.

Such findings shall be on file in the office of the town clerk and be available for public inspection for at least 60 days before the public hearing on the local law.

Section 5. School board and planning board review. A copy of the findings in section four shall also be sent to the board of education of the central school, town and county planning boards in which each road or road segment is located. Such school board and planning boards shall review the findings and within forty-five days file with the town clerk a resolution recommending such road designation or, in the event such designation is not recommended, the school board or planning board shall set forth in a resolution the reasons for not recommending such designation. The town board may, by resolution, accept, accept in part or reject the recommendations of either the school board or town planning board or county planning board prior to any vote upon the proposed local law. In the event the school board, county planning board or town planning board take no action upon the findings issued by the town board, the town board shall consider such inaction as a recommendation for the proposed minimum maintenance designation.

Section 6. Posting of signs. Appropriate signs shall be placed on a minimum maintenance road. Such signs shall notify and advise motorists of the need to exercise caution when traveling such road and shall conform to the manual of uniform traffic control devices. Properly posted signs shall be prima facie evidence that adequate notice of a minimum maintenance road designation has been given to the public.

Section 7. Minimum maintenance practices. Minimum maintenance roads shall be maintained in a manner determined by the town highway superintendent to be consistent with the volume and type of traffic traveling on such road. Nominal road maintenance practices such as, but not limited to, paving, patching, blading, dragging or mowing may be done less frequently depending upon the existing condition and use of the road as shall be determined by the town superintendent of highways. The guidelines for the method and manner of maintaining a minimum maintenance road are set forth in section ten of this local law.

Section 8. Discontinuance of minimum maintenance road. Any person or persons owning or occupying real property abutting a road or portion thereof which has been designated a minimum maintenance road may petition the town board to discontinue the designation of such road or portion thereof as a minimum maintenance road. Such petition shall be filed with the clerk of the town. Such petition shall identify the road or portion thereof to be discontinued as a minimum maintenance road and set forth the reasons for such discontinuance. The town board shall hold a public hearing upon such petition within thirty days after its receipt; at least ten days public notice shall be given prior to the conduct of such public hearing. At least ten days before the public hearing on such petition, written notice of such public hearing shall be served by certified mail upon every owner of real property, as determined by the latest assessment roll, abutting such road or portion thereof. In the event the town board after such public hearing determines that such road or portion thereof shall continue as a minimum maintenance road, no petition may be submitted pursuant to this section until the lapse of at least two years from the date of the filing of the petition. In the event it is determined that such road shall be discontinued as a minimum maintenance road, the town board, by local law shall discontinue such road or portion thereof as a minimum maintenance road and such discontinuance shall take place six months after the commencement of the next succeeding fiscal year.

Section 9. Notwithstanding the provisions of section eight of this local law, the town board may adopt a local law discontinuing such minimum maintenance road designation in the event it determines such discontinuance to be in the public interest.

Section 10. Tables and maintenance data. The following tables and accompanying data shall be used as guides by the town superintendent of highways to classify low volume roads in the Town of _____ and shall be used to enable the town superintendent to determine the guidelines he or she may follow to enable him or her to determine the manner in which low volume rural roads may be designed, maintained and operated.

CLASSIFICATION FOR LOW VOLUME ROADS AND GUIDELINES FOR THEIR DESIGN MAINTENANCE AND OPERATION

The following classifications have been developed to establish a close relationship between the uses of low volume roads and their design, maintenance and operation and are hereby adopted by the Town of _____. The classifications identify the significant use characteristics, including traffic volumes, vehicle types and seasonal use characteristics, that are present on New York State's low volume roads. Guidelines for the design, maintenance and traffic control have been developed that are closely matched to those use characteristics. Such guidelines shall be used by the town superintendent of highways.

Land use adjacent to the road shall be the basis for classification because it is a convenient and accurate way of identifying the kind of use that a low volume road serves.

A low volume road is a road with zero to 400 vehicles per day.

Low Volume Road Classifications in the Town of _____

- **Low Volume Collector**—collects traffic from any of the other classifications and channels it to higher level roads, such as arterials and interstates.
- **Residential Access**—provides access to residences. The traffic volume generated depends on the number of residences. All year access for fire trucks, ambulances and school buses should be provided.
- **Farm Access**—provides access to a farm's center of operations including the residence. Traffic volume is generally low, but may include occasional heavy trucks and farm equipment.
- **Resource/Industrial Access**—provides access to industrial or mining operations. Traffic volume can vary and can include heavy trucks and significant numbers of employees' cars.
- **Agricultural Land Access**—provides access to farm land. Traffic volumes are low and vary seasonally. These roads should accommodate farm equipment that can be up to 20 feet wide.
- **Recreation Land Access**—provides access to recreational land including seasonal dwellings and parks. Volumes of traffic can vary with the type of recreation facility and season of the year, and may include recreational vehicles.
- **Minimum Maintenance Road**—a low-volume road or road segment which may be of a seasonal nature, having an average traffic volume of less than fifty vehicles per day which principally or exclusively provides agricultural or recreational land access. A road, or road segment, which has been so designated may be maintained at a level which allows such road to remain passable and functional in accordance with standards contained in this section of the Guidelines. In no way shall the term "minimum maintenance" be construed to mean "no maintenance" or "abandonment". Further, such term shall not apply to those roads, or road segments, which provide farm access as previously defined, or access to an individual year-round residence.

The guidelines for rehabilitation design shall include three rehabilitation design types. Rehabilitation Design Type A is an all purpose road on which vehicles can pass without a reduction in speed. Rehabilitation Design Type B is an area service, two lane road on which vehicles may have to reduce their speeds to pass. Rehabilitation Design Type C is an area service, one lane road on which either of two passing vehicles must slow, stop or briefly leave the roadway to allow the other to pass.

Vehicle interaction characteristics shall be considered by the town superintendent of highways as the basis for assigning the design types to the respective Classifications. Vehicle size (as determined by the absence or presence of significant truck traffic) and traffic volumes (of either greater or equal to 50 vehicles per day, or less than 50 vehicles per day) are the criteria used. The 50 vehicle per day threshold is used because, at fewer than 50 vehicles per day, vehicle interactions become so infrequent that the effect on vehicle operation is negligible.

The guidelines to be followed by the town superintendent of highways for maintenance shall include provisions for a minimum maintenance designation that allows a reduced level of maintenance on roads which are used for agricultural or recreational land access. The guidelines for traffic control parallel the maintenance guidelines. They may include recommendations for signs on normally maintained roads and a minimum maintenance road sign shall be posted at the entrance points to minimum maintenance roads. The only other signs recommended for minimum maintenance roads are those mandated by Law (for all roads).

Table 3. Rural Low Volume Road Classification

Road Use			Guidelines		
Road Classification	Vehicle Type	ADT ¹	Rehabilitation Design Type	Maintenance	Traffic Control
1. Low-volume collector	All vehicles	50–400	A	Normal	MUTCD ²
		<50	B	Normal	MUTCD
2. Residential access	Cars, emergency and service vehicles	50–400	B	Normal	MUTCD
		<50	C	Normal	MUTCD
3. Farm access	Cars, light trucks, occasional heavy trucks, farm equip.	250–400	A	Normal	MUTCD
		<250	B	Normal	MUTCD
4. Resource/Industrial access	Trucking, employees' cars	50–400	A	Normal	MUTCD
		<50	B	Normal	MUTCD
5. Agricultural land access	Occasional farm equip. seasonal	<400	C	Minimum Maint.	MUTCD
6. Recreation land access	Cars, RVs, Seasonal	50–400	B	Normal	MUTCD
		<50	C	Minimum Maint.	MUTCD

¹ Average Daily Traffic.

² "Manual of Uniform Traffic Control Devices" Supplemented by "Traffic Sign Handbook for Low Volume Roads", New York State Department of Transportation Traffic and Safety Division, June 1985.

Table 4. Design Guidelines for Road Rehabilitation by Road Type

	Type A	Type B	Type C
	All Purpose Road	Area Service 2 Way 2 Lane Road	Area Service Single Lane 2 Way Road
Minimum Width:			
Traveled Way	18 ft.	16 ft. ¹	10 ft. ²
Shoulder	2 ft.	2 ft.	
Opposing Vehicle Interactions	All vehicles pass with no speed reductions.	1. Trucks cannot meet without reducing speed. 2. Cars cannot meet trucks without reducing speed. 3. Cars pass with almost normal speed	All vehicles require special widening for passing.
Operating Speed³	45 mph or greater	25 mph to 45 mph	40 mph or less
Typical Surface Material:⁴			
ADT>150	Asphalt Concrete	Asphalt Concrete	Usually unsurfaced
ADT<150	Aggregate	Aggregate	
Surface Condition	No adverse effect on Operating speed	May cause reduction in operating speed	Reduced operating speed

¹ Add 2 ft. to the traveled way if significant truck traffic is present.

² If farm vehicles are present, maintain 20 foot horizontal clearance. Widening of traveled way should be provided at approximately 1000 foot intervals to allow vehicles to pass.

³ Applicable to normal maintenance roads.

⁴ ADT thresholds recommended based on economic analysis, "Economic Evaluation of Pavement Design for Low Volume Roads," Proceedings of the Third International Low Volume Roads Conference, Transportation Research Board, National Research Council, Washington, D.C., 1983.

Table 5. Cross Slope Drainage Criteria, by Surface Type

Surface Type	Range in Cross Slope
High (asphalt, etc.)	1.5%–2.0%
Intermediate (surface treated)	1.5%–~3.0%
Low (unpaved)	4.0%–6.0%

Clear Zone—The width of the roadside area that should be studied for possible hazard mitigation measures varies with the operating speed, traffic level and degree of curvature of the road. Desirable clear zones are indicated below. (Clear zone is measured from the edge of the traveled way.)

Type A Road—a 10-foot clear zone is desirable.

Type B Road—a 2-foot to 5-foot clear zone is desirable; a 10-foot clear zone on the outside of sharp curves and on curves at the bottom of long grades is desirable.

Type C Road—a 2-foot clear zone is desirable; a wider clear zone on the outside of sharp curves is suggested. On minimum maintenance roads (see chapter III), a clear zone may not be provided.

Hazard mitigation measures to be considered include:

- Improved delineation of the road including edgelines, delineators and reflectors.
- Guiderail
- Berms and earth work
- Drainage modifications
- Removal of the hazard

Property owners should recognize the legal right of local government to remove fixed objects within the right of way of the road.

Guiderail—New York State Department of Transportation Guiderail and Bridge rail designs are intended for high volume, high speed highways and are often too expensive for many low volume road applications. Alternative designs that are less expensive and adequately tested to assure performance may be used on low volume rural roads.

Source: *AASHTO Policy for Geometric Design of Highways and Streets, 2004.*

Table 6. Maintenance Activities

Activity	Normal Maintenance Roads	Minimum Maintenance Roads
Surface Maintenance		
Crack Sealing	As necessary	Maintain in a manner determined by highway superintendent consistent with volume and type of traffic and the manner stated in section seven of this local law.
Patching and Potholes	On demand	
Surface Seals	As necessary	
Thin Overlays	As necessary	
Snow Removal	Roads kept clear	
Shoulder Maintenance	Grading cleaning	
B1ading	Regular	Infrequent
Roadside Maintenance		
Cleaning	As necessary	Maintain in a manner determined by highway superintendent consistent with volume and type of traffic and the manner stated in section seven of this local law.
Mowing	Regular	
Brush Control	Site distance maintained	
Guide Rail Maint.	Regular	
Drainage:		
Structure	As necessary	
Ditches	Positive drainage maintained	
Slopes	Repair failures	
Bridges		
Cleaning	As necessary to preserve bridge	Maintain in a manner determined by highway superintendent consistent with volume and type of traffic and the manner stated in section seven of this local law.
Lubrication	As necessary to preserve bridge	
Painting	As necessary to preserve bridge	
Deck	As necessary to preserve bridge	
Drainage	As necessary to preserve bridge	
Signs		
<u>Signs</u>	<u>MUTCD</u> ¹	<u>MUTCD</u>

¹ "Manual of Uniform Traffic Control Devices." As of September 2007, the official MUTCD for New York State is the National MUTCD combined with the New York State Supplement.

Surface Maintenance

Crack Sealing—manually pouring hot asphalt, with or without a fiber reinforcement material, into road surface cracks that have first been cleaned of all loose debris, vegetation, etc. The cracks may occur at construction joints, utility cuts, or just be random due to the effects of time, weather, loads, etc. Crack sealing has been found to be a very cost-effective measure, because it prevents the entry of water into the base course and sub grade. By blocking the entry of water, crack sealing indirectly strengthens the load- supporting capability of the road.

Patching and Potholes—placement and compaction of asphalt concrete into surface defects, such as potholes, which have first been cut back to sound material and cleaned of loose debris, water, etc. While a certain amount of this work will have to be done on an emergency basis during inclement weather to provide a safe road, expedient patches should be replaced with permanent patches using proper methods and materials when conditions are favorable. Extensive patching and potholes is an indication that a pavement has reached the end of its functional life, and the road should be scheduled for rehabilitation in accordance with the guidelines set forth in this local law.

Surface Seals—also known as "wearing courses." One example of a surface seal/wearing course is a chip seal. This method involves spraying a rapid-setting emulsified asphalt onto the road surface, followed immediately by the placement of a single layer of clean, crushed stone particles. A pneumatic, rubber-tired compactor is used to press the stones into the asphalt before the emulsion sets up. A surface seal is used where the surface cracking is more extensive, while manual crack sealing is used where the cracking is less extensive. Surface sealing may also be used to enhance skid resistance on a slippery road. Where water entry is prevented by the surface seal, some strengthening of the road will result.

Thin Overlays—while "thin" is a relative term, it is used here to refer to hot-mix or cold-mix overlay paving a thickness of 1½ inches or less. This method adds more to the structural capability of the pavement than a surface seal. However, it performs much the same function as a surface seal, although it can be expected to have a more lasting effect. When a thin overlay is placed on a paved road, it is customary to use a tack coat to promote a bond between the old surface and the overlay. According to the Asphalt Institute, the tack coat should be sprayed from a distributor, allowing adequate time for it to become "tacky" before paving. Traffic should be kept off the tacked area before paving. They recommend using an SS-1 or a CSS-1 asphalt emulsion diluted 50-50 with water, and applied at a rate of 0.05 to 0.15 gallons per square yard. Application of tack coat at higher rates should be avoided, as this can lead to slippage of the overlay or "bleeding" and loss of skid resistance on the surface of the overlay.

Snow Removal—Snow and ice control are performed to improve safety and to expedite travel during the winter months. Blading of snow is done to remove it from the roadway to prevent the buildup of ice. Abrasives (sand, usually mixed with salt) are used to enhance trafficability during a storm or immediately afterward when a thin layer of ice or snow remains on the road. Salt is used to lower the melting temperature of the ice, and to diminish the bond of the ice on the road surface.

Shoulder Maintenance—activities may differ depending on whether the shoulder is paved or unpaved. The objective is to keep the surface smooth so that moving vehicles can leave the main roadway safely, and also to assure that water from the road will move across the shoulder and

into the ditch or gutter. It is particularly important to remove the accumulated winter maintenance abrasives from the shoulders to prevent the retention of water near the edge of the pavement.

Blading—for aggregate roads and unpaved shoulders, blading removes potholes, corrugations, and other surface defects, rendering the surface smoother and safer to travel on. Blading is usually preceded by scarification to a depth slightly deeper than the deepest surface defects. Blading should be used to establish a cross-slope of 4 to 6 percent ($\frac{1}{2}$ to $\frac{3}{4}$ inch per foot) for good drainage and to reduce the development of potholes in the aggregate surface.

Regraveling—the addition of aggregate materials to re-establish the crown and grade of the road. This activity is commonly done at the same time as blading, but less frequently. The new aggregate is needed periodically to make up for materials that have been lost due to traffic, water erosion, dusting, and blading losses.

Dust Palliation—application of water, calcium chloride, sodium chloride (salt), lignin sulfonate, or other non-toxic chemicals to bind the surface and prevent loss of dust. Dust loss leads to the gradual erosion of the road surface, reducing its thickness and load supporting capability. Dust can make summertime travel hazardous when traffic volumes are sufficient to require passing maneuvers. Sometimes the use of dust palliatives will reduce the need for blading and regraveling to a sufficient degree as to be highly cost-effective.

Roadside Maintenance

Cleaning—picking up litter and other roadside debris, principally for aesthetic reasons, but also to protect the flow capacity of culverts and ditches.

Mowing—cutting grass and weeds. This is particularly important near driveways and intersections, to provide a clear line of sight for traffic.

Brush Control—cutting woody shrubs to prevent encroachment onto the right-of-way. This is important to provide adequate sight distance, particularly around the inside of curves, and at driveways and intersections.

Guiderail Maintenance—replacement of damaged, ineffective guiderail. This may also involve use of herbicides to retard the growth of weeds and shrubs in front of and immediately behind the guiderail.

Drainage—cleaning debris from the inlets and outlets around culverts, and cleaning ditches to maintain flow capacity. When possible, ditches should be cleaned in the late spring of the year, so that vegetation will be quickly re-established to protect against erosion. At other times, reseeding may be necessary for erosion protection.

Slope Maintenance—remove landslide debris, cut and remove trees from fill slopes, protect against erosion due to runoff from the road surface or ditches, seed slopes to retard erosion.

Bridges

Bridge Maintenance—cleaning of drainage scuppers, lubrication of pins and bearings, painting of beams and railings, cleaning and patching of deck surface defects, removal of winter maintenance abrasive and salt residues, protection of bridge abutments against scour and erosion, inspection of abutments, clearance of the waterway to maintain flow capacity.

Signs

Sign Maintenance—clearance of shrubs and trees obstructing visibility, replacement of damaged signs, verification that signs are used and placed in accordance with the National Manual on Uniform Traffic Control Devices (MUTCD) combined with the NYS Supplement.

Section 11. Guidelines for Traffic Control on Rural Low Volume and Minimum Maintenance Roads. This section lists guidelines for traffic control on rural low volume and minimum maintenance roads. It describes methods of traffic control that are cost effective and promote safety.

Signs on Low Volume Roads

The municipality is authorized in Section 1682 of the Vehicle and Traffic Law to decide conditions to which drivers are to be alerted with traffic control devices. It is mandatory to provide signs indicating weight restrictions, low clearances, dead-end roadways, railroad crossings and road closures. These are specified elsewhere in Law. On low volume roads subject to normal maintenance activities, the decision regarding the need for other signs should be based on the principle of positive guidance. In essence, this principle suggests that hazard warnings be provided whenever a driver cannot anticipate a hazard in time to react safely.

Features that are inconsistent with the general driving environment should be identified and analyzed for the possible installation of signs. Identification can be made by driving over the road and noting if a reduction in speed is necessary or if a surprising or unanticipated feature is encountered. Such things as isolated curves or narrow bridges, especially those with limited sight distance, should be evaluated for a "surprise" factor. Signs at every curve are generally not necessary on low volume roads as drivers are cognizant of conditions. Signs should be restricted to those features that the town superintendent of highways determines are inconsistent with the general highway environment and which cannot be anticipated early enough for drivers to take appropriate defensive action. Records of all determinations should be made and properly filed for future reference.

Signs on Designated Minimum Maintenance Roads

Design of road signs—The NYS Department of Transportation has designed signs for posting minimum maintenance roads. Such signs notify and advise motorists that reduced levels of maintenance are in effect. These signs are contained in the New York State Supplement.

Installation of signs—Minimum maintenance road signs shall be installed at each end of the minimum maintenance section and immediately beyond intersections with other public roads. The maximum distance between signs should not exceed two miles. Additional installation conditions are set forth in the New York State Supplement. Posting of minimum maintenance road signs will not relieve the town of its responsibility to post other legally-required signs such as railroad crossings, dead ends, bridge capacity, low clearance and road closures.

Section 12. This local law shall take effect immediately.

4–References

New York State Department of Transportation

Plan Sales Unit, Bldg. 5, Rm 109
New York State Department of Transportation
50 Wolf Road
Albany, N.Y. 12232
Phone: 518-457-2124
www.dot.ny.gov

- NYSDOT Standard Specifications for Construction and Materials, www.dot.ny.gov/main/business-center/engineering/specifications
- NYSDOT Comprehensive Pavement Design Manual, www.dot.ny.gov/divisions/engineering/design/dqab/cpdm
- NYSDOT Highway Design Manual, www.dot.ny.gov/divisions/engineering/design/dqab/hdm

Manual on Uniform Traffic Control Devices (MUTCD)

www.dot.ny.gov/mutcd

American Association of State Highway and Transportation Officials

444 N Capital St., NW
Suite 249
Washington, DC 20001
Phone: (202) 624-5800
Toll free: (800)-231-3475
www.transportation.org

- *Guidelines for Geometric Design of Very Low-Volume Local Roads*, 2001 or latest.
- *A Policy on the Geometric Design of Highways and Streets*, 2004 or latest.
- *AASHTO Guide for Design of Pavement Structures*, 1993 or latest.

Cornell Local Roads Program

416 Riley-Robb Hall
Ithaca, NY 14853-5701
Phone: (607) 255-8033
clrp.cornell.edu

- *Manual: Guidelines for Rural Town and County Roads*,
Local Roads Research and Coordination Council, December 1992.

