

**ROADWAY RELATED SUBDIVISION
REGULATIONS 11-2006**

TOWN OF NEW DURHAM



ROADWAY-RELATED SUBDIVISION REGULATIONS

New Durham, New Hampshire

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GEOMETRIC AND OTHER STANDARDS FOR STREETS AND INTERSECTIONS

GENERAL STANDARDS

1. STREET LAYOUT, PLAN AND CONSTRUCTION

The layout of all proposed streets shall provide for the continuation of the principal streets in an adjoining subdivision, if applicable. When the adjoining property is undeveloped, proper consideration of future development potential shall be given with respect to future continuous alignments. Safe access to all abutting lots shall be provided. Due consideration to contours and other natural features shall be given when laying out streets. The general street development plan shall be approved prior to the construction of any phase of the plan. The proposed street plan shall show all work necessary to connect and complete improvements and utilities between the proposed street (s) and any non-improved connecting street in an existing subdivision. All streets and related improvements shall be constructed in conformance with the standards described herein. Typical roadway sections, based on expected average daily traffic volume (ADT), are illustrated in Figure One. Typical geometrical and structural guidelines, based on ADT, are illustrated in Figure Two.

2. HALF-STREETS

Half-streets shall be prohibited, except where deemed essential to the reasonable development of the subdivision in conformance with the other requirements of these regulations, and where the Planning Board finds it will be practicable to require the construction and dedication of the other half when the adjoining property is subdivided. Whenever a half-street is adjacent to a tract to be subdivided, the other half of the street shall be plotted within such tract.

3. RESERVE STRIPS

No subdivision showing reserve strips controlling access to streets shall be approved unless the land included in such reserve strips has been dedicated to public use under conditions approved by the Planning Board.

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4. BENCHMARKS

A permanent reinforced concrete or stone marker, as shown in Figure Three, shall be placed at the edge of each roadway boundary on the periphery of the subdivision as reference for location and elevation. All benchmarks shall be placed in reference to a permanent U.S.G.S. point location.

5. STREET NAMES

Proposed street names shall not duplicate any existing street names within the Town. Street names shall be subject to Selectmen approval. Upon completion of a street, street names shall be posted by the developer on a sign of a type approved by the Planning Board.

6. STREET SIGNS

All streets shall have such street signs as are necessary to provide for safe and efficient movement of all vehicles. The posting of all street signs shall be the responsibility of the developer.

7. CUL-DE-SAC

Cul-de-sacs shall be allowed in accordance with the specifications listed in items 36 and 37 and 46-50 of these standards. These standards are illustrated in Figure Four A, Four B, and Four C. A landscaped island in the center of the cul-de-sac shall be required. Hammer-head turnarounds on dead end streets may be permitted at the discretion of the Planning Board. When proposed, the design of these facilities will be subject to approval by the Planning Board. *(Amended 11-17-98 and 11-2006)*

8. BRIDGES

On stream crossings spanning 10 or more feet, the bridge structure shall be designed to HS-20 leading (AASHTO Specifications, hereby incorporated into these regulations by reference). The minimum roadway width on bridges shall be 24 feet. Greater street widths, depending on the volume of traffic anticipated, may be required at the discretion of the Planning Board.

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9. ALLEY WAYS

Alley ways shall not be permitted.

10. SIDEWALKS, PEDESTRIAN WAYS, AND BICYCLE PATHS

Sidewalks, pedestrian ways and bicycle paths may be required at the discretion of the Planning Board. When required, sidewalks shall be constructed in accordance with specifications listed herein. Proposed designs of the pedestrian ways and bicycle paths will be subject to approval of the Planning Board. Sidewalks are defined as those walkways adjacent to traveled roadways. Pedestrian ways and bicycle paths may or may not be adjacent to traveled roadways. All subdivisions shall provide lot easements for sidewalks.

11. DRIVEWAYS AND OTHER ACCESSES

Driveways and other accesses to the local street network or proposed streets shall be constructed in accordance with the "State of New Hampshire Department of Transportation Policy and Procedure for Driveways and Other Accesses to the State Highway System," 1985, as amended. Driveways shall be defined in accordance with the definitions given in the Institute of Transportation Engineers Guidelines for Driveway Design and Location, 1985, as amended. These documents are hereby incorporated into this document by reference.

12. UTILITIES

Utility poles shall be kept close to the roadway right-of-way line and in no case shall be placed closer to the roadway than the ditch line. Utility poles shall always be placed well back of a curb. Water and sewer mains and other underground utilities shall be constructed outside the road surface area, and outside the ditch line except where road crossings are necessary.

13. FUTURE UTILITIES

A feasible layout for all future utilities within the subdivision and on adjacent land (when applicable), relative to natural features, shall be provided by the developer.

14. CLEARING AND GRUBBING

All trees and brush stumps, large roots, loam, forest litter, sod, muck, silt or other unacceptable material within right-of-way or slope lines, whichever is farthest from the

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center line of the street, shall be cut, excavated and removed completely from said area. All stumps and large roots shall be removed from all cuts to a depth of 4 feet below the finished grade in fills. Stumps and roots with a ground level 5 feet below the top of a proposed fill shall be cut within 6 inches of the existing ground surface. Under no circumstances shall any wood, brush or other unsuitable material be placed under, or allowed to remain within the limits of the subgrade area.

15. CUT AND FILL IN STREET CONSTRUCTION

Excavation of roadbeds shall consist of removing earth or ledge to a depth of 2 feet below the finished roadbed grade (subgrade) shown on the final profile (i.e., below the required road base). Filled roadbeds shall be formed by spreading successive layers of fill material not greater than 6 inches in depth. Each layer shall be compacted to a density of at least 95% of maximum density before another layer is begun. Material containing loam, forest litter, wood, roots or other substances that will not provide a stable bed or embankment will not be acceptable for the construction of fills. Broken ledge shall not be placed within 2 feet below the finished sub-grade. Ledge fragments or boulders larger than 1/2 cubic yard shall not be used within 2 feet of the finished subgrade.

Side slopes cut in soil above the finished roadway shall not exceed a ratio of 2 feet horizontal to 1 foot vertical, and shall be graded, loamed (4 inches compacted), and seeded in conformance with "New Hampshire Standard Specifications, Section 644, as amended. Side slopes in ledge above the finished roadway shall not exceed a ratio of 1 foot horizontal to 2 feet vertical. Embankment slopes away from the edge of the finished roadway shall not be constructed at a ratio steeper than 4 feet horizontal to 1 foot vertical unless the length of the grade is greater than 10 feet. If the horizontal length of the grade exceeds 10 feet, a ratio of 2 feet horizontal to 1 foot vertical may be used.

16. ROADWAY GRADES

Roadway grades shall be constructed in conformance with the standards provided herein. Exceptions in unusual cases may be granted by the Planning Board.

17. GRADE STAKES

The developer shall be responsible for placing grade stakes at 50 foot intervals adjacent to the road course where there are abrupt changes in grade and at 100 foot intervals

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where a more level contour is present. Each stake shall be securely placed where it will not be disturbed by construction. Each stake will indicate a station number, its offset from the center line of the street, and the extent of cut or fill to the finished center line grade. Grade stakes shall be preserved until the completion of the roadway. If grade stakes are removed or damaged to the extent that they cannot be read by the Selectmen, Planning Board members or appropriate Town Official or Agent, it will be the responsibility of the developer to replace them.

18. EROSION CONTROL

Erosion shall be controlled by placing mulch or matting on all surfaces disturbed by construction of the road and on all other surfaces where there is danger of eroded material being carried to the roadway area.

19. DRAINAGE

All streets shall be provided with adequate drainage facilities (culverts and ditches) to allow for the removal of storm water and prevent flooding of the pavement and erosion of adjacent surfaces. Construction of such facilities shall be in accordance with "New Hampshire Standard Specifications, Sections 603, 604 and 605, as amended, hereby incorporated into these regulations by reference. No water from adjacent lots shall be allowed to run across street surfaces, but shall be directed into ditches and culverted underground in a culvert of a size recommended by the Town's Road Agent and approved by the Planning Board. Standing water in ditches or culverts shall not be permitted.

20. LANDSCAPING

Upon completion of any development or development phase, all esplanade or planting strip areas adjacent to streets shall receive at least 4 inches of compacted high-quality top-soil (loam) free of stones over one inch in diameter, clay and sods. At a minimum, these areas shall be seeded with a high quality grass seed in conformance with "New Hampshire Standard Specifications," Section 644.

21. CLEAN-UP

Before acceptance, a street shall be cleaned up, by whatever means necessary, in order that it is left in a neat and presentable condition. Construction related debris of all kinds, both natural and man made shall be completely removed from the right-of-way.

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22. INSPECTIONS

In order to ensure that streets are constructed in accordance with the standards prescribed herein, the Selectmen, or appropriate Town agents, reserves the right to inspect any aspect of street construction at any time during the construction process and prior to acceptance of the roadway. At a minimum streets will be inspected, at the cost of the developer, by the appropriate Town officials or agents prior to placement of sub-grade materials, during placement of base course materials and prior to paving. All underground utilities shall be inspected and approved prior to paving. Cut or fill slopes shall also be subject to inspection and approval.

The developer will be responsible for notifying said Town official or agent at each of the construction phases. Failure of the developer to notify the Town official or agent at each of these construction phases will result in a delay of the release of the performance bond posted to cover such work. If any part of the street is found not to be constructed to the standards herein, the Selectmen may order the deficient segment to be reconstructed prior to its acceptance. The developer may request Town inspection of street construction at any point during the construction phase. Requests must be made at least three working days prior to the desired inspection.

The Town agent or official responsible for street inspection shall establish and maintain a record of each inspection. These records shall contain, but are not limited to, the date of inspection, the street or street segment inspected, identified by station, lot line or other reasonable means, conditions found and action taken (approval or disapproval). Reasons for disapproval must be supplied to the developer, in writing, within 48 hours of the inspection.

23. SAFETY

The Planning Board reserves the right to modify proposed street plans for the purpose of enhancing the safety of the traveled way. Potential modifications include, but are not limited to, removing obstructions, adding guard rails in areas where steep slopes exist or are created and requiring additional signs. The Town road agent may act for the Planning Board under this paragraph.

24. TRAFFIC IMPACT STUDIES

A traffic impact study, may be required of any development, at the discretion of the Planning Board. The information presented in these studies shall be in accordance with the "Strafford Regional Planning Commission's Guidelines for Traffic Impact Analysis,

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1986” hereby incorporated into these regulations by reference. The Planning Board reserves the right to retain the services of an outside agency for the purposes of reviewing any traffic impact analysis submitted.

25. ACCEPTANCE

No street shall be accepted by the Town until it has been inspected by the appropriate Town official (s) and found to be constructed in accordance with the specifications prescribed herein or additionally prescribed or agreed to by the Planning Board and approved by the Selectmen.

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STREET CONSTRUCTION STANDARDS			
	Estimated Average Daily Traffic Volume		
	1-100 vpd	100-800 vpd	> 800 vpd
(26) MINIMUM RIGHT-OF-WAY WIDTH:	50'	50'	60'
(27) MINIMUM PAVEMENT WIDTH: (an additional 10' per lane will be required for on street parallel parking)	22'	22'	24'
(28) MINIMUM SHOULDER WIDTH:	4'	4'	6'
(29) CENTER OF STREET TO DITCH LINE:	20'	20'	24'
(30) MINIMUM GRADE:	0.50%	0.50%	0.50%
(31) MAXIMUM GRADE ON:			
Level terrain ¹	6.00%	5.00%	4.00%
Rolling terrain ²	8.00%	7.00%	6.00%
Hilly terrain ³	12.00%	10.00%	8.00%

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- 1 Slopes on adjacent land generally ranging from 0-8%
 - 2 Slopes on adjacent land generally ranging from 8-15%
 - 3 Slopes on adjacent land generally over 15%

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STREET CONSTRUCTION STANDARDS			
	Estimated Average Daily Traffic Volume		
	1-100 vpd	100-800 vpd	> 800 vpd
(32) BASE COURSE DEPTH⁴ (traveled way and shoulders)			
Gravel ⁵	12"	14"	18"
Crushed Gravel ⁶	6"	6"	6"
Total base depth	18"	20"	24"
(33) PAVING, ROADS AND SHOULDERS: (if paved shoulders required)			
Hot bituminous pavement ⁷			
base (binder course)	2"	2"	2"
top (wearing course)	1"	1"	1"

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- 4 Required base depths in poorly and very poorly drained soils may be increased by 6"
 - 5 Type of gravel and method of construction shall be in accordance with New Hampshire Standard Specifications, Section 304, as amended, hereby incorporated into these regulations by reference
 - 6 *ibid.*
 - 7 In accordance with New Hampshire Standard Specification, Section 403, as amended, hereby incorporated into these regulations by reference.

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STREET CONSTRUCTION STANDARDS			
	Estimated Average Daily Traffic Volume		
	1-100 vpd	100-800 vpd	> 800 vpd
34) SHOULDER TYPE	Gravel	Gravel	Paved
(35) ROAD CROWN:	.025"/1'	.025"/1'	.025"/1'
(36) MAXIMUM CUL-DE-SAC LENGTH:	1000'	1000'	1000'
(37) MINIMUM CUL-DE-SAC RADIUS⁸			
Pavement radius (<i>Amended 11-17-98</i>)	59'	59'	59'
Property line radius (<i>Amended 11-17-98</i>)	75'	75'	75'
(38) MINIMUM TANGENT LENGTH between reverse curves:	75'	150'	200'

(39) VERTICAL CURVES (MINIMUM LENGTH):

The minimum vertical curve length required shall be governed by the design speed of the proposed roadway and determined by multiplying the algebraic difference in the two tangent grades times the "K" factors listed below (AASHTO specifications, hereby incorporated into these regulations by reference). The result of this calculation is expressed in feet. This calculation is illustrated in Figure Five.

8 Specifications are for conventional designs. Hammer-head turnarounds may be allowed at the discretion of the Planning Board. Hammer-head designs are subject to the approval of the Board.

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VERTICAL CURVE LENGTH							
Design Speed (mph)	20	25	30	35	40	45	50
(40) "K" FACTOR							
for crest:	10	20	30	50	80	120	160
for sag:	20	30	40	50	70	90	110
(41) MINIMUM STREET SIGHT DISTANCE:	125'	175'	250'	325'	400'	475'	550'
(42) MINIMUM CENTER LINE CURVE RADIUS⁹	180'	280'	430'	580'	720'	1 100'	1 400'
(43) GUTTER WIDTH:	12" to 18" (added to minimum pavement width required item 27)						
(44) SIDEWALK CONSTRUCTION:							
Width:	5'						
Base Course:	8" crushed gravel ¹⁰						
Paving	2" Hot bituminous pavement ¹¹						
Minimum sidewalk distance from curb face:	6'						

⁹ Increased super elevation will effect these minimum standards. See the American Association of State Highway and Transportation Officials-A Policy on the Geometric Design of Highways and Streets, 1984, page 462, for a discussion of the effect super elevation on minimum curve radius. The variances discussed in that document are hereby incorporated into these regulations by reference.

¹⁰ Type of gravel and method of construction shall be in accordance with New Hampshire Standard Specifications, Section 304, hereby incorporated into these regulations by reference.

¹¹ In accordance with New Hampshire Standard Specification, Section 403, as amended, hereby incorporated into these regulations by reference.

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(46) STREET LIGHTING:

Street lighting may be required at intersections and commercial and industrial driveways. Mid-block lighting and lighting of residential driveways may also be required as deemed necessary or appropriate by the Planning Board. All street lighting will be installed in conformance with the standards developed by the Illuminating Engineering Society of North America¹², hereby incorporated into these regulations by reference.

INTERSECTION CONSTRUCTION STANDARDS	
(47) Maximum grade (vertical alignment) on intersection or cul-de-sac approach:	3% within 100 feet of intersection or entry to cul de sac
(48) Maximum grade (vertical alignment) within intersection or cul de sac area:	2.00%
(49) Minimum angle of intersections;	70 degrees
(50) Intersection control:	Intersections and cul-de-sacs shall be controlled in accordance with the standards as specified in the State of New Hampshire Manual on Traffic Control Standards, Statutes and Policies, 1988, hereby incorporated into these regulations by reference.
(51) Minimum center line offset of adjacent (T-type) intersections:	200 feet
(52) Minimum tangent length approaching intersection:	50 feet (on local road approaches)
(53) Minimum property line radii at intersections:	20 feet
(54) Minimum curb radius:	30 feet
(55) Minimum intersection sight distance:	Intersections where the minor approach (s) is controlled by a stop sign (s) shall be provided a minimum sight distance relative to the speed of

¹² Illuminating Engineering Society of North America. American National Standard Practice for Roadway Lighting, 1977.

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INTERSECTION CONSTRUCTION STANDARDS	
	<p>the major 2 or 4 lane street intersected.</p> <p>Standards for these relationships are given below:</p>

REQUIRED SIGHT DISTANCE FROM MINOR APPROACH							
Posted Speed of Major 2 Lane Street (mph) ¹³	20	25	30	35	40	45	50
Required sight distance	260'	325'	390'	455'	520'	585'	650'
Posted Speed of Major 4 Lane Street (mph) ¹⁴	20	25	30	35	40	45	50
Required sight distance	300'	375'	450'	525'	600'	675'	750'

Intersections that are stop controlled on all approaches or signalized shall be provided with adequate stopping sight distance (on each approach) relative to the speed allowed on the approach. These standards are identical to those shown in item #41 of these standards.

13 In cases where over 25% of the expected average daily traffic is projected to be large semi-trucks, these distances may be increased by approximately 30%.

14 In cases where over 25% of the expected average daily traffic is projected to be large semi-trucks, these distances may be increased by approximately 30%.