# ROAD ORDINANCE
# FOR THE
# TOWN OF CAMBRIDGE, MAINE

**Certified copy, attest:** Clara Walker **, Town Clerk**

**Enacted by the Town:** May 8 2004 .

# Purpose

The purpose of these road and traffic standards are to :
1. Establish minimum specifications for all proposed public roads.
2. Establish design and construction standards for safe traffic access.
3. Establish minimum standards for traffic safety and the carrying capacity for all proposed roads.
4. Establish standards for roadway drainage systems.
5. Establish standards for road durability and a reasonable service life.

# ROAD STANDARDS

STREET AND STORM DRAINAGE DESIGN AND CONSTRUCTION STANDARDS

1. General Requirements.

a. Contractors shall submit to the Board of Selectmen (hereinafter **Board**), as part of the review process, detailed construction drawings showing a plan view, profile, and typical cross-section of the proposed streets. The plans shall include the following information:

i. Date, scale, and magnetic or true north point.
ii. Intersections of the proposed streets with existing streets.
iii. Roadway and right-of-way limits including edge of shoulder, sidewalks, and curbs.

iv. Kind, size, location, material, profile, and cross-section of all existing and proposed drainage ways.
v. Complete curve data shall be indicated for all horizontal and vertical curves.
vi. Turning radii at all intersections.
vii. Centerline gradients.
viii. Locations of all existing and proposed overhead and underground utilities, to include but not be limited to water, sewer, electricity, telephone, lighting, and cable television.

b. Upon receipt of plans for a proposed public street the Board shall forward one copy to the Planning Board, the Road Commissioner, and the Municipal Engineer for review and comment.

c. STREET DESIGN STANDARDS.

i. These design standards shall be met by all streets within subdivisions, and shall control the roadway, shoulders, curbs, sidewalks, drainage systems, culverts, and other appurtenances.

ii. Adjacent to areas zoned and designed for commercial use, or where a change of zoning to a zone which permits commercial uses is contemplated by the municipality, the street right-of way and/or pavement width shall be increased on

each side by half of the amount necessary to bring the road into conformance with the standards for commercial streets in these regulations.

iii. The following design standards apply according to street classification:

| Arterial | Collector | Minor | Private | Industrial/Commercial |
|---|---|---|---|---|
| | Minimum Right-of-Way Width: | | | |
| 80' | 50' | 50' | 50' | 80' |
| | Minimum Pavement Width: | | | |
| 44' | 24' | 20' | 12' | 44' |
| | Sidewalk Width: | | | |
| 5' | 5' | 51 | N/A | 8' |
| | Minimum Grade: | | | |
| 0.5% | 0.5% | 0.5% | N/A | 0.5% |
| | Maximum Grade: | | | |
| 5% | 6%-. | 6% | 10% | 5% |
| | Minimum Centerline Radius: | | | |
| 800' | 230' | 150' | N/A | 800' |
| | Minimum Tangent Between Curves of Reverse Alignment: | | | |
| 300' | 200' | 100' | N/A | 300' |
| | Roadway Crown: | | | |
| 1/4"/ft. | 1/4"/ft. | 1/4'/ft. | N/A | 1/4"/ft. |
| | Minimum Angle of street intersections: | | | |
| 90° | 90° | 90° | 90° | 90° |
| | Maximum Grade Within 75 ft. of Intersection: | | | |
| 2% | 2% | 2% | N/A | 2% |
| | Minimum curb Radii at Intersections: | | | |
| 30 | 20' | 15' | N/A | 30' |
| | Minimum r/o/w Radii at Intersections: | | | |
| 20' | 10' | 10' | 10' | 20' |
| | Minimum Width of Shoulders (each side): | | | |
| 3' | 3' | 3' | 3' | 9' |

iv. The centerline of the roadway shall be the centerline of the right-of-way.

v. Dead End Streets. In addition to the design standards above, dead-end streets shall be constructed to provide a cul-de-sac turn-around with the following requirements for radii: Property line 65 ft.; outer edge of pavement 50 ft. The Board may require the reservation of a twenty foot easement in line with the street to provide continuation of pedestrian traffic or utilities to the next street. The Board may also require the reservation of a fifty foot easement in line with the street to provide continuation of the road.

vi. Grades, Intersections, and Sight Distances.

*1.* Grades of all streets shall conform in general to the terrain, so that cut and fill are minimized while maintaining the grade standards above.

*2.* All changes in grade shall be connected by vertical curves to provide for the minimum sight distances below.

3. Where new street intersections or driveway curb cuts are proposed, sight distances, as measured along the road onto which traffic will be-turning, shall be based upon the posted speed limit and conform to the table below.

| Posted speed limit (mph) | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
|---|---|---|---|---|---|---|---|
| Sight distance (feet) | 250 | 300 | 350 | 400 | 450 | 500 | 550 |

4. Cross (four-cornered) street intersections shall be avoided insofar as possible, except as shown on the Comprehensive Plan or at other important intersections. A minimum distance of two hundred feet shall be maintained between center lines of side streets.

vii. Sidewalks. Where installed, sidewalks shall meet these minimum requirements.

a. Bituminous sidewalks.

1. The gravel aggregate sub-base course shall be no less than twelve inches thick.

2. The crushed aggregate base course shall be no less than two inches thick.

3. The hot bituminous pavement surface course shall be no less than two inches after compaction.

b. Portland Cement Concrete Sidewalks

1. The sand base shall be no less than six inches thick.

2. The Portland Cement concrete shall be reinforced with six inch square, number 10 wire mesh and shall be no less than four inches thick.

viii. Where installed, curbing shall be granite or bituminous concrete and shall be installed on a thoroughly compacted gravel base of six inches minimum thickness, except bituminous curbing shall be installed on the base course of the pavement. The specified pavement width above shall be measured between the curbs.

d Street Construction Standards.

i. Minimum thickness of material after compaction:

| Arterial | Collector | Minor | Private | Industrial/Commercial |
|---|---|---|---|---|
| Aggregate Sub-base Course (Max. size stone 4"): | | | | |
| 18" | 18" | 18" | 12" | 18" |
| Crushed Aggregate Base Course: | | | | |
| 4" | 3" | 3" | 3" | 4" |
| Hot Bituminous Pavement: | | | | |

| | | | | |
|---|---|---|---|---|
| Total Thickness: | | | | |
| 3 ¼" | 2 ½" | 2 ½" | 2 ½" | 3" |
| Surface Course: | | | | |
| 1 ½" | ¾" | ¾" | ¾" | 1 ¼" |
| Base Course: | | | | |
| 1 ¾" | 1 ¾" | 1 ¾" | 1 ¾" | 1 ¾" |

ii. Preparation.

*a.* Before any clearing has started on the right of way, the center line and side lines of the new road shall be staked or flagged at fifty foot intervals.

*b.* Before grading is started, the entire right-of-way shall be cleared of all stumps, roots, brush, and other objectionable material. all ledge, boulders, and tree stumps shall be removed form the right of way.

*c.* All organic materials shall be removed to a depth of two feet below the subgrade of the roadway. Rocks and boulders shall also be removed to a depth of two feet below the subgrade of the roadway. On soils which have been identified by the Town Engineer as not suitable for roadways, the subsoil shall be removed from the street site to a depth of two feet below the subgrade and replaced with material meeting the specifications for gravel aggregate sub-base below.

*d.* Side slopes shall be no steeper than a slope of three feet horizontal to one foot vertical, and shall be graded, limed fertilized, and seeded according to the specifications of the erosion and sedimentation control plan.

*e.* All underground utilities shall be installed prior to paving to avoid cuts in the pavement. Building sewers and water service connections shall be installed to the edge of the right-of-way prior to paving.

iii. Bases and Pavement.

*a.* Bases.

*1.* The aggregate Sub-base course shall be sand or gravel of hard durable particles free from vegetative matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch square mesh sieve shall meet the following grading requirements:

| Sieve Designation | Percentage by weight passing square mesh sieves |
|---|---|
| 1/4 inch | 25-70% |
| No. 40 | 0-30% |
| No. 200 | 0-7% |

Aggregate for the subbase shall contain no particles of rock exceeding four inches in any dimension.

2. The-aggregate Base Course shall be sand or gravel of hard durable particles free from vegetative matter, lumps, or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch square mesh sieve shall meet the following grading requirements:

| Sieve Designation | Percentage by weight passing square mesh sieves |
|---|---|
| 1/2 inch | 45-70% |
| 1/4 inch | 30-55% |
| No. 40 | 0-20% |
| No. 200 | 0-5% |

Aggregate for the subbase shall contain no particles of rock exceeding four inches in any dimension.

*b*. Pavement joints. Where pavement joins an existing pavement, the existing pavement shall be cut along a smooth line and form a neat, even, vertical joint.

*c*. Gutters.

Gutters shall be installed as required by the Board.

*d*. Pavements.

*1*. Minimum standards for the base layer of pavement shall be the M.D.O.T., specifications for plant mix grade B with an aggregate size no more than 1 inch maximum.

*2*. Minimum standards for the surface layer of pavement shall meet the M.D.O.T. specifications for plant mix grade C with an aggregate size no more than 3/4 inch maximum.

e. Storm Water Management Design Standards.

i. Adequate provision shall be made for disposal of all storm water, and any drained ground water through a management system of swales, culverts, underdrain, and storm drains. The storm water management system shall be designed to conduct storm water flows to existing watercourses or storm drains.

*1*. All components of the storm water management system shall be designed to meet the criteria of a twenty-five year storm based on rainfall data for Bangor, Maine.

*2*. The minimum pipe size for any storm drainage pipe shall be twelve inches. Maximum trench width at the pipe crown shall be the outside diameter of the pipe plus two feet. Pipe shall be bedded in a fine granular material, containing no stones larger than 3 inches, lumps of clay, or organic matter, reaching a minimum of six inches below the bottom of the pipe extending to six inches above the top of the pipe.

3. Catch basins shall be installed where necessary and located at the curb line.

4. Outlets shall be stabilized against soil erosion by stone riprap or other suitable material to reduce storm water velocity.

ii. The storm water management system shall be designed to accommodate upstream drainage, taking into account existing conditions and approved of planned developments not yet built and shall include a surplus design capacity factor of 25% for potential increases in upstream runoff.

iii. Where soils require a subsurface drainage system, the drains shall be installed and maintained separately from the storm water drainage system.

f. Storm Drainage Construction Standards.

i. Materials.

1. Reinforced Concrete Pipe. Reinforced Concrete Pipe shall meet the requirements of ASTM Designation C-76 (AASHTO M 170). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.2 on the .01 inch crack strength with a Class B bedding. Joints shall be of the rubber gasket type meeting ASTM Designation C 443-70, or of an approved preformed plastic jointing material such as "Ramnek" Perforated Concrete pipe shall conform to the requirements of AASHTO M 175 for the appropriate diameters.

2. Asbestos Cement Pipe. Asbestos cement pipe shall meet the requirements of ASTM Designation C-428 (ASSHTO M 189). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.5 on the crushing strength. Joints shall be of the rubber gasket type meeting ASTM Designation D1869-63, or of an approved preformed plastic sleeve type.

3. Corrugated Metal Pipe. Corrugated metal pipe shall be bituminous coated meeting the requirements of AASHTO Designation M 190 Type C for iron or steel pipe or AASHTO Designation M 196 for aluminum alloy pipe for sectional dimensions and type of bituminous coating. Pipe gauge shall be as required to meet the soil and traffic loads with a deflection of not more than 5%.

4. ABS Pipe. ABS (Acrylonitrile-butadiene-styrene) composite pipe and fittings shall conform to the requirements of AASHTO M 264 and AASHTO M 265. Perforated pipe shall conform to the requirements of AASHTO M 36, Type III.

5. Corrugated Plastic Pipe. Corrugated plastic pipe @shall conform to the requirements of AASHTO M-252.

6. Manholes. Corrugated plastic pipe shall be of precast concrete truncated cone section construction meeting the requirements of ASTM Designation C 478 or precast concrete manhole block construction meeting the requirements of ASTM Designation C 139, radial type. Bases may be cast in place 3,000 psi 28 day strength concrete or may be of precast concrete, placed on a compacted

foundation of uniform density. Metal frames and traps shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTO M 105, class 30 for gray iron castings or AASHTO M 183 (ASTM A 283, Grade B or better) for structural steel.

7. Catch Basins. Catch basins shall be of precast concrete truncated cone section construction meeting the requirements of ASTM Designation C 478 or precast concrete manhole block construction meeting the requirements of ASTM Designation C 139, radial type. Castings shall be square cast iron sized for the particular inlet condition with the gratings perpendicular to the curb line. Bases may be cast in place 3,000 psi 28 day strength concrete or may be of precast concrete, placed on a compacted foundation of uniform density. Metal frames and traps shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTOM 105, Class 30 for gray iron castings, or AASHTOM 183 (ASTM A 283, Grade B or better) for structural steel.

ii. Drain inlet alignment shall be straight in both horizontal and vertical alignment unless specific approval of a curvilinear drain is obtained in writing from the Board, after consultation with the Municipal Engineer.

iii. Manholes shall be provided at all changes in vertical or horizontal alignment and at all junctions. On straight runs, manholes shall be placed at a maximum of 400 foot intervals.

iv. Upon completion each catch basin or manhole shall be cleaned of all accumulation of silt, debris, or foreign matter and shall be kept clean until final acceptance.

g. Additional Improvements and Requirements.

i. Erosion control. If the Town Engineer deems it necessary, an erosion control plan shall be filed by the builder. The procedures outlined in the erosion control and sedimentation control plan shall be implemented during the site preparation, construction, and clean-up stages.

ii. Cleanup. Following street construction, the developer or contractor shall conduct a thorough clean-up of stumps and other debris from the entire street right-of-way. If onsite disposal of the stumps and debris is proposed, the site shall be indicated on the Plan, and be suitably covered with fill and topsoil, limed, fertilized, and seeded.

iii. Street Names,, signs, and Lighting. Streets which join and are in alignment with streets of abutting or neighboring properties shall bear the same name. Names of new streets shall not duplicate, nor bear phonetic resemblance to the names of existing streets within the Municipality, and shall be subject to the approval of the Board.