

§166-14. ~~Town Road~~ **Street Design**

The following standards apply to the construction of ~~streets~~ Town roads:

A. General requirements for ~~road construction~~ Town road design.

- (1) Standards. The Town road shall be constructed in conformance with the requirements and standards of the Town of Barkhamsted and the Connecticut Department of Transportation - Form ~~813~~ 816-2004, or latest versions.

(2.) All Town roads shall be curbless except where any of the following conditions occur:

A. The proposed Town road intersects an existing Town road. Proposed curbs shall be extended a minimum of 200 L.F. from said intersection. (Note: The Board of Selectmen or its' agents shall review each site individually to determine need and/or length of curbing).

B. The proposed Town road grade is six (6) percent or greater.

C. At an inland wetlands or watercourse crossing to prevent direct sediment deposition and roadway run-off of de-icing chemicals.

- ~~2.~~ (3) Supervision and inspection. Construction shall be subject to the approval of and shall be carried out under the supervision of the First Selectman or his/her authorized agent(s). No pipe, catch basin, manhole, or structure shall be backfilled until inspected and approved by the First Selectman or his/her authorized agent(s). The First Selectman or his/her authorized agent(s) shall have free access to the construction work at all times and shall be authorized to take material samples, cores and other tests as deemed necessary to determine compliance with these regulations. The First Selectman or his/her authorized agent(s) may require the applicant, at his own expense, to have such tests made and certified by a professional engineer licensed to practice in the State of Connecticut.

B. Right-of-way. ~~Streets~~ Town roads shall have a width of 50 feet for the right-of-way.

C. Turnaround

- (1) A turnaround with a diameter of 100 feet for the right-of-way shall be provided at the closed end of all dead-end ~~streets~~ Town roads.
- (2) For ~~streets~~ Town roads constructed after November 1, 2005. A reserved area for snow deposition of 40 feet wide, 20 feet deep, on the turnaround must be designated on the road plan. The location must be approved by the First Selectman and be free of driveways, landscaping, mailboxes, utility poles, hydrants, and other obstructions. The reserved area must pitch towards the ~~street~~ Town road at 2% to 4%. If there is a 50 foot right-of way for future development on the road plan, the snow deposition should be located within such right-of-way. [added STM 10-26-2005]

D. Width of travelway

(1) ~~Streets~~ Town roads shall be designated with the following width of pavement:

a. ~~Streets~~ Town roads: ~~26~~ 24 feet of pavement with 4 8-foot shoulders for curbless roads and 24 feet of pavement, measured between curbs, with 6 foot shoulders for curbed roads in both cut and fill areas, constructed and centered between the limits of the 50-foot right-of-way. (Note: Road width shall be 24 feet if proposed Town road is greater than 1,500 linear feet. Road width shall be 22 feet if the proposed Town road length is 1,500 linear feet or less, and it is not feasible or viable that the proposed Town road will be extended in the future).

b. Turnarounds shall be a minimum of ninety feet in diameter : ~~a ninety foot diameter.~~

(2) A greater width and cross section of pavement may be required to accommodate the amount and type of traffic, and turning

movements to be generated by the intended use of the lots. Alternative designs for turnarounds (e.g. depressed vegetated island with drainage) compatible with site conditions which will minimize environmental impact while providing a functional and maintainable turnaround may be proposed, subject to review and approval by the Board of Selectmen and the Planning and Zoning Commission.

- E.** Gradient. The minimum grade for all ~~streets~~ Town roads shall be 1.0%. The maximum grade for any ~~street~~ Town road shall not exceed the following:
1. All ~~streets~~ Town roads: 10%.
 2. Turnaround: 3%.
- F.** Vertical curvature. Appropriate vertical curves for transition, including superelevated curves meeting acceptable engineering standards, shall be established on all ~~streets~~ Town roads and at ~~streets~~ Town road intersections to ensure adequate sight distance in accordance with the classification of the ~~street~~ Town road. Except at intersections, vertical curves shall provide a minimum sight distance of 200 feet along the edge of the pavement. Where any ~~street~~ Town road approaches an intersection at a grade of 4% or more, a transition area having a maximum grade of 2% shall be provided for a minimum of 50 feet measured from the right-of-way line of the ~~street~~ Town road intersection.
- G.** Horizontal alignment.
1. Connecting curves between tangents shall be provided for all deflection angles in excess of five degrees. Suitable tangents shall be provided between curves, and the minimum radius of curvature at the center line of ~~streets~~ Town roads shall be as follows:
 - a. Vertical gradient less than 5%: 150 feet
 - b. Vertical gradient greater than 5%: 250 feet
 2. Tangents between curves shall not be less than 100 feet in length.
- H.** Intersections.
1. New Town road intersections.
 - a. New Town road intersections shall be at least 200 feet from any existing intersection or other proposed intersection or shall be part of an existing

or proposed intersection.

- b. Minimum stopping sight distances shall be two hundred (200) feet in each direction from the proposed intersection.
- c. Minimum intersection sight distances shall be three hundred fifty (350) feet and shall be established by current accepted engineering standards. Greater distances may be required by the Board of Selectmen.

- 2. Town roads shall intersect at ninety-degree angles where feasible. Where unusual topographic conditions warrant, the Board of Selectmen may, through written approval allow modification to this standard.
- 3. Intersections of right-of-way lines shall be connected with a curve having a radius of thirty-five (35) feet. Edges of pavement at intersections shall be connected with a radius of twenty-five (25) feet.

- I. Cross-sections. Local ~~streets~~ Town roads and collector ~~streets~~ Town roads shall be designed with a cross section in accordance with the drawing entitled "~~Typical Street Cross Section, Town of Barkhamsted,~~" "Curbless Roadway Cross Section, Town of Barkhamsted" and/or "Curbed Roadway Cross Section, Town of Barkhamsted", which drawings are is hereby made a part of ~~these Regulations~~ this Ordinance.

§166-14a. Private Roads

The following standards apply to the design of Private Roads:

- 1. The Private Road travelway shall be at least eighteen (18) feet in width.
- 2. The maximum length of the Private Road shall be 1500 L.F.
- 3. A minimum of fifty (50) feet of existing frontage on a Town accepted Town road or State of Connecticut Highway is required.

4. The Private Road shall be centered within a proposed common access area that is a maximum of forty-five (45) feet in width at all points.
5. The Private Road shall be paved from the existing edge of pavement of the Town road for a minimum of fifty (50) linear feet.
6. Grade of intersection. Every Private Road shall have an intersection grade of not more than four (4) percent extending a distance of fifty (50) feet from the existing Town accepted Town road or State highway.
7. The maximum grade of the Private Road shall not exceed twelve (12) percent.
8. The minimum grade shall be one (1) percent.
9. A hammerhead turnaround or a turnaround with a thirty-five (35) foot radius shall be provided at the end of the Private Road. The maximum grade of the turnaround shall be five (5) percent and shall accommodate a minimum turning radius of an SU-30 vehicle. Turning radius of emergency vehicles shall be considered.
10. A stormwater management plan that incorporates low impact development and best management practices as set forth in the 2004 Connecticut Stormwater Quality Manual, as amended, so as not to promote negative impacts to said property, surrounding properties, and nearby inland wetlands or watercourses.
11. Storm drainage analysis and design practices, principles, and methodology shall be completed as per the requirements of the Subdivision Regulations.
12. A plan and profile sheet of the Private Road shall be submitted containing the following information:
 - a. Complete horizontal and vertical geometry of the Private Road to include the centerline, twenty-five (25) feet right and twenty-five (25) feet left of

centerline.

b. Vertical curvature, horizontal alignment and intersections shall meet the Town road requirements as stated in sections “166-14F, 166-14G & 166-14H” of this ordinance.

c. Typical Private Road cross-sections showing pavement width/thickness (where applicable), cross slope, dimensions, drainage swales, shoulders, underdrains, etc. conforming to the standards illustrated on the drawings entitled, “18’ Wide Paved Private Road Cross Section, Town of Barkhamsted” and/or “18’ Wide Unpaved Private Road Cross Section, Town of Barkhamsted” which drawings are hereby made a part of this Ordinance. (These drawings are also an Appendix to the Town of Barkhamsted Subdivision Regulations).

d. All other improvements including proposed storm drains, catch basins, manholes, culverts, curbs, gutters, swales, and bridges. (Note: The Board of Selectmen or its agents shall review each site individually to determine need and/or length of curbing).

e. Plan and profile drawings shall be at a horizontal scale of not less than one inch equals forty (40) feet and at a vertical scale of one inch equals four (4) feet.

f. A Professional Engineer licensed in the State of Connecticut shall sign and seal all plans.

13. Private Road grades that are eight (8) percent or greater will be reviewed by the Town Engineer to determine if bituminous pavement and/or curbing will be required based upon individual site conditions/applications.

14. All construction methods for the Private Road shall be in accordance with Section 166-15, “Town Road Construction” of

this Ordinance.

15. The Design Engineer shall inspect all phases of construction and provide written certification to the Board of Selectmen that the Private Road construction with associated drainage has been installed according to the Approved design plans. The Board of Selectman or its agents reserve the right to inspect any or all phases of construction.

16. An As-built Plan shall be provided to the Board of Selectman to include Private Road grades, associated drainage improvements/BMP's, and embankment sloping upon completion of the construction.

17. Any Private Road created pursuant to this provision shall be approved by the Planning and Zoning Commission and the Board of Selectmen. Any Private Road constructed after the adoption of this ordinance shall be owned by a common interest ownership association ("COIA") in accordance with the Connecticut Common Interest Ownership Act, Chapter 828 of the Connecticut General Statutes. The ownership documents shall be reviewed and approved by the Town Attorney at the applicants expense and filed with the Town Clerk along with the record subdivision drawing or map illustrating the Private Road. All lot owners shall be members of the COIA. Each lot owner shall have an undivided interest in the Private Road.

18. The owners of any Private Road constructed after the adoption of this ordinance shall provide the Board of Selectmen evidence of compliance with §170-38.B.(3)(b), as amended, concerning property owner obligations, covenants and authority granted to the Town to assure compliance with all owner responsibilities related to the Private Road.

~~17.~~19. An Operation and Maintenance Plan (OMP) of the Private Road and associated drainage shall be submitted to and approved by the Board of Selectmen or its agents prior to construction and shall be filed on the Town of Barkhamsted Land Records. The ~~Homeowners Association~~ COIA shall adhere to the OMP. A copy of the OMP shall be made part of the deed covenants and restrictions of the ~~Homeowners Association~~ COIA.

20. Liability of Town - This section shall not be construed as imposing upon the Town liability or responsibility for damages to any person injured by the performance of any excavation or construction work for which the foregoing approval has been granted nor shall any official or employee be deemed to assume any liability or responsibility by reason of inspection for work being done.

§166-15. **Town Road Street Construction.**

Town roads Streets shall be constructed in accordance with the following standards and procedures:

- A. The **Town road streets** shall be constructed in conformance with the requirements and standards of the Town of Barkhamsted.
- B. Survey and field layout. Instrument surveys shall be made, maintained and recorded as follows:
 - 1) A centerline survey of the ~~street~~ **Town road** shall run in the field and suitable construction ties established to all control points. Stations shall be established at all control points. Stations shall be established at fifty-foot intervals and at all points of curvature and points of tangency. The beginning of this line shall be designated as Station 0 + 00 and shall be the intersection point of the proposed centerline with the centerline of the connecting ~~street~~ **Town road**. Offset hubs shall be provided as part of the center-line survey.
 - 2) A construction stake shall be placed perpendicular to the tangent or radial, in the case of curves, at each station on both sides of the ~~street~~ **Town road** and clear of all construction. The construction stake shall be marked with station, offset to center line and cut or filled to provide the grade as measured from the top of the stake.
 - 3) A stake sheet showing stations, profile grade, stake offsets and grade cuts and grade fills shall be prepared and presented to the Board of Selectmen before construction starts.
 - 4) Permanent bench marks shall be established and recorded with the Board of Selectmen throughout the length of the project at one thousand-foot intervals or as directed by the Board. The datum for bench marks shall be town, state or United States datum. An assumed datum may be used only with permission, in writing, from the Board.
 - 5) Grade stakes shall be protected and preserved until the Board of

Selectmen or its agent(s) approves the construction work.

- C. Clearing and grubbing. The entire area of the right-of-way required to be graded in accordance with the standard cross section shall be cleared of trees, stumps, brush, roots, large rocks, ledge and other unsuitable materials, except that the trees suitable for ~~street~~ Town road trees shall be left standing as directed by the Board of Selectmen. All felled trees, stumps, brush, and roots shall be removed from the site.
- D. Preparation of subgrade. The subgrade shall be prepared as follows:
- 1) All trees and roots shall be stripped to below the base course of the pavement and for the full width of the pavement. All soft spots, peat, loam, organic material, spongy soil, boulders, ledge and other unsuitable material conforming to State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form ~~813-1985~~ 816-2004, as amended, hereinafter referred to as “Form ~~813, M.02.07~~ 816-2004, Section M.02, as amended”. Where ledge rock is encountered, it shall be removed to a depth of twenty-four (24) inches below the subgrade and the area backfilled with gravel.
 - 2) Embankments shall be constructed of suitable fill material deposited in successive layers not exceeding twelve (12) inches in depth after compaction. Embankments to an elevation of three (3) feet above the free water surface at the time of filling shall be constructed of rock and/or free draining material conforming to Form ~~813~~ 816-2004, Section M.02.07 ,as amended. No stone over five (5) inches in its greatest dimension shall be placed within twelve (12) inches of the elevation of the subgrade.
 - 3) The subgrade shall be shaped with Road motor graders. Vibratory compactors shall be used and compacted to 95 % as per the Standard Proctor Test. The subgrade shall be brought to surface uniform with and shall not vary more than one-half ~~1/2~~ inch from the required cross section.
 - 4) Where rock fill is used, fill shall be installed in lifts no greater than three (3) feet to the desired depth.
 - 5) The Board of Selectmen may require the installation of underdrains beneath the ~~street~~ Town road pavement or in the right-of-way where

necessary to protect the stability of the pavement.

E. Sub-base course. The sub-base course shall be constructed as follows:

- 1) The road sub-base shall consist of twelve (12) inches of (3.5) inch minus gravel as per ConnDot Specifications and compacted to 95 % as per the Standard Proctor Test.
- 2) The sub-base course shall not be constructed during freezing weather or on a wet or frozen subgrade.

F. Base Course. The base course shall be constructed as follows:

- 1) The road base shall consist of six (6) inches minimum of approved processed gravel or processed stone placed in one layer and compacted to 95 % as per the Standard Proctor Test.
- 2) The final surface shall not be more than three-eighths (3/8) inch from the established grade and standard cross section.
- 3) The base course shall not be constructed during freezing weather or on a wet or frozen sub-base.

G. Surface course. On the prepared and approved base course, there shall be constructed a two-course surface of bituminous concrete, a two-inch Class 1 bituminous binder course and a ~~one~~ (1.5) inch Class 2 bituminous surface course. Construction methods and materials shall conform to Form ~~813~~ 816-2004, entire Section M.04 and Section ~~4.06~~ 4.01 or as amended, Bituminous Concrete. The surface course shall be installed when the temperature is greater than forty degrees Fahrenheit (40 F.) and rising, except that it shall be installed only between April and October 1, unless written permission is obtained from the Board of Selectmen and unless a period of at least sixty (60) days has elapsed with the drainage subgrade, sub-base, and base course in place where deemed necessary.

H. Curbs. Where bituminous curbing is required on all roads unless otherwise directed by the Selectmen, the paved portion of the road shall be increased to twenty-four (24) feet in width unless it is 1,500 linear feet or less in which case it shall be increased to twenty-six feet in width in order to receive the bituminous curbing. Curbs shall be “Connecticut Cape Cod” type machined-formed, having a cross section approved by the Board of Selectmen, a height of four and five eighths (4-5/8) inches and base width of twelve and one half (12-1/2) inches. The curb material method of

construction shall conform to Form 813 816-2004, Section M.04 and Section 8.15 or as amended. Where driveways exist or are planned, depressed curbing must be installed. The surface of the pavement where the curbing is to be contacted shall be cleared of all loose and foreign material, shall be dry and shall be coated with an R.C.-2 or other bitumen just before placing the material. The material shall be properly compacted to the required cross section by use of a suitable machine specifically designed for the purpose. After completion of the curbing, traffic shall be kept at a safe distance for a period of not less than twenty-four (24) hours and until the curbing has set sufficiently to prevent injury to the work. The requirements of C.G.S section 7-118a shall be complied with wherever applicable. See drawing entitled, “Curbed Roadway Cross Section, Town of Barkhamsted”, which drawing is hereby made a part of this Ordinance.

I. Slopes: Restoration and sight distance.

- 1) Curb-less Road Slopes. All roads shall be graded to a total width of forty (40) feet. Road cross slopes shall be minus zero and four hundredths (0.04) foot per linear foot to form a crown; the eight foot shoulder cross slope shall be minus zero and eight hundredths (0.08) foot per linear foot, allowing the shoulder to drain away from the road to low impact development drainage best management practices (BMP's). Road embankments are to be sloped in this manner: cut areas not less than (1) on two (2) (slope vertical or horizontal); fill areas four (4) feet or less in depth, one (1) on four (4), and four (4) feet or more in depth, one (1) on two (2).
- 2) Curbed Town Road Slopes: All roads shall be graded to a total width of ~~thirty four (34)~~ thirty-six (36) feet. Town road cross slopes shall be minus ~~two hundredth (0.02)~~ four hundredths (0.04) foot per foot to form a crown; the ~~four~~ six foot shoulder cross slope shall be plus zero and eight hundredths (0.08) foot per linear foot, allowing the shoulder to drain to the Town road. Town road embankments are to be sloped in this manner: cut areas not less than on (1) on two (2) (slope vertical on horizontal); fill areas four (4) feet or less in depth, one (1) on four (4), and four (4) feet or more in depth, one (1) on two (2).
- 3) Restoration. All earth slopes and areas of distributed soil shall be ~~fertilized~~ loamed with six-inch minimum depth after compaction to prevent settlement behind curbing, seeded and hay mulched. The areas to be seeded shall be made viable and receptive. The entire seeded area shall be given a complete cover of hay mulch. All areas and spots that do

not show prompt catch shall be reseeded at ten-day intervals until growth of grass is established over the entire area.

- 4) The Board of Selectmen may require the removal or lowering of embankments adjacent to ~~street~~ Town road intersections in order to assure adequate sight distance at the intersection. No cut or fill sections beyond the right-of-way shall extend into property outside of subdivision or property not owned by the applicant, unless appropriate slope rights are obtained for the town.
- J.** Guiderails or single posts. Guiderails or single posts shall be installed along all ~~streets~~ Town roads where there will be an embankment, which has a depth of four (4) feet or more occurring within twenty (20) feet of the proposed pavement. Post shall conform to Form ~~813~~ 816-2004, Section M.10 .as amended, and shall be installed in accordance with Form ~~813~~ 816-2004, Section 9.01 .as amended, spaced ten (10) feet on center with a minimum tip diameter of six (6) inches and a minimum length of six (6) feet six (6) inches and a maximum length of six (6) feet eight (8) inches.
- K.** Site cleanup. All large rocks, boulders, felled trees, stumps, brush or other debris shall be removed from the ~~street~~ Town road right-of-way and shall be deposited and properly disposed of under the supervision of the Selectmen.

§166-16 Storm drainage design standards.

Storm drainage for ~~streets~~ Town roads shall be planned and designed in accordance with the standards of Article VII of Chapter 170, the Town of Barkhamsted Subdivision Regulations, and the following specific standards and requirements:

- A.** General. Sufficient pipe shall be installed to carry existing watercourses in the ~~street~~ Town road right-of-way and to drain both the proposed ~~street~~ Town road or ~~streets~~ Town roads and extensions thereof or other ~~streets~~ Town roads which, based on topography, will be served by the same drainage system. For curbed roads, no open ditches or channels shall be provided in the ~~street~~ Town road right-of-way unless sufficient additional right-of-way in excess of the minimum standard width is provided so as to maintain the standard cross section and proper provision is made for protective guideposts or rails. ~~Street~~ Town road drainage systems shall take into account the effects upon downstream systems, shall be coordinated with general drainage requirements for the use and development of the abutting land and shall provided for the following:
- 1) The use, protection and improvement, if needed, of the natural drainage system.

- 2) The interception of channel drainage coming from any adjoining property or ~~street~~ Town road.
 - 3) The protection of locations, both in use or proposed, necessary for onsite sewage disposal and water supply facilities.
 - 4) The prevention of flooding and soil erosion.
- B.** Runoff calculations. (See Article VII of Chapter 170, Town of Barkhamsted, Subdivision Regulations). The method of determining runoff shall be as specified in Article VII of Chapter 170, Town of Barkhamsted, Subdivision Regulations. The Implementation of Low Impact Development techniques and best management practices (BMP's) shall be utilized where feasible and appropriate for the specific site conditions. ~~If requested by the Board of Selectmen,~~ The applicant's consultant shall provide the commission with drainage computations to determine the adequacy of stormwater systems, including the spacing of catch basins and the need for double basins in roadway sags. (Amended during codification; see Ch.1, General Provisions, Art.II.)
- C.** The design of storm drainage best management practices (i.e. drainage swales, infiltration swales, etc.) shall be designed as per the 2000 Connecticut Department of Transportation Drainage Manual and the 2004 Department of Environmental Protection Stormwater Quality Manual, both as amended.
- D.** Pipe design. The minimum size of stormwater pipe shall be fifteen (15) inches in diameter. Coefficients used in the design for reinforced concrete pipe shall be ~~N=0.013~~ N = 0.015, smooth wall HDPE N=0.012, and for asphalt covered corrugated metal pipe, N = 0.021. The minimum slope of pipes shall be five-tenths percent (0.5%). Pipe size and slope shall be such that the head on the invert shall be contained without damage to any adjacent property. Pipe, except for underdrains, shall be laid on straight alignments, both horizontally and vertically, with catch basins or manholes spaced no more than ~~four hundred (400)~~ three hundred (300) feet apart, providing access at all deflection points or at the junction of two (2) or more lines. The open end cover over the top of the pipe shall be twenty-four (24) inches. Culverts under ~~streets~~ Town roads shall extend to the edge of the right-of-way.
- E.** Discharge.
- 1) The discharge of all stormwater that has been collected or otherwise

artificially channeled shall be into suitable natural streams, wetlands or into town or state drainage systems with adequate capacity to carry the discharge. Otherwise, there shall be no discharge onto or over private property within or adjoining the ~~street~~ Town road unless proper easements and discharge rights have been secured by the applicant, such easements and rights are transferable to the town and there will be adequate safeguards against soil erosion and flood danger.

- 2) Easements shall be at least thirty (30) feet in width, offset no less than ten (10) feet and no more than twenty (20) feet, respectively, from the storm drain and extended to a suitable existing storm drain or an adequate natural watercourse or wetland. Greater easement width may be required for ~~ditches/channels~~ drainage swales or unusual site conditions. No stormwater shall be diverted from one (1) watershed to another. Discharge shall be made in a manner that protects streams, ponds, and wetlands from pollution.

- 3) The 2000 Connecticut Department of Transportation Drainage Manual and the 2004 Department of Environmental Protection Stormwater Quality Manual, both as amended, shall be utilized within the storm drainage design.

166-17. Storm drainage construction standards.

Storm drainage shall be constructed in accordance with the following standards:

- A. Pipe. All storm drainage pipes within paved road areas shall be Class 4 reinforced concrete pipe (RCP) unit and shall conform to the requirements of Form ~~813~~ 816-2004, Section 6.51 ,as amended,. The minimum cover over all storm drainage within the paved road areas shall be three (3) feet. Where water is encountered in the pipe trenches or where the Selectmen shall direct, underdrains shall be either slotted RCP, ~~perforated ACCMP or perforated aluminum pipe~~ or perforated PVC SDR35 pipe, or smooth wall HDPE and shall conform to the requirements of Form 816-2004, Section 7.51 ,as amended,. In general, underdrain shall be installed on the uphill side of the road. Reinforced concrete pipe (RCP), Class IV, shall normally be specified for storm drainage systems, except when fill heights require Class V.
- B. Methods. Storm drainage pipe shall be laid in accordance with

Section 6.51.03 of the Connecticut Department of Transportation
Form 813 816-2004.

- 1) Prior to laying pipe, the trench shall be excavated to the required depth, the bottom of which shall be graded to afford a uniformly firm bearing for the pipe throughout its length. Where rock is encountered, it shall be excavated to not less than twelve (12) inches below the bottom of the trench, and this depth shall be refilled with crushed stone and thoroughly tamped and shaped. Where the nature of the foundation material is poor, it shall be removed and backfilled with gravel or crushed stone approved by the Board of Selectmen or its agents.
- 2) All pipe shall be carefully laid, true to the lines and grades given, hubs up grade and with the ends fully entered into adjacent hubs.
- 3) Line and grade stakes shall be set by a Connecticut licensed land surveyor or professional engineer and shall be maintained in good order until the work has been inspected and approved by the Board of Selectmen. ~~Where necessary, three (3) batter Boards shall be maintained in place at all times when laying pipe and shall not be spaced more than thirty (30) feet apart. The use of pipe lasers is preferred.~~ A pipe laser level shall be required when laying pipe.
- 4) In sandy, silty, or other soil in which there is a danger of washing or cave-ins, the joints of concrete pipe shall be thoroughly wetted and caulked.
- 5) All metal pipes shall be carefully joined and firmly clamped together by approved connecting bands, which shall be properly bolted in place before any backfill is placed.
- 6) Backfill underdrain shall be ~~three eights inch~~ three eights or one half inch broken stone (Form 816-2004 Section M.01.01, as amended,) to proposed grade. ~~around and to eight (8) inches above the top of the pipe. The remainder of the trench shall be filled with sand (Form 813, Section M.03.01-02) to the subgrade. The top of the underdrain trench shall be protected by a six inch layer of subbase material or gravel placed over the underdrain trench immediately after its completion.~~ See cross-section in accordance with the drawing entitled “Curbless Roadway Cross Section, Town of Barkhamsted” and/or “Curbed

Roadway Cross Section, Town of Barkhamsted”, which drawings are hereby made a part of this Ordinance.

- 7) Riprap conforming to the requirements of Form ~~813~~ 816-2004 Section 7.03 and M 12.02-03 ,as amended, shall be placed at inlets, outlets and in channel beds at bends or curves as required to prevent scouring, erosion and/or siltation of streams and culverts. Computations as per the 2000 Connecticut Department of Transportation Drainage Manual as amended shall be submitted for type and sizing of riprap outfalls.
- 8) The inlets and outlets of all exposed drainage culverts shall be protected by concrete flared ends, concrete or mortared stone headwalls, endwalls and where necessary, appurtenant wingwalls. All endwalls shall conform to the requirements set forth in Form ~~813~~ 816-2004 Section 5.06 ,as amended,. (Note: the Board of Selectmen or its agent(s) may require Guiderails).
- 9) Catch basins, manholes, drop inlets, endwalls and other related drainage structures shall be constructed in accordance with Form ~~813~~ 816-2004 Section 5.07 ,as amended,