



STANDARD SPECIFICATIONS  
FOR CONSTRUCTION OF PUBLIC UTILITIES IN  
EXETER, NEW HAMPSHIRE

TOWN OF EXETER, NEW HAMPSHIRE  
DEPARTMENT OF PUBLIC WORKS

REVISED: MARCH 2002

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## INTRODUCTION

These specifications implement and supplement Town of Exeter ordinances by providing specifications and procedures to install and maintain gravity sewers, water mains, drain lines, construct roads, sidewalks, bridges, and erect signs, as well as providing procedures to excavate within the right-of-way of town streets.

All construction shall also conform with the latest edition of "Standards of Design for Sewerage and Wastewater Treatment Facilities", New Hampshire Department of Environmental Services; American Water Works Association (AWWA) Standards; and State of New Hampshire Department of Public Works and Highway Standards. If conflicts occur, the stricter documents will govern.

If implementing these standards would result in construction adverse to the best interest of the public, the Public Works Director or their designee may waive or modify portions of these standards.

Non-compliance will not be permitted or tolerated and the Town will prosecute violators to the fullest extent allowable by law.

It shall be the responsibility of contractors and others, doing work under these Standards, to assure that they have and are using the latest revision of this document.

END OF SECTION

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**SECTION A**

**GENERAL REQUIREMENTS**

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## SECTION A

### GENERAL REQUIREMENTS

#### I. DEFINITIONS:

##### A. The following definitions shall apply:

1. "Excavation" shall mean any opening in the surface of a public place made in any manner whatsoever, except an opening in a lawful structure below the surface of a public place, the top of which is flush with the adjoining surface and so constructed as to permit frequent openings without injury or damage to the public place.
2. "Public place" shall mean any public street, way, place, alley, sidewalk, park, square, plaza or any other similar public property owned or controlled by the Town and dedicated to public use.
3. "Town" shall mean the Town of Exeter or its Public Works Department.
4. "Sub-structure" shall mean any pipe, conduit, tunnel, duct, manhole, vault, buried cable or wire, or any other similar structures located below the surface of any public place.
5. "Facility" shall mean any pipe, pipeline, main, service, trap, hydrant, manhole, meter, gauge, regulator, valve, conduit, wire, tower, pole, pole line, anchor, cable, junction box or any other material structure or object of any kind or character, whether enumerated herein or not, which is, or may be, lawfully constructed, left, placed, or maintained in, upon, along, across, under, or over any public place.
6. "Person" shall mean any person, firm, partnership, association, corporation, company or organization of any kind.
7. "Utility" shall mean a private company, corporation, or quasi-municipal corporation under the direction and control of the Public Utilities Commissioner.
8. "Newly constructed, reconstructed or paved streets" shall mean any street which has been newly constructed, reconstructed or paved within the past five years.

#### II. GENERAL:

- A. All work being done on any water, sewer and drainage lines, outside of the Public Works Department's normal business hours, must have a department employee present to inspect the work at the expense of the contractor. Contractor must request such service twenty-four hours in advance. Or, in the case of an unanticipated delay, prior to 3:00 p.m. weekdays. No work will be done on Saturdays or Sundays - unless the Public Works Director grants special permission.

**Important:** Inspections are required in many instances of construction. It is the responsibility of the contractor to request an inspection and to ensure that it is completed at the appropriate time, as well as obtaining a written certification of approval.

- B. It is drawn to the contractor's attention that all work is subject to the Safety and Health Regulations (CFR 29, Part 1926, and all subsequent amendments), as promulgated by the U.S. Department of Labor. Contractors are urged to become familiar with the requirements of these regulations.

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- C. When working within the right-of-way of a State Highway, the contractor shall be bound by the conditions, restrictions and regulations made by the State Department of Transportation. All such regulations shall be in addition to those set down in these specifications.
- D. Excavation, dewatering, sheeting and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure of any work previously completed.
- E. The contractor shall obtain all permits, including excavation permits, which may be necessary for the prosecution of the work. See Index and sample copies.
- F. Where water, sewer or drain lines cross private property, the Town requires that easements be obtained and copies supplied to the Town.
- G. The contractor shall provide suitable and adequate room for materials and equipment during the progress of the work. They shall conduct their work so as to minimize public inconvenience and shall notify property owners and merchants that may be affected by the work.
- H. The contractor shall provide such traffic barriers and police protection, as the Chief of Police may require.
- I. Inspection of work by the Town does not imply acceptance. All periodic work will be subject to final inspection and testing procedures before acceptance.
- J. The contractor shall coordinate all work with appropriate utilities and shall notify the Town Water and Sewer Department and Dig Safe seventy-two (72) hours in advance of any excavation in town streets or rights-of-way.
- K. The contractor must obtain a valid utility pipe installer's license and the job supervisor or foreman must be certified by the Town, prior to working on any water, sewer or drainage pipes that are in a town street or right-of-way, or that will connect or may be connected, to a town water, sewer or drainage system. A certified supervisor or foreman must be present at the job site at all times during construction.
- L. The Town shall approve alternate or substitute materials and methods prior to their use. The Town's decision on suitability of an alternate or substitute shall not be disputed.
- M. The contractor is responsible for insuring that their operation will not cause or contribute to water pollution or degradation. The contractor shall also take all necessary steps to prevent erosion due to their efforts. Erosion control methods shall be approved by the Town and the U.S. Soil Conservation Service.
- N. The contractor shall develop a schedule for the construction and placing in service of the new works, subject to the approval of the Town. All work involving cutting into and connecting to the existing facilities shall be planned so as not to interfere with operation of the existing facilities for the shortest possible time and when the demands on the system best permit such interference, even to the extent of working outside of normal working hours to meet these requirements.
- O. Plans for water, sewerage and drainage connections must state approximate quantities as per "New Hampshire Subdivision and Individual Sewage Disposal System Design Rules", latest revision.
- P. The licensed contractor responsible for installation, repair or modification of any water, sewer or storm drainage lines must have in their possession copies of a valid "Application for Water and Sewer and/or Storm Drainage Service Work" issued for the project by the

- Public Works Department, 13 Newfields Road, prior to beginning work. Failure to obtain appropriate application prior to work will result in license revocation for thirty (30) days.
- Q. If required by state regulations, plans for water and sewer mains and facilities must be approved by the New Hampshire Department of Environmental Services prior to construction.
- R. Prior to any construction work, all special assessment fees must be paid.
- S. The contractor shall immediately notify the Public Works Department and the utility company concerned, in the event of damage to any property or facility.
- T. Permit, License and Installation Requirements:
1. Excavation permit: needed to excavate, disturb or enter any Town street or right-of-way.
    - a. Fee: in accordance with Board of Selectmen's Schedule of Fees.
    - b. Specifications: \$15.00 per copy.
    - c. License/Permit Bond: \$500.00/per 100 sq. ft. Bond or \$5,000 blanket bond to be issued by an acceptable surety company or bank for a full two-year period.
    - d. Insurance:
      - Liability Coverage: General Liability \$500,000 combined single limit comprehensive form; Broad Form property damage; Independent contractor's Insurance; Product/Completed Operator's Insurance.
      - Vehicle Insurance: \$500,000 Combined Single Limit, Comprehensive form, Hired/Non-Owned.
      - Workers Compensation: Statutory Limits, Employer Liability \$500,000.

Note: These certificates shall contain a provision that the insurance company will notify the certificate holder and Town by registered mail, at least fifteen (15) days in advance of any cancellation or material change.

2. Sewer Service Installation Requirements: needed to repair or install any service or pipe outside of a building foundation wall that connects to the Town system.
  - a. Utility Pipe Layer's license.
  - b. Commercial or non-single family home:
    - Copy of approved State of NH discharge permit.
    - Copy of Preliminary Water, Sewer and Drainage Application.
  - c. Copy of approved application for Sewer Service Work.
3. Water Service Installation Requirements: needed to repair install any service or pipe outside of a building foundation wall that connects to the Town system.
  - a. Utility Pipe Layer's License.
  - b. Commercial or non-single family home:
    - Copy of Preliminary Water, Sewer and Drainage Application.
  - c. Copy of approved application for Water Service Work.
  - d. Copy of approved application for fire line service, when required, with fees paid.
4. Storm Water Drainage Installation Requirements: needed to repair or connect to any Town drainage system.
  - a. Utility Pipe Layer's License.
  - b. Copy of Preliminary Water, Sewer and Drainage Application.

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- c. Copy of approved application for Storm Drainage Work.
- 5. Driveway Permit: needed to construct any driveway, road or entryway onto any Town street or right-of-way.
  - a. Fee: \$10.00
- 6. Utility Pipe Layer's License: needed to install, alter or repair any water, sewer or drainage pipe that will or may connect to the Town system.
  - a. Fee: \$25.00/year.
  - b. Specifications: \$15.00 per copy.
  - c. Test \$10.00; Picture I.D. \$5.00; Retest, \$10.00.
  - d. Certification: Job foreman or supervisor must pass an exam, administered by the Town, by correctly answering fifteen out of twenty questions pertaining to the Town's regulations. The cost for the exam is \$10.00. If the applicant should fail, they must wait a period of seven days, prior to retaking the exam. (A fee of \$10.00 will be charged for re-testing.)
- 7. License and Permit Distribution Points
  - a. State of New Hampshire Declaration of Sewage Discharge .....Planning Office
  - b. Preliminary Application to Connect to Water, Sewer or Stormwater Drainage System.....Planning Office
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### III. PROTECTION, CARE AND RESTORATION OF PROPERTY AND UTILITIES

- A. Excavating machinery, cranes and all other heavy equipment shall be operated with care to prevent damage to trees. Where required, trees and utility poles within or adjacent to the work site shall be braced by suitable means. Only those trees that are in direct physical interference with the work may, with the approval of the Town, be removed.
- B. All cutting of branches, limbs, trunks and roots shall be smoothly and neatly done without splitting or crushing. In case of cutting or unavoidable damage to branches, limbs and trunks of trees, the cut or damaged portions shall be neatly trimmed so as to minimize water penetration.
- C. At the beginning of the planting season that follows the original seeding of permanent grass, the seeded areas shall be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the contractor at their own expense.
- D. Cultivated hedges, shrubs and plants, which might be injured by the Contractor's operation, shall be protected by suitable means or shall be dug up and temporarily replanted and maintained and, if required, replaced.

- E. All lawns, paved surfaces, roadways and structures which have been damaged by the contractor's operations shall be restored to a condition at least equal to that in which they were found - immediately prior to the beginning of operations.
- F. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end.

#### IV. EXCAVATION

- A. The contractor shall make excavations in such manner, and to such widths, as will give suitable room for building the structures or laying and jointing pipe; shall furnish and place all sheeting, bracing and supports; shall do all pumping and draining; and shall render the bottom of the excavation firm and dry, and in all respects acceptable; and shall dispose of surplus or unsuitable materials.
- B. While excavating trench, care must be taken to prevent disturbing soil beneath limits of bedding material. All loose material shall be removed from the bottom of the excavation so that the bottom shall be in an undisturbed condition.
- C. Loam, topsoil and reusable surplus material shall be carefully removed from areas within the excavation and separately stored to be used again, as directed. If the contractor prefers not to separate surface materials, they shall furnish clean loam, topsoil or gravel, at least equal in quantity and quality to that excavated. When excavations are made in paved surfaces, the pavement shall be removed so as to provide a clean uniform edge with a minimum disturbance of remaining pavement.
- D. If pavement is removed in large amounts or pieces, it shall not be mixed with other excavated material, but shall be disposed of away from the work site before the remainder of the excavation is made.
- E. The contractor shall furnish, place and maintain such sheeting and bracing as may be required to support the side of excavation to prevent personal injury or to prevent movement which might in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures from undermining or other damage.
- F. All sheeting and bracing not left in place shall be removed carefully so as not to endanger the work or other structures, utilities or property. All voids left or caused by withdrawal of sheeting shall immediately be back filled with sand and compacted by ramming with tools especially adapted for that purpose, or by other means as may be directed.
- G. At all times during construction, the contractor shall temporarily provide ample means with which to remove and dispose of all water entering trenches and other excavations. Excavations shall be kept dry until the structures, pipes and appurtenances to be built therein have been completed to such extent that they will not be damaged. At that time, the contractor may remove such temporary means and devices.
- H. During cold weather, all earth exposed at the bottom of excavations shall be protected against freezing by covering it with tarpaulins or straw, or where necessary, by the use of heating devices.
- I. All water pumped or drained from the work shall be disposed of in a manner satisfactory to the Town, without undue interference with other work or damage to pavements, lawns or private property.

- J. If, in the opinion of the Town, the material below the depth to which excavation for roads, structures and pipes would normally be carried is unsuitable for foundation, it shall be removed and shall be replaced with gravel, screened gravel, crushed stone or concrete, as determined by the Town.
- K. Where the bottom of the excavation shall, by error of the contractor, have been taken to a depth greater than the depth specified or shown on the drawings, said condition shall be corrected by refilling to the proper grade with compacted screened gravel, crushed stone or concrete.
- L. All blasting operations shall be conducted in full compliance with all the laws of the State, all local ordinances and with all possible care, so as to avoid injury to persons and property. The rock shall be well covered, and sufficient warning shall be given to all persons in the vicinity of the work before blasting. Care shall be taken to avoid injury to all water pipes, gas pipes or other structures, and to private property. The contractor, in addition to observing all municipal and other ordinances relating to the storage and handling of explosives, shall also conform to any further regulations that the Town shall deem necessary.
- M. If rock below the required depth of excavation is shattered as a result of holes having been drilled too deeply, excessive charges of explosives having been used or for any other causes related to the Contractor's activities, and, if in the opinion of the Town, said shattered rock is unsuitable for foundations, the shattered rock shall be removed and excavation refilled as required by the Town at the contractor's expense.
- N. Excavation near an existing structure shall not be allowed below the bottom of the foundation without shoring the excavation with sheeting. The contractor's attention is directed to the fact that other underground utilities may exist within, or immediately adjacent to, the areas of proposed construction. Information as to the location of these utilities may be available. However, this information is subject to field verification by the contractor. Any information furnished as to the location of these utilities shall be regarded as unverified and without guarantee. All utility lines shall at all time be located on the ground with pipe location equipment well ahead of the work. All such locations shall be plainly marked by coded paint symbols in pavement areas, or in other areas by marked stakes. Only manual methods of excavating shall be employed around buried utilities. All utility services shall be supported by suitable means provided by the contractor, so that the services do not fail.
- O. Unless otherwise approved or directed by the Town, back filling from one foot above pipelines will be compacted in twelve (12) inch lifts using a vibratory plate compactor. Acceptable levels of compaction may be determined by proctor density testing.
- P. The extent of excavation left open at any one time will be controlled by the conditions, but the contractor shall not have more than 100 feet of trench open at any one time for each working crew.
- Q. The Town may require the contractor to control dust through sweeping and/or application of calcium chloride or sprinkling the area.
- R. Surplus material, which is not used as fill or backfill, is the property of the Town when taken from Town streets or rights-of-way and shall be removed from the site and deposited as directed by the Town or disposed of by the contractor, as directed by the Town.

V. REPAIR OF UTILITIES:

- A. When excavations are to be made near existing underground utilities, or damage occurs to underground utilities, the contractor must notify the owner of the effected utility and the Town.
- B. Water and sanitary sewer lines will be repaired in accordance with the Town's specification. The Town, prior to back filling, must inspect repair work.
- C. The contractor shall pay the Town for any costs incurred by the Town, as a result of repairs to any damaged water, sewer or drain lines.

VI. REPAIR OF PAVEMENTS:

- A. The contractor shall repair all damaged paved areas in strict accordance with the Town's "Specifications for Construction in Exeter, New Hampshire, Section F, Procedures and Specifications for Excavations Within the Right-of-Way of Town Streets."

VII. RECORD DRAWINGS:

- A. The contractor shall maintain one record copy of all specifications, drawings and shop drawings at the site. The documents shall be kept in good order and noted to show all changes made during the construction process.
- B. The contractor shall submit to the Town, within ten days after the completion of contract, one set of "as built" drawings containing all changes, additions or deviations from the original set of drawings. Record prints shall accurately reflect locations, depths and character of all buried and covered works, as well as finished roadway and elevation of all structures and appurtenances, groundwater elevations and ledge encountered.
- C. Record drawings for Planning Board approved subdivisions shall consist of three complete sets of those approved drawings updated to accurately reflect locations, depths and character of all buried and covered works, as well as any other changes in locations or elevations. Ground water and ledge encountered shall be shown on the profiles. Plans shall be identified as "as built" and stamped by the design engineer as such.
- D. The Town will require submission of detailed plans of all proposed water, sewer and drainage improvements, prior to construction.

VIII. CLEANUP:

- A. During construction, the contractor will make every effort to maintain a clean work site, free from litter, debris and clutter. Upon completion of project, contractor must thoroughly clean the site to a condition as good or better than existed, prior to construction.

END OF SECTION

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**SECTION B**

**SPECIFICATIONS FOR INSTALLATION  
OF  
SANITARY SEWERS AND APPURTENANCES**

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## SECTION B

### SPECIFICATIONS FOR THE INSTALLATION OF SANITARY SEWERS AND APPURTENANCES

#### MATERIAL AND SPECIFIC INSTALLATION REQUIREMENTS

##### I. PIPE

###### A. GENERAL REQUIREMENTS

1. Poly-vinyl chloride (PVC) pipe shall be used for all gravity sewers, up to and including, 27 inches in diameter.
2. Gravity sewers, 30 inches and larger in diameter, shall be reinforced concrete pipe.
3. All pipe couplings and fittings shall be produced by a manufacturer approved by the Town.
4. The minimum size sanitary sewer shall be eight (8) inches.
5. The minimum size service pipe shall be four (4) inches.

###### B. POLY-VINYL CHLORIDE PIPE (PVC)

1. Poly-vinyl chloride pipe and fittings, 4" to 15", should conform to ASTM D 3034 (SDR35). For 19" to 27", it shall conform to ASTM F679 and PVC polymer specification, ASTM D1784. In addition to joint, shall conform to the requirements of ASTM F-447, D-1869, C-361 or C-443.
2. The manufacturers' recommendation for handling, storage and installation shall be strictly observed. Gaskets and gasket lubricant material shall be furnished by the manufacturer of the pipe.
3. PVC pipe of the size and class indicated on the drawings shall have rubber rings, gaskets and push on joints.
4. PVC pipe is a flexible conduit and it will become "egg" shaped if installed without proper side support. PVC sewer pipe shall be bedded in screened gravel or 3/4" pea stone to the spring line of the pipe, followed by back filling with sand to the top of the pipe. After compaction on both sides, sand shall be placed to one foot over the pipe, followed by compaction with a suitable vibratory plate compactor.
5. The completed installation of PVC pipe shall be subjected to roundness test by pulling mandrel through each length of pipe. Failure to pass this test will be cause for replacement.
6. PVC sewer pipe comes in long lengths and is subject to shear failure if there is a substantial variation in bedding. Care shall be taken to provide uniform depth of bedding in areas where the bottom conditions change in firmness (for example, where ledge or pipe lines are encountered).
7. Two joints shall be required at all manholes or structures within a five foot distance from that structure.
8. Vibratory compaction shall be required one foot above the pipe at the top of the sand layer and at 12 inch lifts to finish grade.

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C. REINFORCED CONCRETE PIPE:

1. Reinforced concrete pipe shall be manufactured in accordance with reinforced concrete spun on roller suspended sewer pipe ASTM C76. Pipe manufactured by the "packer head" method will not be accepted.
2. Concrete pipe shall be reinforced with a cage, or cages, formed of circumferential and longitudinal steel. The structure shall be constructed with a self centering joint and round rubber gasket and be capable of accommodating normal movement due to earth settlement and extremes of temperature. Elliptical reinforcement will not be permitted.
3. Pipe shall be of the strength and/or class, size, and interior and exterior finish as approved by the Town and in conformance with the requirements of the State of New Hampshire, and each piece shall be marked to identify the manufacturer, pipe strength, and date of manufacture. Concrete pipe from different manufacturers may be joined together only at manholes.
4. All pipe fittings and specials shall be produced by a manufacturer approved by the Town and the contractor shall submit, before manufacture, shop drawings showing full details and joint dimensions for all pipe and fittings.
5. Unless otherwise specified, minimum laying length of pipe shall be 7 1/2 feet.
6. Pipe strength, or class, shall be as required by the Town, but in no case, less than Class III.
7. The quality of all materials and the finished pipe shall be subject to inspection and approval by the Town. Such inspection may be made at the place of manufacture, or at the work site, or at both places, and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements. All damage to precast sections, that is not cause for rejection, shall be repaired. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout or other accepted method. Sufficient time shall be allowed for curing before precast sections are installed. Pipe, rejected after delivery, shall be marked for identification and shall be removed from the job site.
8. All concrete pipe to be installed may be inspected at the plant for compliance with these specifications by an independent testing laboratory selected by the Town. The contractor shall require the manufacturer's cooperation in these inspections.
9. A minimum of two percent of pipe and specials shall be hydrostatically tested at a minimum internal pressure of five psi for a minimum time period of 15 minutes. Pipe with obvious leaks of magnitude which will prevent compliance with the leakage requirements specified elsewhere will be rejected. The method used to test the pipe shall be subject to the Town's approval.
10. A minimum of two percent of pipe and specials shall be tested under the three edge bearing tests specified in ASTM C76.
11. Manufacturer's certificate of compliance shall be furnished to the Town, prior to installation.
12. Joints for all sanitary sewer pipe, fittings and specials shall be of the bell and spigot type and sealed by a round rubber "o" ring gasket contained in an external groove in the spigot joints and rubber gaskets shall conform to the requirements specified in ASTM 361, except where upgraded for pressure applications or for infiltration and exfiltration allowances. Joints shall be assembled in the field in strict accordance with the recommendations of the pipe manufacturer.

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13. Appurtenances and special shapes shall be manufactured in accordance with the applicable paragraphs of Reinforced Concrete Culvert, Storm Drain and Sewer Pipe, ASTM 076, this clause of the specifications and as approved by the Town. Unless shown or specified otherwise, they shall be designated and manufactured equal to the diameter, class and joint of the pipe with which they are to be used. All house connection tees shall be manufactured in the plant.
14. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces and abrasion of the pipe coating.
15. Unless otherwise specified, all reinforced concrete pipe used for gravity sewer shall be lined to prevent attack of concrete and mortar surfaces by hydrogen sulfide or sulfuric acid. Lining shall be a coal tar epoxy specifically resistant to sulfuric acid fumes. Lining shall be "Tneme-Tar 413", as manufactured by Tnemec; "Bitumastic 300-M", by Koppers; "Mobile 64-J-2 Tar Coat", "Ceilcote", "Flaketar", or approved equal. Contractor must submit and receive approval of material an installation before lining is applied. Application of material shall be in strict accordance with manufacturer's approved printed instructions.

## II. MANHOLES

- A. Manhole components shall be stored at the site in such a manner as to prevent damage before installation. All precast manhole components shall be lifted and moved by use of suitable lifting slings and plugs that will not damage the precast manhole lip. All damage to precast sections that is not a cause for rejection shall be repaired. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout. Sufficient time shall be allowed for curing before precast sections are installed.
- B. The manholes shall be constructed of precast reinforced concrete manhole sections. The sections shall be a minimum of four feet in diameter. For 24" and greater pipe diameters, manhole sections shall be of the diameter required by the Town. The sections shall conform to the requirements of "Specifications for Precast, Reinforced Concrete Manhole Sections", ASTM C478-80 (AASHTO designation M199-82).
- C. The manhole bases shall be constructed of precast reinforced concrete sections with Monolithic Bases. The contractor shall submit to the Town, for approval, manufacturer's shop drawings.
  1. Precast bases: The bases shall be integrally cast and shall consist of manhole bottom and walls which shall extend a minimum of six inches above the top of the highest inflowing sewer. The top of the base section shall be carefully formed to receive the tongue of the barrel section. There shall be a minimum distance of four inches between the invert of the lowest outflowing sewer and floor of the precast base to provide for the construction of a formed invert and bench wall within the manhole. No more than two lift holes shall be cast in the bases.
  2. Manholes, four feet in diameter, shall have a bottom at least four inches thick and a wall at least five inches thick.
  3. Openings in manhole bases for pipe connections shall have KOR-N Seal gaskets, manufactured by Nashua Precast Company, boot gaskets, by Interpace, Inc., or an equivalent, cast integrally in the manhole.
- D. The top of base walls, the ends of reinforced concrete risers and the bottom ends of precast tops shall be so formed that when risers and tops are assembled with the base, they will

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- make a continuous manhole joints shall be of such design as will permit effective joining and placement without irregularities in the interior wall surface of the manhole.
- E. Manhole barrels shall consist of riser and top sections with a minimum wall thickness of five inches. The top section shall be an eccentric conical section with thickened upper walls with the smallest inside diameter equal to 30 inches, to receive the manhole frame and cover. No more than two lift holes shall be cast in each barrel or top section.
  - F. O-ring gaskets for joints between manhole sections shall conform to ASTM C443-72.
  - G. Base section risers and cover shall be produced by only one manufacturer.
  - H. No manhole steps are to be provided.
  - I. All castings for manhole covers and frames and other purposes shall be close-grained, tough gray iron, free from cracks, holes, swells, and cold shuts. The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal. All manhole castings shall be made accurately to the pattern and to the dimensions specified with carefully machined bearing surfaces, with the word, "Sewer" cast in the cover.
  - J. Allowances shall be made in the patterns so that specified thickness shall not be reduced. All lids, which "rock" and do not lie solid after construction is finished, will be rejected and shall be replaced by adequate lids. No plugging, burning in, or filling will be allowed. Covers shall fit the frames in any position. All castings shall be carefully coated, both inside and out, with coal tar pitch varnish. The varnish shall be made from a good quality of coal tar, with sufficient oil added to make a smooth coating, tough and tenacious when cold and not brittle nor with any tendency to scale off.
  - K. The total weight of each manhole cover and frame will not be less than 400 pounds. The opening, inside diameter, shall be 30 inches and the minimum total height shall be 7 inches.
  - L. Weight and dimensional tolerances shall not exceed those permitted by ASTM Standards.
  - M. Brick shall be made of clay or shale and shall be whole, sound, burnt hard entirely through, straight brick, uniform in structure with true even faces, free from stones, pebbles, masses of lime, checks and cracks extending into the body of the brick. When struck with a trowel, bricks shall give a clear, ringing sound and a fracture shall show uniform and compact structure. Bricks shall comply with ASTM Serial Designation C32-73, Grade SS (AASHTO Designation M91-78).
  - N. Manhole bases shall rest upon and be uniformly supported by a six-inch mat of compacted screen gravel or crushed stone placed over a base of sound, level, undisturbed earth.
  - O. Pipes entering precast sections of manholes shall be set securely in the precast opening at the correct line and grade. Sewers to be connected to existing manholes or other similar structures, where no stub or other opening has been provided, shall be made through a sewer opening or minimum diameter, cored in the wall of the structure at the required elevation and location. A KOR-N-SEAL boot shall be provided. At manholes, the annular space outside of the pipe shall be filled and sealed with premixed epoxy, grout or an approved equal. The outer surface of any sealing mortar shall be given a coating of heavy bitumastic waterproofing compound, a type approved by the Town.
  - P. Manhole sections shall not be set by wedging or placing shims to secure proper level.
  - Q. In constructing manhole drop inlets, the riser and incoming pipe shall be encased and supported with concrete down to undisturbed earth as shown on the detail drawings. Encasing the riser with brick will not be acceptable. Care shall be taken to have all pipes

laid to correct lines and grade before concreting is undertaken. Internal drop inlets are acceptable using up to a 10" pipe in a 4' manhole.

- R. In constructing manholes, all ground water shall be kept away from newly grouted pipe and rings or freshly laid brick work until cement has properly set and until a watertight job is obtained. Manholes which admit ground water after completion shall be repaired.
- S. In precast bases, the flow channels and bench walls in each manhole shall be carefully formed of mortar and brick, to the dimensions indicated on the drawings. Tables shall be lined with brick. Precast and cut pipe inverts shall not be used.
- T. The minimum depth of flow channel shall be equal to  $\frac{3}{4}$  the diameter of the pipe to which it connects. The channel shall be graded to give a smooth, uninterrupted flow through the manhole.
- U. Tables shall be pitched a minimum of one inch per foot from the inside periphery of the manhole to the edge of the flow channel.
- V. The top of all precast manholes shall be brought to proper grade for receiving manhole frames by using not more than three courses of brick.
- W. Mortar, to be used in brickwork, setting manhole frames and parging, shall be prepared by thoroughly mixing one volume of Type II Portland Cement with three volumes of sand and sufficient clean water to produce a rich mass of approved consistency. Mixing mortar on the ground, or any paved surface, shall not be permitted. Sand to be used in making mortar shall be clean, well graded, and shall pass a standard number four sieve.
- X. All mortar, to be used in joining manhole sections, filling lift holes in risers, and in sealing pipe joints in manholes, shall be an approved mixture of sand and cement.
- Y. All mortar work exposed to salt contamination, such as mortar used for setting manhole frames and any parging, shall be sealed with an appropriate concrete sealer.
- Z. Masonry shall not be constructed during cold weather (air temperature below 40 degrees F.) unless precautions are observed.
- AA. The distance between manholes shall not exceed 300 feet.

### III. PIPE INSTALLATION:

- A. Pipes shall be laid true to the invert lines and grades shown on drawings, or as directed by the Town. A variation of  $\frac{1}{4}$  inch or more from the true invert grade on sewers laid on a one percent, or less, grade and  $\frac{1}{2}$  inch or more on sewers laid on grades above one percent, will be deemed sufficient reason to cause the work to be rejected. Work, so rejected, shall be corrected by the contractor at their own expense, in a manner acceptable to the Town. The minimum depth for a sewer line shall be six feet from finish grade to the top of pipe.
- B. The contractor shall demonstrate their proposed methods of maintaining the grade and alignment of pipe during construction with the Town before the start of construction. Methods that will be acceptable for consideration are, but not limited to, the following:
  - 1. Use of transit (only allowed with 1%, or greater, grade).
  - 2. Laser beam, utilizing the equipment's manufacturer recommended procedure for sewer construction.
- C. All gravity sewer pipe shall be installed, according to standard details. When, in the opinion of the Town, unsuitable foundation material is encountered, a greater depth of excavation may be required. The bedding material shall extend upward, around the pipe barrel, to form a positive cradle fitting the bottom half of the pipe barrel, providing a uniform support along the length of pipe section at the required line and grade. Suitable recess shall be

- provided in the bedding to permit adequate clearance for bells, couplings or similar projections. Bedding material shall be spread in six-inch layers, and each layer shall be compacted with 20 pound, hand tampers or pneumatic tampers until the required total depth of bedding has built up. The pipes shall be laid with the spigot ends pointing down stream.
- D. Screened gravel or crushed stone bedding material shall be free from clay, loam, organic matter and meet ASTM C-33, stone size 67.

#### Screened Gravel

Percent Passing	Sieve Size
100%	1"
90 - 100%	3/4"
20 - 55%	3/8"
0 - 10%	#4
0-5%	#8

Where ordered by the Town to stabilize the trench base, graded screened gravel or crushed stone, 1/2 inch to 1 1/2 inch, shall be used.

- E. A sand blanket shall be placed from the spring line to a minimum depth of 12 inches above the crown of the pipe. This material shall be clean sand, free from organic matter and so graded that 90-100% passes a 1/2-inch sieve and not more than 15% will pass a #200 sieve. This blanket may be omitted for concrete pipe, provided that no stone larger than 2 inches is in contact with the pipe.
- F. The contractor should be aware that PVC pipe is a flexible conduit and that care must be taken to achieve the proper size support to obtain a round pipe after installation.
- G. Following the placement of the sand blanket, "suitable material" may be used to fill the remainder of the trench. In general, suitable material will be classified as the material found in the excavation with the exception of debris, pieces of pavement, organic matter, top soil, all wet or soft material, large chunks of clay and peat, all excavated ledge material, and all rocks over six inches in the largest dimension, or any other material which the Town determines will not provide sufficient support or maintain the completed construction in a stable condition.
- H. In "cross county" construction, "suitable material" shall be as described above, except that the Town may permit the use of top soil, loam or mud, if the Town is satisfied that the completed construction will be entirely stable and provided that easy access to the sewer for maintenance and possible reconstruction will be preserved.
- I. Where unstable conditions are encountered, special concrete cradle, or encasement, may be required by the Town. This concrete, and all other unreinforced concrete, unless specified to the contrary, shall be a six bag mix with aggregate no larger than one inch, and it shall extend from undisturbed soil to the mid-diameter of the pipes.
- J. All pipe, fittings and specials shall be carefully inspected in the field, before lowering into the trench. Cracked, broken, warped, out-of-round, or otherwise defective pipe, fittings or specials, shall be removed, rejected and such rejected pipe shall be clearly tagged in such manner as not to deface or damage it; and the pipe shall then be removed from the job site

by the contractor at their own expense. All pipe fittings and specials shall be carefully lowered into the trench with ropes, slings, and proper equipment. Blocking will not be permitted except where the pipe is to be encased in concrete. Any pipe that has grade or joints disturbed, after laying, shall be taken up and re-laid. The interior and ends of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. Every precaution shall be taken, which in the opinion of the Town, is necessary to obtain watertight construction for all joints and all joints with manholes or existing facilities. The contractor shall also take any and all other measures to keep the sewer clean and free from deposits and protect same from injury, until final inspection and acceptance by the Town. Sewer lines and manholes shall be tested for leakage, as the work progresses, in infiltration, exfiltration or air testing, as defined below. If the line is damaged from any cause, or becomes either partly or completely filled with dirt, stones, sand or other debris, the contractor shall make all necessary repairs and remove all such material to the satisfaction of the Town. Upon refusal or failure to do so, it may be done by the Town and the cost thereof shall be charged to the contractor. Before machine back filling shall be done, the Town may require tests, in order to ascertain if the sewer is true to line and grade. In case the test shows poor alignment of the main, misplaced pipe or other defects, such defects shall be remedied by the contractor, to the satisfaction of the Town, before the work of back filling proceeds. Recommendations of manufacturer must be followed in laying pipe with special joints, as specified.

- K. After installation, wye or tee branches shall not be back filled until their location has been determined and recorded by the contractor (by means of horizontal measurements to the nearest downstream manhole and appropriate cross ties) and the depth, below grade, recorded. Branch lines shall be extended to the property line or edge of easement; marked with a ferrous metal rod (for detection); and properly sealed against entrance of water and earth. No flow shall be introduced from the service connections until the main sewer has successfully passed the leakage test specified below and has been approved by the Town. Chimneys should be constructed as shown on the included detail drawings.
- L. On new roadway construction, manholes shall not be brought to finish grade until the base course of asphalt has been applied. The contractor shall provide suitable covers for all structures until such time as the specified frames and covers are installed.
- M. Water and sewer lines in same trench must be designed and constructed in accordance with State of New Hampshire Standards of design.
- N. All connections into municipal sewer lines shall be made gas tight and watertight by the use of a "saddle", appropriate in size to the receiving sewer line.

#### IV. TESTING:

##### A. PIPE:

1. Manholes shall be tested as soon as lines in manholes are tested. Each section of installed line must be visually inspected by the Town, prior to final testing. The pipe shall be true to both line and grade; shall contain no broken pipe; shall show no leaks; shall show neither obstructions or the projection of connecting pipes into the main pipe; and shall contain no debris or other deposits which shall in any way reduce the full cross section area of the pipe. Any section of pipe which does not comply with these

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inspection criteria, as determined by the Town, shall be promptly corrected, replaced or repaired by the contractor at their own expense. Such methods as are employed for the correction shall be approved by the Town. When directed by the Town, the contractor shall remove all debris from manholes and shall thoroughly flush sewers preparatory to testing for water tightness. All sewers, (including manholes, service connections and sewer laterals), constructed under this contract shall be tested under this section and shall satisfactorily meet the test requirements, prior to final acceptance of the work. No exceptions will be permitted from this rule, unless in written orders from the Town. The contractor shall furnish all labor, testing materials and equipment (including plugs and standpipes, etc.); shall perform the tests to the satisfaction of the Town. The contractor shall make their own arrangements for water.

2. Low-pressure air testing of sanitary sewer section shall be used. Sewer pipe installations shall be considered free from breakage or significant leakage when tested with low-pressure air according to recommended procedure. Contractor shall furnish all necessary equipment to perform the tests, including labor.
3. Equipment used shall meet the following minimum requirements:
  - a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
  - b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking. Pipe shall be braced to the opposite side of the manhole to prevent blowing the pipe in, when the pressure is applied.
  - c. All air used shall pass through a single control panel.
  - d. Three (3) individual hoses shall be used for the following connections:
    - i. From control panel to pneumatic plugs for inflation.
    - ii. From control panel to sealed line for introducing the low-pressure air.
    - iii. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

#### V. AIR TEST PROCEDURE:

After a manhole-to-manhole reach of pipe has been back filled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low-pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3/5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed 3.5 to 2.5 psig (greater than the average back pressure of any groundwater that may be over the pipe) and shall not be less than the time shown for the given diameters in the following table:

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Pipe Diameter (in inches)	Minutes
4	2.5
6	4.0
8	5.0
10	6.5
12	7.5
15	9.5
18	11.5
21	13.5
24	15.5
36	23.0

In areas where groundwater is known to exist, the contractor shall install a one-half inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed, immediately prior to the performance of the Line Acceptance Test, the groundwater shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11 1/2 feet, then the added pressure will be 5 psig, and the 2.5 psig increase to 7.5 psig. The allowable drop of one pound and the timing remain the same.)

The contractor shall provide the proper plugs, weirs and other equipment, as required, to perform all tests. Testing of each section of sewer installed shall include the portions of service connections that are to be installed under the contract.

Where groundwater is high, the Town may elect to accept infiltration measurements, in lieu of exfiltration tests. If the installation fails all tests, the contractor shall, at their expense, determine the source of leakage. They shall then repair or replace all defective materials and/or workmanship. All repairs shall be approved by the Town.

These tests shall be conducted at all times in the presence of the Town.

The entire system shall be tested for infiltration. The maximum allowable infiltration shall be 100 gallons per inch of inside diameter of the main sewer pipe per mile in 24 hours. If the leakage exceeds the specified amount, the contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit. The test shall be performed at the point of lowest elevation in the system, or at any other location, as directed by the Town.

Flexible sewer pipes shall be mandrel with a rigid device sized to pass 5%, or less, deflection (or deformation) of the pipe for all pipes over 8 inches.

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The mandrel (Go/No Go) device shall be cylindrical in shape and constructed with an odd number of evenly spaced arms or prongs.

Allowances for pipe wall thickness tolerances of ovalness (from heat, shipping, poor production, etc.) shall not be deducted from the "D" dimension but shall be counted as a part of the 5%, or less, deflection allowance.

The mandrel shall be hand pulled by the contractor through all sewer lines. Any sections of sewer, not passing the mandrel, shall be uncovered, and the contractor shall round or replace the sewer to the satisfaction of the Town. These repaired sections shall be retested.

The inspection shall be conducted no earlier than 30 days after reaching final trench back fill grade - provided, in the opinion of the Town, that sufficient water densification or rainfall has occurred to thoroughly settle the soil throughout the entire trench depth. If this cannot be achieved in the time after installation, prior to the project completion date, then the mandrel size shall be increased to measure 1/3 less of a deflection allowance.

#### VI MANHOLE TESTING:

- A. Vacuum Method: A special plate and seal to fit the top of the cone is required and is available from several testing companies. Plug all pipe inlets to manhole with suitable pneumatic plugs. Brace the pipes to the opposite side of the manhole to prevent sucking the pipe in when the vacuum is applied. Fit the special plate to the top of the cone and seal it with the attached bladder. Connect the vacuum pump and reduce the pressure in the manhole by 10 inches of Hg. The manhole is acceptable if the pressure in the manhole is not less than nine inches of Hg after two minutes.
- B. Exfiltration Method: Fill the manhole with water to a point six inches above the bottom of the cone and allow time for the concrete in the manhole to become saturated (one hour or more). Add more water to six inches above the bottom of the cone. Accurately measure the height of the water to the nearest 1/32-inch. The manhole is acceptable if the water level does not drop more than 0.020 inch per foot of water in four hours.

Water Depth in Feet	Allowable Drop	In Inches
5	0.10	3/32
6	0.12	1/8
7	0.14	5/32
8	0.16	3/16
10	0.20	7/32
12	0.24	1/4
14	0.28	9/32

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## VII. PUMP STATIONS & FORCE MAINS:

Where pump stations and force mains are required, design must be stamped by a professional, licensed engineer and all pertinent details shall be submitted to the Town for review and approval and submitted to the State of New Hampshire Department of Environmental Services for their approval.

### A. Design

1. Force mains shall be designed to withstand hydrostatic pressures of at least 2.5 times the design total dynamic head.
2. Force mains shall be sized to yield a cleansing velocity of 3 feet per second or greater at design flow.
3. Where velocities greater than 10 feet per second are attained, provisions shall be made to protect against erosion and shock.
4. Force mains shall enter the gravity sewer system at a point not more than 2 feet above the flow line of the receiving manhole.
5. Force mains shall be provided with drainage blow-offs, properly valved, at low points. Space shall be available at such locations for handling the displaced waste without danger of pollution or health hazard.

### B. Construction

1. Force mains shall be constructed of ductile iron, polyethylene or PVC material
  - a. PVC shall conform to ASTM D2241 or ASTM D1784.
2. Thrust blocks shall be placed at all bends, elbows, tees and junctions.
3. Force mains shall be treated as gravity sewers for purposes of bedding and backfill requirements.

### C. Testing

1. Force mains shall be tested in accordance with Section 4 of AWWA C600 at a pressure equal to 150% of the design operating total dynamic head.

## VIII. LIMITATION OF USE:

Nothing but sanitary waste flow from house toilets, sinks, laundry, etc. shall be permitted. Roof leaders, footing drains, sump pumps or any other similar connection carrying rainwater, drainage or ground water shall not be permitted, in accordance with the Sewer Use Ordinance.

## IX. PRETREATMENT DEVICES FOR NON-DOMESTIC WASTEWATER DISCHARGES:

- D. Required: Pretreatment structures for oil, grease, sand and other substances that are harmful or hazardous to the collection and/or treatment systems, its equipment, material or personnel shall be installed on all non-domestic wastewater discharge lines, as required in this section. A "Pretreatment Device Permit" (see sample) must be obtained, prior to any installation of the device.
- E. Not Required: Pretreatment devices shall not be required for individual dwelling units or multi-units dwelling units discharging only domestic wastes into the Exeter collection and treatment systems.
- F. Structure Approval: The size, type and location of each pretreatment structure shall have prior approval of Exeter's pre-treatment coordinator.

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- G. Grit, Sand and Oil Traps Required: Grit, sand and oil traps shall be required at any facility that has the potential for the discharge or induction of wastewaters containing petroleum or oil based wastes, insoluble inorganic particles, and/or any wastes that may interfere with, pass through or inhibit the wastewater collection or treatment systems. Traps shall be installed, prior to the point of discharge of other waste streams into the facility drainage system. Facilities, such as, but not limited to, repair garages, machine shops, gasoline stations, vehicle or equipment wash facilities, auto body repair shops, and chemical or petroleum storage areas, are subject to this provision. (See Standard Detail #13.)
- H. Grease Interceptors: Grease interceptors shall be required at any facility that has the potential for the discharge or induction of wastewaters containing grease laden wastewaters, and/or any wastes associated with food preparation that may interfere with, pass through or inhibit the water collection or treatment systems. Grease discharge or other waste streams into facilities, such as but not limited to restaurants, hotel/motel kitchens, fast food establishments, cafeterias and public or private clubs, are subject to this provision. (See Standard Detail #11.)
- I. Solids and Scum Interceptors: Solids and scum interceptors shall be required at any facility that has the potential for the discharge or induction of wastewaters containing heavy solids or scum; excessive discoloration; rags, cloth or fabric; glass, plastic, wood or sawdust; packaging material or binding; animal or vegetable wastes; and/or any wastes that may interfere with, pass through or inhibit the waste water collection or treatment systems. Solid interceptors shall be installed, prior to the point of discharge of other waste streams into the facility drainage system. Facilities, such as but not limited to laundries, bottling establishments, slaughterhouses, fruit/vegetable processors, meat, poultry or seafood packers, ink, paint or printing facilities, dairy product producers, warehouses and shipping facilities, textile, pulp and paper, or tanning facilities, assembly and manufacturing facilities, hospitals, health care or veterinary facilities, wood working or lumber facilities, concrete, tar and asphalt roofing or rubber processing; incineration, steam or power plants, are subject to this provision.
- J. Design of Pre-treatment Structures: All pre-treatment structures, traps, interceptors and separators shall conform to BOCA National Building Codes (Section P-1002.0, 1987) for: capacity, flow rate, design, size, type, location, venting, accessibility and maintenance requirements.
- K. Sanitary Sewer Back Flow Prevention: A back water valve shall be installed on all new sewer services entering the Town's sanitary sewer system. This valve shall be of such design that back up of sewage from the sanitary sewer system, into the facility or building, shall be prevented. This valve shall be installed in the service line at the foundation or wall in an accessible location for maintenance. This valve shall be maintained by the property owner, in a serviceable condition, able to perform its intended function.

END OF SECTION

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**SECTION C**

**SPECIFICATIONS FOR THE INSTALLATIONS  
OF  
WATER MAINS AND APPURTENANCES**

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## SECTION C

### SPECIFICATIONS FOR THE INSTALLATION OF WATER MAINS AND APPURTENANCES

#### I. MATERIALS:

A. Pipe: Ductile iron pipe shall be used for all water mains and copper pipe be used for all service connections.

1. Ductile iron pipe shall be "Class 52", double thickness cement as a minimum, and conform to ANSI A21.51.76 and ANSI for flanged joints as required. Minimum size for water service shall be 8" in diameter.
2. Fittings shall be cast iron, rated 250 pounds per square inch and conform to ANSI A21.11. Fittings shall have mechanical joints or push on joints. Valves shall have mechanical joints, push on joints or flanged joints.
3. Push on joints shall have lubricated rubber gasket conforming to ANSI A21.11-80.
4. Flanged joints shall have rubber, full face gaskets, 1/16 inch thick and will generally not be used for direct bury service.

B. Water Service Connections:

1. 3/4" to 1" copper tubing shall be rolled. 1-1/2" to 2" copper service pipe may be straight length. Copper shall be used from the street main to the meter. All copper pipe supplied shall conform to ASTM B-88-62 for type K copper.
2. The thread form for the inlet end of corporation stops shall have American National Taper Pipe Threads, ASA B21-1960 and C.P.C.J. They shall be AWWA approved.
3. Pipe saddles shall be stainless "Smith Blair" or "Dresser", both with "American National Taper Pipe" threads. Saddles for tapping 6" and smaller mains may be single strap, 8" and above, saddles shall be double strap.
4. Service valves and meters shall be supplied by the Town of Exeter, New Hampshire Water Department. Meters are required. 5/8 inch meters will be provided to the customer, by the Town, at no charge. Meters, 3/4 inch and larger, shall be charged to the customer. All associated fittings or parts, regardless of size of meter, will be charged to the customer.
5. Water service connections shall include an approved "Backflow Protection Device," installed immediately after the meter on the demand side. This device shall remain on the pipe as installed and removal shall require termination of the town water supply.
6. Service saddles shall be provided for all taps to PVC, asbestos cement and cast iron pipes as well as taps on ductile iron, when the service is larger than 1". Saddles are not required for taps 1" and smaller for class 52 ductile iron pipe.
7. Discontinued services shall be disconnected at the main.

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C. Valves:

1. All gate valves shall conform to AWWA C500-80.
2. All gate valve boxes shall be "Caldwell" or "Prescott", slide adjustable type, street valve boxes with top flange, sized to suit the valves they are to serve. All valve box covers shall have the word "Water" in raised letters on their top surfaces.
3. All gate valves shall be mechanical joint or push on joint; iron bodied; bronze mounted; resilient wedge gate valves.
4. All gate valves shall have a 2" square wrench, not on a non-rising stem, and shall open by turning stem counter clockwise. An arrow indicating the turning direction for opening the valve shall be cast in raised letters on the bonnet flange of the valve or the flared base of the wrench nut.
5. Conspicuously cast on the valve body, in raised letters, shall be the name of the manufacturer, the size of the valve and the rated working and test procedures.
6. Valves, 2 1/2" and smaller, shall be "Ford" ball valves, or approved equal.

D. Hydrants:

1. All post fire hydrants shall be Mueller Centurion or American Darling B-62-B, mechanical joints and shall conform to the latest AWWA "Standard for Fire Hydrants for Ordinary Water Works Service."
2. Post fire hydrants shall have a minimum valve opening of 5 1/4", a 5" inlet, two 2 1/2" hose and one 4 1/2" pumper nozzle with National Standard fire threads. All nozzles shall be equipped with chains. Operating nut and all nozzle caps shall open by turning counter clockwise.
3. Depth of bury shall be 5-6 feet, and the break off ring shall be located no more than 9" above finished grade. Hydrants shall be set at a location and angle, as directed by the Fire Department. Installer must seek Fire Department approval and direction, prior to installation.
4. Hydrant drain holes shall be plugged.

E. Curb Stops.

1. 3/4" through 2" curb stops shall be "Ford" ball valves, or approved equal.
2. Curb boxes shall be Buffalo style "Caldwell No. 1" slide type with 36" base and 24" top sections, sized to suit the valves they are to serve. They shall have the word, "Water", cast in raised letters on their box lids.
3. Curb stops shall be all brass, compression pack joint, ball valves, without drains and AWWA approved. Inverted keys are not accepted.
4. All curb stops shall be on the municipal property line, unless access easements are provided and approved by the Public Works Director.

II. PIPE INSTALLATION:

- A. The quality of all materials, the process of manufacture and piping in place shall be subject to inspection and approval of the Town. Pipe may be inspected at the place of manufacture

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and on the work site. Pipe shall be subject to rejection at any time even though submitted samples may have been approved. In addition, the Town reserves the right to have any of all pipe or fittings, inspected or tested, or both, by an independent inspection service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the owner's expense.

- B. Piping shall be installed at the elevations and locations indicated on the drawings, or as directed by the Town. However, unless otherwise shown or stated, the minimum cover over the top of the barrel of all installed piping shall be five feet.
- C. All pipe and fittings shall be carefully handled by equipment of sufficient capacity and proper design to avoid damage to the pipe and fittings. Under no circumstances, shall materials be dropped or dumped. Pipe and fittings shall be stored in such a manner as to be protected and kept clean.
- D. All "ductile iron pipe" shall be bedded in granular material.
- E. Pipe and fittings shall be thoroughly cleaned before they are placed. All lumps, blisters, and excess coal tar coating shall be removed from the spigot and from the interior of the socket and these surfaces shall be wire-brushed, wiped clean and dry, and be free from oil and grease before the pipe is laid.
- F. Every precaution shall be taken to prevent foreign material from entering the pipe before it is placed into service. The entrance of earth into pipe will not be permitted, and the Town may require the placing of a heavy canvas bag of suitable size over each end of the pipe, before it is lowered into the trench. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.
- G. Pipe and fittings shall be laid accurately to the lines and depth indicated on the drawings, or as directed by the Town. Care shall be taken to ensure alignment, both horizontally and vertically. Pipe shall be bedded in compacted granular material to the center line of the pipe. Compacted granular or select material placed to the top of the pipe. "Select material" is defined as "native soil excavated from the trench, free of rocks, foreign materials and frozen earth. Pipes shall not be laid in water, nor shall water be allowed to flow through them. The contractor shall take all necessary precautions to prevent flotation of the pipe in the trench.
- H. After placing a length of pipe in the trench, the spigot end shall be centered in the socket, and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, tamped under and around it. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed that required for making a satisfactory joint and shall be subject to the approval of the Town.
- I. Joints:
  - 1. For mechanical joints, the spigot shall be centrally located in the bell and adequate anchorage shall be provided at abrupt changes in direction and at dead ends. All surfaces in contact with the rubber gaskets shall be brushed thoroughly with a wire brush, immediately prior to assembly. The clean surfaces shall then be brushed with manufacturer's recommended lubricant, prior to slipping the gasket over the spigot and into the bell. Lubricant shall also be brushed over the gasket, prior to installation, for the purpose of removing loose dirt and lubricating the gasket as it is forced into its retaining space. The contractor shall use torque wrenches, as recommended by the manufacturer, when tightening bolts. It is essential that the gland be drawn toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of

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- the flange at all points around the socket. Glands shall be of the retainer type and installed according to the manufacturer's recommendations.
2. For slip type joints, all foreign matter in the gasket seat in the socket shall be removed and the gasket wiped clean and flexed, before placing in its seat. The plain end of the next pipe, after wiping clean, shall be aligned and carefully entered into the socket until it just makes contact with the bottom of the socket.
- J. Where it is necessary to join pipes of different types, the contractor shall furnish and install the necessary adapters. Adapters shall have ends conforming to specifications for the appropriate type of joint to receive the adjoining pipe.
  - K. At all times, when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs, or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.
  - L. The contractor shall furnish and install all supports necessary to hold the piping and appurtenances in firm, substantial manner at the lines and grades indicated on the drawings, or as directed by the Town.
  - M. Where required, bends, tees and other fittings in pipe lines buried in the ground shall be backed up with concrete placed against undisturbed earth where firm support can be obtained. If the soil does not provide firm support, then suitable bridle rods, clamps and accessories to brace the fitting properly shall be provided. Such bridle rods, etc. shall be coated thoroughly and heavily with an approved bituminous paint after assembly, or if necessary, before assembly.
  - N. All air release assemblies, fittings and appurtenances needed upon the pipelines shall be as specified hereinafter and shall be installed where indicated on the drawings, or as directed by the Town.
  - O. All corporation stops shall be connected to the water main by the use of a pipe saddle of proper size, and properly tapped to receive the corporation stop. The saddle and stop shall be 30 degrees above the spring line to form a gooseneck in the copper service line in order to safely absorb any undue stresses placed upon the service after installation.
  - P. Curb stops shall be rigidly installed between the water main and the property line, and shall be true to alignment. Curb boxes shall be installed over all curb stops, and shall be centered and plumb over the tee head. The curb box lid shall be set flush to the top of the pavement, or other surface as may be specified.
  - Q. Gate valves shall be installed true to alignment and shall be rigidly supported. Valve boxes shall be installed above all gate valves that are set with their stems in a vertical position. The box shall be centered and plumb over the wrench nut of the valve, with the box cover flush to the top of the pavement or other such grade, as may be directed.
  - R. Hydrants shall be located in such a manner as to allow complete accessibility and to keep the possibility of damage to a minimum. When installing a hydrant behind a curb, the barrel of the hydrant shall be so located that no portion of the nozzle caps will be closer than 6" or further than 12" from the gutter. When installing a hydrant in the space between a curb and a sidewalk, or between a sidewalk and a property line, no portion of the hydrant or nozzle caps shall be within 6" of the sidewalk or street.
  - S. All hydrants shall be set plumb and shall have their hose nozzles set according to the direction and instructions of the Fire Department. Each hydrant shall be connected to the

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water main with a 6" ductile iron branch, controlled by an independent 6" gate valve and valve box in accordance with the "Standard" details.

A concrete pad shall be placed under all hydrant elbows for support and concrete thrust blocks shall be set from the back of the elbows (below drain) to undisturbed earth, as specified in "Standard Details section of the "Specification", or as directed by the Town. Swivel tees shall be used for the gate valve and retaining glands shall be used on the valve and hydrant.

### III. FIELD TESTING:

- A. After the pipe has been laid, the pipe shall be subjected to a hydrostatic pressure, 150 percent of normal operating pressure, or 150 psi, whichever is greater, but not exceeding, the rated working pressure of the pipe. The normal operating pressure shall be defined by the Town.
- B. Tests shall not be made until at least 36 hours after the last joint to be tested has been made, at least 36 hours after the last concrete thrust or reaction blocking has been cast with high early strength cement, or at least seven days after the last concrete thrust or reaction blocking has been cast with standard concrete. Where possible, concrete shall not encase assembly bolts.
- C. Each section of pipeline shall be slowly filled with water and the specified test pressure measure at the point of lowest elevation shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Town. The pump, pipe connection, gauges, pipe taps and all necessary apparatus shall be furnished by the contractor. The contractor shall also provide all necessary assistance for conducting the test. The duration of the test shall be two hours unless otherwise directed by the Town. All air must be expelled from the pipeline, prior to the test period.
- D. During the test, all pipes, fittings, valves, hydrants and joints will be carefully examined. If found to be cracked or defective, they shall be removed and replaced by the contractor with sound material in the manner prescribed. The test shall then be repeated until satisfactory to the Town.
- E. During the pressure test, the pipe shall be tested for leakage. The pressure, during the leakage test, shall be at 150% of normal operating pressure. The duration of the leakage test shall be two hours, unless otherwise directed by the Town. The test shall be conducted in the same manner as the pressure test, except that the contractor shall provide suitable equipment for measuring the amount of leakage.
- F. No pipe installation will be accepted until, or unless, the leakage for the section of line tested is less than the rate of leakage specified in the following table and/or at minimum of 150 lbs. (Refer to AWWA C600, Section 4, for complete testing procedures).

See attachment, #7 Standard Details, for recommended allowable leakage per 1,000 ft. of pipeline. (gallons per hour)

NOTE: For mechanical or push-on joint pipe with 18' nominal lengths. To obtain the recommended allowable leakage for pipe 20' nominal lengths, multiply the leakage

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calculated from the above table by 0.9. If pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

- G. Should any test of a section of pipeline disclose leakage greater than that permitted, the contractor shall, at their own expense, locate and repair the defective joints and/or pipe until the leakage is within the permitted allowance.

#### IV. CHLORINATION OF WATER MAINS:

- A. After satisfactory pressure and leakage tests have been made, before placing the newly laid water mains in service, and when directed by the Town, the contractor shall sterilize the water mains by chlorination, in accordance with AWWA's Standard C601, "Disinfection of Water Mains", and as follows:

1. Prior to chlorination, the water mains shall be flushed to remove dirt and other foreign substances.
2. The water mains shall be sterilized by the contractor, under the supervision of the Town. The contractor shall use a manually controlled vacuum type solution feed chlorinator using a mixture of water and approved chlorine bearing compound of known chlorine content, such as calcium hypochlorite; or direct feed chlorinator, using liquid chlorine in cylinders. This machine must be capable of feeding 300 lbs. of chlorine per 24 hours.
3. Water from an approved source shall be introduced slowly into the water main during the application of chlorine. The rate of chlorine mixture flow shall be in such proportions to the rate of water entering the pipe that the chlorine dose entering the water main shall be at least 50 parts per million. When the pipeline has been completely filled with treated water, the main shall be sealed off. Treated water shall be retained in the main for a period of at least 24 hours. At the end of the retention period, the chlorine residual at the extremities of the pipe and at other representative points, shall be at least 5 parts per million.
4. Should the first treatment fail to meet the above requirements, the procedure shall be repeated until tests show that, in the opinion of the Town, effective sterilization has been accomplished.
5. Following sterilization, the chlorinated water shall be flushed from the newly laid main until such time as the replacement water throughout its entire length shall be equal in quality to that elsewhere in the system.
6. After final flushing and before water main is placed in service, a sample, or samples, shall be collected from the end of the line and tested for bacteriologic quality and show the absence of coliform organisms. The number and frequency of sampling shall be as described by the New Hampshire Department of Public Health and NHDES.
7. The cost of water used for filling, flushing and cleansing of water mains shall be charged to the owner, at the bulk rate, of water used. Volume to be determined by multiplying pipe capacity by a factor of 2.5.

- B. Procedure after cutting into or repairing existing mains: The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that

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are repaired with clamping devices, while the mains remain full of water under pressure, present little danger or contamination and require no disinfection.

1. Trench "Treatment": When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers.

Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation, because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

2. Swabbing and Flushing: The following procedure is considered as a minimum that may be used:
  - a. Swabbing with hypochlorite solution: The interior of all pipe and fittings used in making the repair (particularly, couplings and tapping sleeves) shall be swabbed with a 5% hypochlorite solution before they are installed.
  - b. Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valve and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated. (See IV A7 for water use charges.)
3. Slug Method: Where practicable, in addition to the procedures of "2", a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in the previous sections, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as 1/2 hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.
4. Sampling: Bacteriological samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break. The cost of sampling, or testing, conducted by the Town shall be charged to the Owner.

END OF SECTION

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**SECTION D**

**SPECIFICATIONS FOR THE INSTALLATION  
OF  
STORM DRAIN LINES AND APPURTENANCES**

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## SECTION D

### SPECIFICATIONS FOR THE INSTALLATION OF STORM DRAIN LINES AND APPURTENANCES

#### I. MATERIALS:

Unless otherwise permitted or directed by the Town, concrete pipe, galvanized pipe, poly-vinyl chloride (PVC), or helical aluminized corrugated metal pipe shall be used for all drain lines, and the minimum size to be used shall be 12 inches. Structures shall be constructed of precast elements, or constructed of brick and block.

##### A. Concrete Pipe:

1. The contractor shall submit for approval of the Town, shop drawings showing full details and joint dimensions for all pipe, fittings and specials. No pipe fittings or specials shall be manufactured until shop drawings have been approved by the Engineer. Manufacturer's certificate of compliance may be required by the Town prior to installation.
2. Each length of pipe, closure piece and fitting shall be indelibly marked to identify the manufacturer's pipe strength.
3. The quality of all materials and the finished pipe shall be subject to inspection and approval by the Town. Such inspection may be made at the place of manufacture, or on the work after delivery, or at both places, and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. All damage to precast sections that is not cause for rejection shall be repaired. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout or other accepted method. Sufficient time shall be allowed for curing before precast sections are installed. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.
4. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machine surfaces.
5. Reinforced concrete pipe shall be manufactured in accordance with reinforced concrete culvert, storm drain, and sewer pipe, ASTM C76. Concrete pipe shall be reinforced with a cage or cages formed of circumferential and longitudinal steel. Elliptical reinforcement may not be used. The structure shall be constructed with a self-centering joint.
6. Pipe shall be of the strength and/or class and size required by the Town. The minimum class of pipe shall be Class III.
7. Appurtenances and special shapes shall be manufactured in accordance with the applicable paragraphs of reinforce concrete culvert, storm drain, and sewer pipe, ASTM C76. Unless shown or specified otherwise, they shall be designated and manufactured equal to the diameter, class and joint of the pipe with which they are to be used.

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B. Poly-vinyl Chloride Pipe (PVC):

1. Poly-vinyl chloride pipe and fittings shall conform to ASTM D3032 (SDR-35) for 12" & 15" diameter and shall conform to ASTM F679 for 18" through 27" diameter, and PVC polymer specification ASTM D1784. In addition, the joint shall conform to the requirements of ASTM D3312 and the gasket shall conform to the requirements of ASTM F-477, D-1869, C-361, or C-443.
2. The manufacturers' recommendations for handling, storage, and installation shall be strictly observed. Gaskets and gasket lubricant material shall be furnished by the manufacturer of the pipe.
3. PVC pipe of the size and class indicated on the drawings shall have rubber rings, gaskets and push on joints.
4. PVC pipe is a flexible conduit and it will become "egg" shaped if installed without proper side support. PVC drainpipe shall be bedded in screened gravel to the spring line of the pipe followed by back filling with sand to the top of the pipe. After compaction on both sides, sand shall be placed to one foot over the pipe, followed by compaction with a suitable vibratory plate compactor.
5. The completed installation of PVC pipe shall be subjected to roundness test by pulling a mandrel through each length of pipe. Failure to pass this test will be cause for replacement.
6. PVC drainpipe comes in long lengths, and it is subject to shear failure if there is a substantial variations in bedding. Care shall be taken to provide uniform depth of bedding in areas where the bottom conditions change in firmness (for example, where ledge or pipe lines are encountered or when placed in a fill section).
7. Two joints shall be required at all manholes or structures within a five-foot distance from the structure.
8. Vibratory plate compaction shall be required one foot above the pipe at the top of the sand layer at 12-inch lifts to finish grade.

C. Helical Aluminized Corrugate Steel Pipe:

1. The contractor shall submit for approval full details of the pipe to be used.
2. The pipe shall have helical corrugation with aluminum coating conforming to AASHTO M-274-81 with a minimum thickness of .064 (16 gauge) or galvanized coated.
3. Corrugated metal pipe is a flexible conduit and, it will be come egg shaped, if installed without side support. Corrugated metal pipe shall be bedded in gravel to a depth of 12" over the pipe.
4. Surfaces of aluminized pipe that are in contact with concrete or masonry shall be thoroughly coated with a zinc chromate primer.

D. Drainage Structures:

1. Precast concrete sections shall conform to the standards established in ASTM C478-80 (AASHTO M199-82). The concrete shall be Class A, 3000 psi, with five percent entrained air plus or minus, one percent.

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2. Clay brick shall conform to the requirements of AASHTO M91-790, grade MS.
3. Concrete brick shall conform to the requirements of ASTM C55, grade U-11.
4. Concrete shall be Class A, 3000 psi.
5. Concrete masonry units shall conform to the requirements of ASTM C139 and shall have a minimum compressive strength of 3000 psi.
6. The mortar shall be composed of "Portland Cement", hydrated lime and sand in the proportions of one part cement to 1/2 part lime to 4 1/2 parts sand (by volume). The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick. But, in no case, shall the volume of sand exceed three times the sum of the volume of cement and lime.
  - a. Cement shall be "Type II, Portland Cement" conforming to ASTM, C150 Standard Specifications for Portland Cement.
  - b. Hydrated lime shall be "Type S" conforming to ASTM Standard Specifications for "Hydrated Lime for Masonry Purposes", designation C207.
  - c. Sand shall consist of inert natural sand conforming to ASTM Standard Specifications for "Concrete (Fine) Aggregates", designation C33.
7. Casting shall be gray iron conforming to AASHTO M105-82. Unless otherwise specified, all gray iron castings shall be Class 30.
8. Steel grates shall be of copper bearing, structural steel, conforming to ASTM A36. The grates shall be fabricated, as shown on the plans, or as approved by the Town. All top edges shall be flush, and all rivets shall be tight and properly headed. After fabrication, the grates shall be galvanized in accordance with AASHTO M111, or ASTM, A153, as applicable.

## II. INSTALLATION:

- A. Pipes shall be laid true to the lines and grades shown on the drawings, or as directed by the Town. A variation of 1/4 inch or more, from the true invert grade on storm drains laid on a one percent or less grade and 1/2 inch or more on storm drains laid on grades above one percent, will be deemed sufficient reason to cause the work to be rejected. The minimum depth for a drain line shall be 3 ft. to top of pipe, unless specific permission has been obtained from the Town, and special construction methods are used. Work, so rejected, shall be corrected by the contractor at their own expense in a manner acceptable to the Town.
- B. The contractor shall demonstrate their proposed methods of maintaining the grade and alignment of pipe during construction with the engineer before the start of construction. Methods that will be acceptable for consideration are, but not limited to, the following:
  1. Use of a transit (only at grades greater than 1%).
  2. Laser beam, utilizing the equipment manufacturer's recommended procedure for sewer construction.
- C. The contractor shall furnish all labor, material and tools to establish and maintain all lines and grades. Such tools and materials, as are required for the work and furnished by the contractor, shall be approved by the Town.
- D. All pipes, fittings, and specials shall be carefully inspected in the field before lowering into the trench. Cracked, broken, warped, out-of-round, or otherwise defective pipe, fittings or specials, as determined by the contractor or the Town, shall be pulled and not installed.

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- Such rejected pipe shall be clearly tagged in such manner as to not deface or damage it, and the pipe shall then be removed from the job site by the contractor at their own expense.
- E. After the trench has been brought to the proper grade, as hereinbefore specified, the pipe and bedding shall be laid. Unless otherwise approved by the Town in writing, pipe laying shall be done only in the presence of the Town, and the contractor shall give ample notice of scheduled pipe laying operations to the Town.
  - F. All pipe, fittings and specials shall be carefully lowered into the trench with ropes, slings and proper equipment. Pipe becoming cracked or otherwise damaged during or following installation shall be marked by the contractor, or Town, and removed from the site as required in the preceding clause.
  - G. Pipes shall be laid true to the grades shown on the drawings, or as directed by the Town. Each section of pipe shall rest upon the pipe bed for the full-length of its barrel, with recess excavated to accommodate bells and joints. Blocking will not be permitted, except where the pipe is to be encased in concrete. Any pipe that has its grades or joints disturbed after laying shall be taken up and re-laid.
  - H. The interior and ends of all pipe shall be thoroughly cleaned of all foreign matter, before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. Under no circumstances, shall pipe be laid in water, and no pipe shall be laid when trench conditions or the weather is unsuitable for such work, except by permission of the Town. In all cases, water shall be kept out of the trench until the concrete encasement, or cradle where used, has hardened or, until the pipe side fills have been placed.
  - I. If the drain is damaged from any cause, or becomes either partly or completely filled with dirt, stones and sand, or other debris, the contractor shall make all necessary repairs and remove all such material to the satisfaction of the Town.
  - J. All drain pipe and structures shall be installed in the dry and supported on a bedding of free draining sand or stone, less than 3/4" to a minimum depth of 6" below the bottom of the pipe, or 1/4 the diameter of the pipe (whichever is larger). The pipes shall be laid with the spigot ends pointing downstream. When, in the opinion of the Town, unsuitable foundation material is encountered, a greater depth of excavation may be required. This bedding material shall extend upward around the pipe barrel to form a positive cradle, fitting the bottom half of the pipe barrel, providing a uniform support along the length of a pipe section at the required line and grade. Suitable recess shall be provided in the bedding projections. Bedding material shall be spread in 6" layers, and each layer shall be compacted with 20 lb. hand tampers, or pneumatic tampers, until the required total depth of bedding has built up.
  - K. All drain manholes and drop inlets shall have a brick lined channel that corresponds in shape with the lower half of the outlet pipe, as shown on the drawings, or as directed by the Town. The minimum depth of flow channel shall be equal to 3/4 the diameter of the pipe to which it connects. The channel shall be graded to give a smooth, interrupted flow through the manhole. Bench walls shall be pitched a minimum on one inch per foot from the inside periphery of the manhole to the edge of the flow channel. All catch basins are required to have sumps.
  - L. Each section of installed drain will be visually inspected by the Town. The pipe shall be true to both line and grade; shall show neither obstructions nor the projection of connecting pipes into the main pipe; and shall contain no debris or other deposits that shall, in any way,

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reduce the full cross section area of the pipe. Any section of drainpipe which does not comply with these inspection criteria, as determined by the Town, shall be promptly corrected, replaced or repaired by the contractor at their own expense. Such methods as are employed for the correction shall be approved by the Town.

- M. The catch basin, drop inlets and manholes shall be constructed to the lines, grades, dimensions, and designs shown on the drawings and as directed by the Town with the necessary frames, grating or covers, in accordance with these specifications. On new roadway construction, catch basins, drop inlets, and manholes shall not be brought to finish grade until the base course of bituminous concrete has been applied. The contractor shall provide suitable covers for all structures, until such time as the specified frames and covers, or gratings, are installed. Metal frames shall be set in a full mortar bed, true to line and grade. When directed by the Town, the casting shall be temporarily set at such grades as to provide drainage during construction.
- N. Masonry shall not be erected when the ambient temperature is below 40 degree F, except by written permission of the Town. Masonry shall be laid plumb, true to line, with level courses accurately spaced and breaking joints with the course next below. Any unit disturbed after mortar has stiffened shall be removed and re-laid with fresh mortar. Chases and raked out joints shall be kept free from mortar and other debris. Spaces around built in items shall be solidly filled. Anchors, plugs, sleeves, accessories, boxes, and other items required to be built in with the masonry shall be installed as the masonry work progresses.
- O. All brick, except brick having absorption of less than 5%, shall be made wet, but not saturated, before laying. Brick masonry shall be protected against too rapid drying by the use of moistened burlap, or other approved means. For laying brick in cold weather, water and sand shall be preheated. No work shall be laid when the temperature is 35 degrees F., or less, unless materials are preheated. The use of frozen or ice coated materials, or building upon frozen masonry is prohibited.
- P. Catch basins shall be placed on the street so that the greatest distance water will have to flow over the surface shall not be over 300 ft. Catch basins shall have sumps of not less than 3 ft. in depth, measuring from the invert on the outlet pipe. Manholes are required at all points in the main drains, where there is a change of grade or a change in line, and also, at all points where feeder pipes enter the main drain.
- Q. Concrete head walls, or flared end sections, shall be installed at the open ends of any drain pipe, in accordance with good engineering design must be certified with engineer's stamp and approved by the Town.
- R. Stone splash pads and riprap in open ditches may be required by the Town.
- S. Connections to the municipal storm drain system from private property must include a backwater valve, approved by the building inspector, to prevent drain water backups onto private property.
- T. All mortar work exposed to salt contamination, such as mortar used for setting frames, covers or grates, and parging, shall be sealed with an appropriate concrete sealer.

END OF SECTION

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**SECTION E**

**SPECIFICATIONS FOR THE CONSTRUCTION  
OF  
ROADS, SIDEWALKS, BRIDGES AND STREET SIGNS**

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## SECTION E

### SPECIFICATIONS FOR THE CONSTRUCTION OF ROADS, SIDEWALKS, BRIDGES AND STREET SIGNS

#### I. INTRODUCTION

In order to promote the public's health, safety and welfare, as well as to ensure adequate materials, proper design and methods of construction, the following specifications and standards shall apply to the construction of roads, sidewalks, bridges and street signs that will, or may, become Town of Exeter maintained or accepted. Where reference is made herein to the "Town", it shall include, as appropriate, the Public Works Director and/or their designee.

The construction of such facilities shall also conform to the latest edition of State of New Hampshire's "Standard Specifications for Road and Bridge Construction", "Traffic Control Standards, Statues & Policies" and "Architectural Barrier Free Design Code". Also, work shall conform to the Federal Highway Administration's "Manual on Uniform Traffic Control Devices" and recommendations of the Institute of Transportation Engineers: "Transportation and Traffic Engineering Handbook", second edition. This document is intended to augment ordinances that have been adopted by the Town. Where strict adherence or compliance with these standards would result in construction which is not in the best interests of the public, the Town may waiver, or modify, portions of the standards. It shall be the responsibility of the developer or contractor to obtain amendments to these specifications.

#### II. GENERAL REQUIREMENTS:

The contractor shall furnish all labor, materials, tools and equipment necessary for the satisfactory construction of roads, sidewalks, bridges and signs:

- A. When working within the right-of-way of a State Highway, the contractor shall be bound by the conditions, restrictions and regulations made by the appropriate body. All such regulations shall be in addition to those set down in these specifications.
- B. The contractor shall obtain any permits, including excavation permits that may be necessary for the prosecution of the work.
- C. The contractor shall provide suitable and adequate room for materials and equipment during the progress of the work. The contractor shall conduct work so as to minimize public inconvenience and shall notify property owners and merchants that may be affected by the work.
- D. The contractor shall provide such traffic barriers and police protection as the Police Chief may require.
- E. Inspection of work by the Town does not imply acceptance. All periodic work will be subject to final inspection and testing procedures, prior to acceptance.

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- F. Contractor shall coordinate all work with appropriate utilities and shall contact the Town Water and Sewer Division and "Dig Safe" seventy-two hours (72) in advance of any excavations in Town streets or rights-of-way.
- G. The Town shall approve alternate or substitute materials and methods to these specifications and the approved plans, prior to their use. The Town's decision on the suitability of an alternate or substitute shall not be disputed.
- H. The contractor is responsible for insuring that the operation will not cause or contribute to water pollution. The contractor shall take all necessary steps to prevent erosion. Erosion control methods shall be approved by the Town, Rockingham County Conservation District and the New Hampshire Department of Environmental Services, as appropriate.
- I. Inspection will be done in complete accordance with Section "F" (Inspections).
- J. All road plans submitted for review shall state, in general notes, that "Roads, Sidewalks, Bridges and Street Signs" must be built in accordance with Town of Exeter's specification.

### III. ROADS:

#### A. Curbing:

- 1. Granite curbs shall not have rust stains and be required at all street intersections extending from the point of curvature to the point of tangency with a straight six foot length laid at either end and shall conform to the following nominal dimensions:
  - a. Straight granite curb, 5"x18"x48", minimum length
  - b. Slope granite curb, 4 1/2"x18"x48", minimum length
  - c. Curb shall be bedded on, and surrounded by, a minimum 6" layer of clean gravel
  - d. Joints must be properly mortared and pointed
  - e. Complete compaction shall occur in all areas and under the entire length of curb.
- 2. Asphalt curbing shall not be used in new construction. Asphalt curbing may be used to patch existing asphalt curbing. Asphalt curbing shall not be used on roads unless backed with asphalt sidewalk, or of "Cape Cod" type. Placing of asphalt curb must be completed with temperatures above 70-degree F. and with a coating of approved emulsion between curb and roadway. "Cape Cod" type curb shall be laid on asphalt base course and locked in with finish course.

#### B. Driveway Openings (Curb Cuts):

- 1. Residential driveway widths
  - a. Shall not exceed 10 feet nominal width unless approved by the Highway Superintendent.
- 2. Commercial driveway widths
  - a. One-way traffic: shall not exceed 15 feet nominal width
  - b. Two-way traffic, low volume: shall not exceed 24 feet nominal width
  - c. Two-way traffic, high volume: shall not exceed 30 feet nominal width
- 3. Industrial driveway widths
  - a. Where routine tractor-trailer traffic occurs, may be permitted to have up to 40 feet width with approval of Town Engineer

- C. Cul-de-Sac: Except where near future connections are planned, approved and bonded, dead end streets shall not be allowed without a turn-around - minimum radius of fifty-nine ft. from center to outside edge of pavement. Any temporary dead-end street shall be provided

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with a temporary turn-around and a place designated to deposit snow. Turn-around is also required at Town lines for plows and school buses.

D. Roads: Roads shall be designed and built, as shown, on standard detail:

1. Dimensions and Grades of Roads:

Dimensions	Collector	Residential
Minimum width pavement	34 ft.	24 ft.
Minimum grade	1%	1%
Maximum grade	6%	8%
Maximum grade at intersection	3% within 50' of intersection	
Minimum width of shoulder	6 ft.	6 ft.
Minimum center line radius curves	200 ft.	150 ft.
Minimum tangent length (between reverse curves)	200 ft.	100 ft.
Minimum angle of intersection	60 degrees	60 degrees
Minimum right of way width	60 ft.	50 ft.

NOTE: 60 degree angle is considered to be the minimum angle between a straight section of the intersecting roadway and the connecting roadway. Roads that do not connect to a straight roadway or cannot meet this requirement must be designed and bear the stamp of a professional traffic engineer.

Curb radius intersections	Collector	Residential
90 degree intersections	25 ft.	25 ft.
Less than 90 degree intersection	30 ft.	30 ft.

2. Intersection Angles: Streets shall be laid out, as near as possible, to intersect at right angles. Street, entering opposite side of another street, shall be laid out, either directly opposite one another or with a minimum offset of 125 ft. between their centerlines.
3. Sight Distance: A distance of 150 ft. in each direction in areas where speed is below 30 mph and 250 ft. in areas where the speed limit exceeds 30 mph must be provided, prior to Town's acceptance.
4. Street Drainage: Roads must be built to eliminate "ponding" or water entering private driveways or roads. Drainage systems must be built and designed according to Town specifications. Culverts and water control devices shall be designed by and bear the stamp of a registered civil engineer.
5. Underdrain Systems: Underdrain systems shall be required if existing site conditions contain excessive groundwater, water trapped by ledge or impervious soil, or water and soil conditions which would create excessive water within road base or frost heaves.
  - a. Underdrain systems shall consist of geotextile fabric, crushed stone bedding, perforated smooth interior corrugated polyethylene pipe, bankrun sand/gravel, catch basins or drain manholes.
  - b. Underdrains shall discharge into catch basins, drain manholes or open drainage ditches.

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- c. Access shall be provided for maintenance every 300 feet and at the ends of underdrains.
6. Road Construction:
- a. Clearing: The entire area of each road or way shall be cleared and cleaned of all stumps, brush, roots, boulders, like materials and all trees not intended for preservation. Trees and stumps will not be used for fill.
  - b. Excavation: All loam, soft clay and other yielding materials shall be removed or stripped from the roadway to a depth of no less than 21" below finish of grade. Areas that are muck must be removed or stripped from the roadway to a depth of no less than 36" below finish grade and replaced with gravel. No soft or inferior material shall be used below subgrade. The subgrade shall be shaped to a true surface, conforming to the proposed cross section of the road and thoroughly compacted prior to applying gravel. Inspection by the Highway Superintendent must be completed and appropriate forms signed for compliance (see "Inspections").
  - c. Gravel Base: Gravel, as specified in Section 304 of NHDOT specs, shall be spread in two, six inch layers to a total depth of twelve inches: each layer, so placed, shall be compacted with an approved vibratory roller, until optimum density is obtained - 95% by proctor. An additional final lift of crushed gravel, as specified in Section 304 of NHDOT specs, shall be first compacted with an approved vibratory roller and then fine rolled with a roller weighing not less than 12 tons. Any depressions that appear during, or after, the rolling shall be re-compacted and re-rolled until the surface is true to grade.
  - d. Bituminous Concrete Pavement: Prior to placing any asphalt on the road, inspection by the Highway Superintendent must occur (see Inspection). Asphalt will be placed in two layers.
    - 1) The first base course shall be type "B", as specified in Section 401 of NHDOT specifications. The rolled thickness shall not be less than three inches. If rolling with a tandem roller, the roller shall weigh no less than five tons. A plate shall be attached to the roller which shall list the roller's weight.
    - 2) A wearing course of one inch shall be type "F", as specified in Section 401 of NHDOT specifications. Applications must be made when outside temperature is above 50 degrees F. The base course must be clean and free of any sand or debris. Pavement must be rolled, as in previous paragraphs. Care must be taken that the joints do not show. If a significant time interval occurs between successive passes of the paving machine, the contractor must infrared treat the joint to ensure bonding. The total thickness of bituminous concrete shall not be less than four inches.
  - e. Embankments/shoulders: Excavated material, if suitable, may be used for embankments and in filling low areas. A minimum of four inches of topsoil shall be placed to cover all finished and disturbed slopes and seeded with quality seed and thatch with straw. In no case shall an embankment or shoulder be constructed with a greater than 2:1 slope unless approved materials, and/or, stone riprap is utilized for stabilization.

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- 1) Embankments/shoulders that have 3:1, or greater, slope shall require guardrails approved by the Town.

#### IV. SIDEWALKS

At the discretion of the Town of Exeter's Planning Board, sidewalks, five feet in width, shall be installed on both sides of each street in conformity with the following specifications (see Standard Detail).

- A. The sub base shall be at least 12" of gravel after being thoroughly compacted with a vibratory plate compactor. Bituminous concrete shall be laid in two courses, with a total compacted thickness of 2 1/2 inches. Inspection of sub base gravel must be completed by Highway Superintendent, prior to placing of asphalt.
- B. Concrete or brick sidewalks must be approved by Town of Exeter Selectmen.

#### V. BRIDGES:

Bridges must be built according to State of New Hampshire specifications and as approved by the Town Engineer. Plans shall be stamped by a State of New Hampshire licensed engineer.

#### VI. TRAFFIC SIGNS, STREET SIGNS, AND MAILBOXES:

- A. Prior to acceptance of a roadway by the Town, traffic signs as deemed necessary by the Town of Exeter Police Chief must be installed and the street name signs erected.
- B. All traffic control signs or devices shall be installed in accordance with the "Manual on Uniform Traffic Control Devices for Street and Highways", as published by the U.S. Department of Transportation, Federal Highway Administration.
- C. Note: "Slow Children" and "Blind Driveway" signs are not allowed in Exeter.
- D. Service and Business Directional Signs: Permission for erection of signs must be granted by the Board of Selectmen. Design of signs and their locations shall be approved by the Public Works Director in accordance with the following:
  1. Sign dimensions shall not exceed 6 inches in height by 36 inches in length.
  2. Sign shall have white upper case letters, numbers, and arrows, not to exceed 4 inches in height, on a blue background.
  3. Signs shall not be mounted on trees or regulatory sign poles.
- E. The face of any mailbox must not be any closer than two (2) feet from the edge of the paved roadway, unless approved by the Highway Superintendent. In accordance with Town Ordinance#502, mail boxes may not be placed in or obstruct the travel way of any sidewalk.

#### VII. STREET LIGHTS:

Streetlights shall be installed on new or existing streets, as approved and recommended by the Public Works Director.

Installation on streets of new subdivisions shall be paid for by the developer. Service charges shall be paid for by the developer, until such time as the roadway, with streetlights, are accepted as town property.

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Fire alarm pull box and street light locations are to be coordinated such that the pull box is on a lighted pole.

All new or replaced lamps shall be the "high pressure sodium" type.

#### VIII. INSPECTIONS:

Inspections, as identified on the checklist sheet, are required to be completed. For inspections, three working days advanced notice shall be given to the Town of Exeter's Highway Superintendent. Inspections will only be done during the normal working hours, 7 a.m. to 3 p.m., Monday through Friday, unless specifically approved by the Public Works Director.

#### IX. FIVE-YEAR MAINTENANCE WARRANTEE:

Prior to acceptance of a roadway or street, including public improvements by the Town, the Public Works Department requires a "Letter of Credit" or other surety satisfactory to the Public Works Director in the amount of 15% of the actual cost of construction for a two year period from the date of acceptance by the Board of Selectmen and further guarantee in writing for the total five year period. If repair or unusual maintenance is needed or additional improvements are required due to design deficiencies, or construction then such costs as are necessary shall be drawn against said guarantee.

For a description of the Town's procedure for posting a maintenance guarantee, contact the Public Works Department.

Notice: Failure to give the required notice and proceeding with construction may result in the following:

- A. A "Cease and Desist" order may be issued to stop construction.
- B. The Town may require certification by an independent soils laboratory stating that the subgrade is compacted to 95% optimum density and/or a letter of certification by an independent soils laboratory stating that the pavement has the minimum density of 95% AASHTO T245 method, or core samples may be required.
- C. Possible loss of opportunity for a reduction in the bond.
- D. Extra cost to the contractor for laboratory work, core drilling engineering or infrared pavement treatment.

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TOWN OF EXETER  
ROAD INSPECTION CHECKLIST

1. PRIOR TO ANY CUTTING

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

2. AFTER CLEARING & GRUBBING OF ALL DESIGNATED MATERIAL:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

3. COMPLETED EXCAVATION, EMBANKMENT SLOPE INSTALLED, ROAD GRADES & COMPACTION:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

4. SUBGRADE FILL MATERIAL WHERE LARGE STONES OR HUMUS IS REMOVED:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

5. GRAVEL SUB-BASE: 2"-6" LIFTS COMPACTED TO 95% OPTIMUM (NO STONES LARGER THAN 3"):

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

6. CRUSHED GRAVEL BASE 6" LIFT (NO STONE LARGER THAN 1-1/2") COMPACTED 95% OPTIMUM:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

7. ASPHALT BINDER 3" AFTER COMPACTION:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

8. ASPHALT TOP COAT 1" AFTER COMPACTION :

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_ HOURS: \_\_\_\_

VERIFIED BY: \_\_\_\_\_

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9. FINAL INSPECTIONS: SEEDING/SIGNS/GENERAL CLEANUP & CONSTRUCTION  
COMPLETED:

DATE: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ BY: \_\_\_\_\_ HOURS: \_\_\_\_\_

VERIFIED BY: \_\_\_\_\_

END OF SECTION

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**SECTION F**

**PROCEDURES AND SPECIFICATIONS  
FOR  
EXCAVATIONS WITHIN THE RIGHT-OF-WAY OF TOWN STREETS**

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the failure of the permit holder to complete the work, or make required repairs or restoration of damages involving the work or encroachment, authorized by the permit.

The bond shall be released to the permit holder upon the expiration of the guarantee period. The guarantee period shall be for a period of five (5) years following the placement of the permanent patch. During the guarantee period, the permittee shall be responsible for restoration, repairs and maintenance of their work.

#### IV. INSURANCE REQUIREMENTS:

An applicant for a permit to work within Town highways or lands shall furnish to the Town, prior to the issuance of the permit, certificates of minimum insurance, including automobile, property damage, liability, bodily injury liability, and worker's compensation insurance, according to the following amounts:

- A. Liability coverage: General liability \$500,000 combined single limit comprehensive form, broad form property damage. Independent contractors insurance, product/completed operations insurance. If work involves the following, appropriate coverage is necessary: explosion; collapse; underground.
- B. Vehicle Insurance: \$500,000 combined single limit, comprehensive form, owned, hired/non-owned.
- C. Worker compensation: Statutory limits, employer liability \$500,000.

These certificates shall contain a provision that the insurance company will notify the certificate holder and Town, by registered mail, at least fifteen days in advance of any cancellation or material changes.

#### V. FEES:

To be consistent with current Selectmen's Policy.

NOTE: Area of trench shall be computed by actual size of trench, or in case trench is patched, area of patch. Town designated inspector will compute area after trench is made. If area is larger than permittee estimated, they will be required to pay additional fee.

#### VI. ISSUANCE OF PERMIT:

- A. After completion of all information on permit form.
- B. Upon receipt of a bond and insurance in the correct amounts.
- C. Payment of fees as required by Public Works Director. Permit form must be signed by the Highway Superintendent, or their designee, before it becomes valid.

#### VII. EMERGENCY PERMIT & UTILITY NOTIFICATION

Nothing in this manual shall be construed to prevent the making of such excavations, as may be necessary, for the preservation of life or property; or for the location of trouble in conduit or pipe;

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or for making repairs, provided that the person making such excavation shall apply to the Town for such a permit on the first working day after such work is commenced. Before any excavation work is started, the person or utility excavating must contact "Dig-Safe" and the Town Water and Sewer Division for on spot locations.

#### VIII. REVOCATION OF PERMIT:

Any permit, issued by the Town of Exeter, may be revoked immediately upon written notification to the permittee.

#### IX. DISPLAY OF PERMITS:

A copy of the permit shall be at the job site at all times for inspection by local police, public works personnel and other interested persons. To be valid, the permit must show the effective and expiration dates and must be signed by the Highway Superintendent, or their designee. This regulation will also apply to public utilities and their sub-contractors.

#### X. EXTENSION OF TIME:

All required work shall be completed prior to November 15th in a manner satisfactory to the Town or before the expiration date shown on the permit, except in cases where permanent repairs, such as loam and seeding must be made at a future date. Otherwise, the permit holder shall request the Town to allow them an extension of time. Extension of time may be granted upon written request by the permittee stating the reasons for the request.

#### XI. INDEMNIFICATION:

The applicant agrees, as a condition governing the issuance of a permit, that they will hold harmless the Town of Exeter, the Public Works Director and their agents and employees from any and all claims and actions whatsoever arising from the experience of said permit.

#### XII. CLEARANCE FOR VITAL STRUCTURES:

The excavation work shall be performed and conducted so as not to interfere with access to fire hydrants, fire stations, fire escapes, water gate valves, underground vaults, valve housing structures, traffic signal cables and loops, and all other vital equipment as designated by the Town. Water valve covers and sewer or drainage manholes shall not be paved over.

#### XIII: PROTECTIVE MEASURES AND TRAFFIC CONTROL:

- A. Safety to Traffic: It shall be the duty of the permittee to make certain that the security of the traveling public is safeguarded, and that their rights are not unreasonably curtailed. Unless specifically indicated in the permit, or authorized by the inspector, the traveled path shall not be obstructed. The portions of the highway that are disturbed or used for storing materials, or are otherwise unsafe for public travel, shall be marked at night by flares, lanterns, lights, flasher beacons, or other warning devices approved by the inspector. When

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portions of the traveled way are made dangerous for the movement of vehicles or pedestrians, a sufficient number of uniformed police officers or flaggers shall be employed by the permittee to direct the traffic safely through the areas. The work shall, if possible, be planned to avoid such conditions.

- B. Detours: When, in the opinion of the Town of Exeter's Police Chief, a Town highway may be obstructed by the permitted applicant's proposed operations to such an extent as to unduly restrict vehicular traffic, or make hazardous its use, a parallel Town road bypass may be designated. All expense incurred by the permittee as a result of this bypass establishment, use, and restoration of said detour shall be the entire responsibility of the permittee. The permittee shall notify the police and fire departments of the layout and expected time of the use of the detour. The permittee shall supply and maintain such signs at the road bypass, and an inspection shall be made by the permittee and a representative of the Town to determine the adequacy of the signs and the structural condition of the road involved. A second inspection shall be made when the detour is terminated so that an agreement is made by the permittee to restore the conditions equal to those existing prior to the establishment of the detour.
- C. Protective Measures and Routing of Traffic: The permittee shall, in general, maintain safe crossing for two lanes of vehicular traffic at all street intersections where possible; and safe crossings for pedestrians at intervals of not more than two hundred (200) feet. Adequate crossings shall be maintained for vehicles and pedestrians when an excavation is made across any public street, alley or sidewalk. If the street is not wide enough to hold the excavated material without using part of the adjacent sidewalk, a passageway at least one-half of the sidewalk width shall be maintained along such sidewalk line. When an excavation on any major or minor arterial takes up more than one-third of the roadway and is to remain open, overnight, steel bridging of sufficient strength will be required to maintain a normal traffic flow.

The permittee shall take appropriate measures to assure that during the performance of the excavation work, traffic conditions are as near normal as possible and shall be maintained at all times, so as to minimize inconvenience to the occupants of the adjoining properties and to the general public.

When traffic conditions permit, the Police Chief, or their designated representative, may, with written approval (or by verbal approval in case of emergency), permit the closing of streets and alleys to all traffic for a period of time prescribed by them, if in their opinion, it is necessary. The written approval of the Police Chief of the Town may require that the permittee give notification to various public agencies and to the general public. In cases of an emergency on weeknights, weekends or holidays, the facility owner, having such emergency, shall contact the police and fire departments by phone before closing a street to traffic. Warning signs shall be placed far enough in advance of the construction operation to channel traffic, in accordance with the instructions of the Police Chief of the Town after their review of the proposed traffic control measures for the project.

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#### XIV. RELOCATION AND PROTECTION OF UTILITIES:

The permittee shall not interfere with any existing facility without the written consent of the Town and the owner of the facility. If it becomes necessary to relocate an existing facility, its owner shall do this. No facility owned by the Town shall be moved to accommodate the permittee, unless the cost of such work be borne entirely by the permittee. The cost of moving privately owned facilities shall be similarly borne by the permittee, unless other arrangements are made with the person owning the facility. The permittee shall support and protect, by the use of timbers, all pipes, conduits, poles, wires or other apparatus, which may, in any way, be affected by the excavation work, and do everything necessary to support, sustain, and protect them under, over, along or across said excavation work. The permittee shall secure approval of the method of support and protection from the owner of the facility. In case any of said pipes, conduits, poles, wires or apparatus should be damaged, including pipe coating or encasement or devices are to be considered as part of a substructure, the permittee shall promptly notify the owner thereof and the Public Works Department. All damaged facilities shall be repaired by the agency or person owning them, and the expense of such repairs shall be charged to the permittee. It is the intent of this paragraph that the permittee shall assume all liability for damage to facilities and injury to persons. The only exception will be such instances where damage is exclusively due the negligence of the owning company. The Town shall not be made a party to any action because of this paragraph. The permittee shall inform themselves of the existence and locations of all underground facilities and protect the same against damages.

#### XV. PROTECTION OF PUBLIC PROPERTY:

The permittee shall not remove, even temporarily, any trees or shrubs which exist in the street area without first obtaining the consent of the appropriate Town department, or Town official having control of such property.

#### XVI. CARE OF EXCAVATION MATERIAL:

All materials excavated from trenches and poles adjacent to the trench, or in any street, shall be piled and maintained in such a manner as not to endanger those working in the trench, pedestrians, or users of the streets; and so that as little inconvenience as possible is caused to those using the street adjoining properties. Whenever necessary, in order to expedite the flow of traffic, or to abate the dirt or dust nuisance, toe boards or bins may be required by the Town to prevent the spreading of dirt into traffic lanes where the confines of the area being excavated are too narrow to permit the piling of excavated material beside the trench. The Town shall have the authority to require that the permittee haul the excavated material to a storage site, and then, re-haul it to the trench site at the time of back filling.

It shall be the permittee's responsibility to secure the necessary permission and make all necessary arrangements for all required storage and disposal sites.

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XVII. DRIVEWAY OR ROAD ENTRY:

Driveway or road entry to a Town street requires a permit (see "Permit/License Requirements"). Permit must be approved by both the Public Works Highway Superintendent and the Town of Exeter Board of Selectmen.

- A. It is required that the area adjacent to the highway be graded in such manner that the surface will slope from the edge of the pavement to a drainage gutter. Adequate provisions must be provided for proper drainage. Culverts and head walls are required when determined to be necessary.
- B. Other access to the highway from the premises is to be prevented by construction of barriers, such as grass plot, low hedge, curbing, etc.
- C. No part of the right-of-way shall be used for other than travel.
- D. Driveway entrance width may vary. However, twenty feet is nominal.
- E. On roadways of the State of New Hampshire, the permit is issued by New Hampshire Department of Public Works and Highways.
- F. A safe sight distance of two hundred feet in both directions is required on an entrance to a residential street from a point in the driveway, ten feet back from the traveled way.

XIX. BACKFILLING OF EXCAVATION:

Fine material (free from lumps, stones larger than three inches in any diameter, and any frozen material) shall be thoroughly compacted around and under the substructure to the upper level of ten inches and thoroughly compacted by approved mechanical compactors. Within eighteen inches of the subgrade of the pavement, back fill shall be good, clean, bank run gravel, compacted in lifts of eight to ten inches. The Town may require soil tests to be furnished by a recognized soil testing laboratory, or registered, professional engineer specializing in soil mechanics, when, in its opinion, back fill for any excavation is not being adequately compacted. In order for the resurfacing to be permitted, such tests must show that the back fill materials meet the minimum requirements, as prescribed by the Town. All expense for such tests shall be borne entirely by the permittee.

XX. REPAIR OF ROADWAY EXCAVATIONS:

- A. Temporary Repairs: As soon as the excavation has been back filled and tamped, the pavement may be temporarily replaced. The temporary pavement shall consist of four inches of cold patch material, or hot bituminous concrete, and placed in accordance with the Department of Public Works Specifications.

No traffic is to pass over an area in which an excavation has been made until the temporary pavement has been placed, unless approved by the Highway Superintendent.

In the event of non-acceptable maintenance of temporary repairs, the permittee will be notified of such situations. Upon notification, the permittee will make required improvement within twenty-four hours before being billed for improvement. In emergency situations, the Town will make immediate repairs, and the permittee will be billed directly.

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All temporary paving material shall conform closely to the level of the adjoining paved surface and shall be compacted hard enough and smooth enough to be safe for pedestrian travel over it, as well as, for vehicular traffic to pass safely over it at a legal rate of speed. The permittee shall maintain temporary patch for a minimum of seven days, and until permanent patch is made.

B. Permanent Repairs: Applicant must complete the permanent pavement repair in the following sequence and in accordance with the construction detail.

1. After proper backfilling and compaction, adjacent pavement must be "saw cut" (straight cuts) a minimum of one foot around the perimeter of the excavation. Pavement must be removed.
2. Install a three-inch base course of "Type B" asphalt, leaving a one-inch reveal.
3. After fourteen days, and before thirty days, install wearing course.
4. Apply emulsion sealant and perimeter of joint overlapping base course. Install one inch wearing course of "Type E" asphalt to grade. Apply light sand to absorb excess joint sealant.

NOTE: No permanent resurfacing shall be done until the highway division is notified to mark limits of excavation repairs. All temporary pavement material shall be removed within perimeter markings to allow for new, hot bituminous concrete repair.

#### XXI. TRENCH REPAIR:

The maximum, permissible length of open trench, at any time, shall be one hundred feet (100'), and no greater length shall be opened for pavement removal, excavation, construction, back filling, patching, or any other operation, without the written permission of the Town.

#### XXII. PROMPT COMPLETION OF WORK:

After an excavation has commenced, the permittee shall prosecute, with diligence and expeditiously, all excavation work covered by the excavation permit and shall promptly complete such work and restore the street as specified herein. The permittee shall perform such restoration so as not to obstruct, impede or create a safety hazard to either pedestrian or vehicular traffic.

#### XXIII. NOISE, DUST, DEBRIS:

Each permittee shall conduct and carryout excavation work in such a manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of the neighboring property. The permittee shall take appropriate measures to reduce, to the fullest extent possible, noise, dust, and unsightly debris between the hours of 7:00 a.m. and 7:00 p.m. They shall not use, except with the express written permission of the Town, or in case of an emergency as herein otherwise provided, any tool, appliance or equipment producing noise of sufficient volume, so as to disturb the sleep of the neighboring property.

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XXIV. PRESERVATION OF MONUMENTS:

Any monument, set for the purpose of locating or preserving the lines of any street or property subdivision, survey reference point, or benchmark within the Town, shall not be removed or disturbed without first obtaining permission from the Town.

Permission to remove or disturb such monuments, reference points, or benchmarks shall be granted only when no alternate route for the proposed substructure or conduit is available. If the Town is satisfied that no alternate route is available, permission shall be granted, only upon condition by agreement in writing, that the person or utility applying for such permission shall pay all expenses incidental to the proper replacement of the monument.

XXV. GRANITE CURB AND STONES

No person or utility shall remove, damage, haul away or cause misalignment of any granite curbing, catch basin, stones or cobblestones, without first receiving written permission from the Town.

XXVI. BITUMINOUS CURB

Any person or utility damaging bituminous concrete curbing during the course of excavation, or for any other reason, shall replace it.

XXVII. ROAD MARKINGS:

No person or utility shall mark or paint, permanently or temporarily, any road, sidewalk or land on, or within, a Town road or right-of-way, unless the color of said mark or paint is in compliance with the universal marking code for the type of utility use.

Color	Purpose
Red	Electric power lines, cables, conduit and lighting cables.
Yellow	Gas, oil, steam, petroleum or gaseous materials.
Orange	Communications, alarm or signal lines, cable or conduit.
Blue	Water, irrigation and slurry lines.
Green	Sewer and storm drain lines.
White	Boundary, surveying and/or highway measurement marks.

XXVIII. INSPECTIONS:

The Town shall make three (3) inspections and monitor conditions of the excavation for a five (5) year period. The first inspection will be within thirty (30) days after completion of the pavement patch. The second will be at the two (2) year period and the final at five (5) years.

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XXIX. PROCEDURES:

All excavations, with bituminous concrete repairs found deficient during inspection, shall be repaired by the permit holder to "as new" condition or at the discretion of the Highway Superintendent, or Engineer, equal to the existing adjacent pavement condition

XXX. REPAIRS:

Between the one (1) and two (2) year period, the patch shall be infrared treated, or crack sealed at the discretion of the Highway Superintendent or Engineer. Patches found beyond repair must be replaced.

At the five (5) year period, patches shall be crack sealed with the approved crack sealer, or replaced at the discretion of the Highway Superintendent or Engineer.

XXXI. PAVEMENT CRACK SEALANT:

Sealant shall be "W.P. Meadows, Inc. Cold Applied 'Sof-Seal'", or "Hi Spec 'Hot Pour' Joint Sealant" as distributed by A. H. Harris Co., Portsmouth, NH, or an approved equal.

Application shall be as recommended by the Manufacturer.

XXXII. OTHER:

All pavement replacement or repairs to sidewalks, manholes or catch basins adjustments, water gate valves, etc., that may not require a permit, will still require monitoring and crack sealing as for permitted excavations.

XXXIII. PENALTY:

Any person, firm or corporation who violates any of the regulations of this manual shall be subject to a fine up to \$100, as provided by Town Ordinance #505. Those in violation will be issued an order to stop construction. If unsatisfactory work continues, each successive day shall be considered in violation.

If the work, or any part thereof mentioned in the preceding sections, shall be unskillfully or improperly done, the Town shall cause the same to be skillfully and properly done and shall keep an account of the expense thereof. And in such case, such person or utility shall pay the Town an amount equal to the whole of said expense incurred by said Town with an additional amount of 50% to cover indirect costs. Thereafter, upon completion of the work and the determination of the costs thereof, the Town shall issue no further permits to any person or utility until it shall receive payment of said costs.

Any person or utility who continues to violate any regulation of this manual shall receive no further permits until such time as the Town is satisfied that the person, or utility, shall comply with the terms of this manual.

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XXXIV. COMPLIANCE WITH OTHER ORDINANCES, STATUTES OR REGULATIONS.

This document is intended to augment Town ordinances and State of New Hampshire statutes and regulations. The stricter of said ordinances, statutes and regulations will govern when deemed in the best interest of the Town by the Town Manager.

XXXV. PROCEDURE FOR ASPHALT REPAIRS IN THE ROADWAYS

These procedures are supplemental to the "Standard Specifications for Construction of Public Utilities" and are to be followed for all asphalt roadway repairs and maintenance unless specifically waived by the Public Works Director.

1. Selection of asphalt type will be in accordance with the following criteria:
  - a. Pavement base - 3/4" aggregate (Type B)
  - b. Pavement topcoat - 3/8" aggregate (Type F)
  - c. Potholes, crack and crevice repairs, situations where two lift process is impracticable - 3/4" aggregate "Single Course" (Type D)

NOTE: Alternative selection of asphalt type is permissible when the normal type is unavailable from the asphalt plant.

2. Prior to asphalt placement, area is to be clean and free of loose debris.
3. All repairs are to be feathered with a lute and properly compacted. In no instance shall the asphalt lifts (layer) exceed 3".
4. Following placement of asphalt, patch or repair the area is to be cleaned or residual asphalt.

END OF SECTION

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**SECTION F**  
**PROCEDURES AND SPECIFICATIONS FOR**  
**EXCAVATION WITHIN THE RIGHT-OF-WAY OF TOWN STREETS**

**REVISION #1**

III. FIVE YEAR WARANTEE: change to **TWO YEAR WARANTEE:**

Change last paragraph to read:

The bond shall be released to the permit holder upon the expiration of the guarantee period. The guarantee period shall be for a period of **two (2)** years following the placement of the permanent patch. During the guarantee period, the permittee shall be responsible for restoration, repairs and maintenance of their work.

**REVISION #2**

XIX. BACKFILLING OF EXCAVATION

Change paragraph to read:

**To the maximum extent possible the same excavated material should be used as backfill.** Material (free from lumps, stones larger than **six** inches and any frozen material) shall be thoroughly compacted by approved mechanical compactors. Within eighteen inches of the bottom of the pavement, **roadway base material shall meet NHDOT Standard Specifications** for bank run gravel. **Within six inches of the bottom of pavement the roadway base material shall meet NHDOT Standard Specifications for crushed gravel.** **Roadway base materials shall be compacted in six inch lifts.** The Town **will** require soil tests to be furnished by a recognized soil testing laboratory, or registered professional engineer specializing in soil mechanics, for any excavation **in the roadway.** All expense for such tests shall be borne entirely by the permittee. **Testing results must be reported to the department within 24-hours.** **Testing report documents must be delivered to the department within one week.**

Add:

**A. Materials: Shall meet the following NHDOT Standard Specifications:**

- 1. Bank Run Gravel – Section 304 - Item No. 304.2**
- 2. Crushed Gravel - Section 304 - Item No. 304.3**

**B. Compaction Test: The roadway gravels shall be compacted to not less than 95% optimum density using the Modified Proctor Method by nuclear method. For longer trenches compaction tests shall be performed every 100 feet.**

**REVISION #3**

**XX. REPAIR OF ROADWAY EXCAVATIONS:**

Change A. Temporary Repairs: the last sentence to:

The permittee shall maintain the temporary patch until the permanent patch is made.

Change B. Permanent Repairs: as follows:

- B. Permanent Repairs:** Applicant must complete the permanent pavement repair in the following sequence and in accordance with the construction detail.
1. After proper backfilling and compaction, **a compaction test shall be performed.**
  2. **After a successful compaction test meeting the required standard,** adjacent pavement must be "saw cut" (straight cuts) a minimum of one foot around the perimeter of the excavation. Pavement must be removed.
  3. **Asphalt paving must be either same day or next day paving at the direction of the Highway Superintendent.**
  4. **The thickness of the asphalt shall match the existing thickness of the surrounding pavement but in no case less than 4" thick.**
  5. **Apply emulsion tack coat to the edges of the trench.**
  6. Install a **minimum** three-inch base course of "Type B" asphalt, leaving a one-inch reveal.
  7. Install **minimum** one-inch wearing course of "Type E" asphalt to grade.
  8. Apply emulsion sealant to the perimeter of the trench patch. Apply light sand to absorb excess joint sealant.

NOTE: No permanent resurfacing shall be done until the highway division is notified to mark the limits of excavation repairs. All temporary pavement material shall be removed within perimeter markings to allow for new, hot bituminous concrete repair.

#### **REVISION #4**

##### XXVIII. INSPECTIONS:

The Town shall make three (3) inspections and monitor conditions of the excavation for a **two (2)** year period. The first inspection will be within thirty (30) days after completion of the pavement patch. The second will at the **one (1)** year period and the final at **two (2)** years.

#### **REVISION #5**

##### XXIX. PROCEDURES:

All excavations, with bituminous concrete repairs found deficient during inspection, shall be repaired by the permit holder to "as new" condition or at the discretion of the Highway Superintendent, or Engineer, **in an improved manner as compared** to the existing adjacent pavement condition.

#### **REVISION #6**

##### XXX. REPAIRS:

**In special circumstances the Highway Superintendent may require the patch to be** infrared treated.  
**Within the two (2) year period the trench patch must be repaired,** crack sealed or replaced at the discretion of the Highway Superintendent or Engineer.

**SECTION F**  
**PROCEDURES AND SPECIFICATIONS FOR**  
**EXCAVATION WITHIN THE RIGHT-OF-WAY OF TOWN STREETS**

**REVISION #1**

III. FIVE YEAR WARANTEE: change to **TWO YEAR WARANTEE:**

Change last paragraph to read:

The bond shall be released to the permit holder upon the expiration of the guarantee period. The guarantee period shall be for a period of **two (2)** years following the placement of the permanent patch. During the guarantee period, the permittee shall be responsible for restoration, repairs and maintenance of their work.

**REVISION #2**

XIX. BACKFILLING OF EXCAVATION

Change paragraph to read:

**To the maximum extent possible the same excavated material should be used as backfill.** Material (free from lumps, stones larger than **six** inches and any frozen material) shall be thoroughly compacted by approved mechanical compactors. Within eighteen inches of the bottom of the pavement, **roadway base material shall meet NHDOT Standard Specifications** for bank run gravel. **Within six inches of the bottom of pavement the roadway base material shall meet NHDOT Standard Specifications for crushed gravel.** **Roadway base materials shall be compacted in six inch lifts.** The Town **will** require soil tests to be furnished by a recognized soil testing laboratory, or registered professional engineer specializing in soil mechanics, for any excavation **in the roadway.** All expense for such tests shall be borne entirely by the permittee. **Testing results must be reported to the department within 24-hours.** **Testing report documents must be delivered to the department within one week.**

Add:

NOTE: No permanent resurfacing shall be done until the highway division is notified to mark the limits of excavation repairs. All temporary pavement material shall be removed within perimeter markings to allow for new, hot bituminous concrete repair.

#### **REVISION #4**

##### XXVIII. INSPECTIONS:

The Town shall make three (3) inspections and monitor conditions of the excavation for a **two (2)** year period. The first inspection will be within thirty (30) days after completion of the pavement patch. The second will at the **one (1)** year period and the final at **two (2)** years.

#### **REVISION #5**

##### XXIX. PROCEDURES:

All excavations, with bituminous concrete repairs found deficient during inspection, shall be repaired by the permit holder to "as new" condition or at the discretion of the Highway Superintendent, or Engineer, **in an improved manner as compared** to the existing adjacent pavement condition.

#### **REVISION #6**

##### XXX. REPAIRS:

**In special circumstances the Highway Superintendent may require the patch to be** infrared treated. **Within the two (2) year period the trench patch must be repaired,** crack sealed or replaced at the discretion of the Highway Superintendent or Engineer.

## SAMPLES & STANDARD DETAILS

### Sample of License, Permits and Policies:

1. Declaration of Sewage Discharge Application
2. Preliminary Application for Water, Sewer or Drainage.
3. Application for Water and/or Sewer Work.
4. Excavation Permit.
5. Utility Pipe Layer's License.
6. Driveway Permit.
7. Pretreatment Device Permit.
8. Application for Storm Drainage Work.
9. Selectmen's Policy 97-21 – Street Acceptance

### Details to be included with these specifications are as follows:

1. Typical hydrant setting.
2. Typical service connections for water systems.
3. Typical thrust blocks for water distribution system.
4. Typical manhole.
5. House sewer typical.
6. Standard trench section.
7. Line allowable leakage per 1000 ft. of water.
8. Typical curbed roadway.
9. Typical patch, concrete pavement.
10. Typical patching standards.
11. Typical pre-cast concrete grease trap.
12. Typical sampling manhole.
13. Typical oil and grease trap.
14. Typical mailbox installation.

### Addenda as Applicable:

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TOWN OF EXETER  
PUBLIC WORKS DEPARTMENT  
10 FRONT STREET  
EXETER, NEW HAMPSHIRE 03833  
603-773-6157

DECLARATION OF SEWAGE DISCHARGE

Petitioner: \_\_\_\_\_ Date: \_\_\_\_\_

Business Name: \_\_\_\_\_

Address: \_\_\_\_\_

Nature of Business: \_\_\_\_\_

Gentlemen:

Pursuant to Federal, State of New Hampshire and Town of Exeter regulations, the petitioner hereby declares and certifies that the proposed flow of \_\_\_\_\_ gallons per day, discharging into the Town of Exeter Sewer System from the referenced property.

\_\_\_\_\_ Contains only nonindustrial flow and raw domestic sanitary sewage, as defined by the New Hampshire Department of Environmental Services.

\_\_\_\_\_ Contains some nonresidential flow, and as such, have completed:

1. An industrial user Pretreatment Questionnaire, attached.
2. Discharge Permit Request, attached.

Further, the petitioner acknowledges and agrees that failure to accurately declare the type of sewage flow, now or in the future, shall be sufficient cause for immediate revocation of access to the Town of Exeter Sewer System and prosecution for violation of Federal Law.

In witness whereof, the parties hereunto set their hands (and seals) the day and year written above.

Petitioner and Owner: \_\_\_\_\_ Date: \_\_\_\_\_

Town of Exeter: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

State of New Hampshire  
Rockingham County

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ and \_\_\_\_\_.

\_\_\_\_\_  
Notary Public/Justice of Peace  
(SAMPLE NUMBER 1)

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TOWN OF EXETER  
PUBLIC WORKS DEPARTMENT  
10 FRONT STREET  
EXETER, NEW HAMPSHIRE 03833  
(603) 773-6157

PRELIMINARY APPLICATION TO CONNECT TO  
TOWN OF EXETER, NEW HAMPSHIRE  
WATER, SANITARY SEWER OR STORM DRAINAGE SYSTEM

PROPERTY LOCATION: \_\_\_\_\_ DATE: \_\_\_\_\_

PROPERTY OWNER AND ADDRESS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROPOSED TIE-IN LOCATION (DRAW SKETCH SHOWING STREETS, LANDMARKS,  
NORTH ARROW, ETC.):

(SAMPLE NUMBER 2, PAGE 1 OF 3)

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TOWN OF EXETER  
PRELIMINARY APPLICATION TO CONNECT TO  
WATER, SANITARY SEWER OR STORM DRAINAGE SYSTEMS

PROPOSED AVERAGE DAILY SEWAGE FLOWS PER UNIT DESIGN FLOW:

Consumption quantities for sewer user's permit:

Single family homes            120 gallons per bedroom

Consumption quantities for all other uses are based on WS1007.02, paragraph "B" of the "New Hampshire Subdivision and Individual Sewage Disposal System design Rules", August 1999.

No water turn on or certificate of occupancy shall be effected until the sewer assessment fee of \$4.85 per gallon discharge and water assessment fee of \$2.00 per gallon is paid for all new and additional building.

Total flow \_\_\_\_\_ gal/day.

PROPOSED WATER REQUIREMENTS:

Service Size: \_\_\_\_\_  
Total Water requirements: \_\_\_\_\_  
Interior sprinkler system: \_\_\_\_\_  
Exterior fire hydrants: \_\_\_\_\_  
Other: \_\_\_\_\_

Design Storm Water Flow: (based on 25 year storm frequency)

Attach all calculations.

Conditions of approval:

The applicant acknowledges and agrees to pay all charges incurred for monitoring, testing and subsequent analysis performed on Town of Exeter's water, sanitary sewer or storm drainage systems in the course of determining said Town utility's available capacity to serve the applicant's project.

Further, the applicant acknowledges and agrees that failure to accurately declare the said flow requirements shall be sufficient cause to deny access to the Town of Exeter Water, Sanitary Sewer or Storm Drainage System.

(SAMPLE NUMBER 2, PAGE 2 OF 3)

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TOWN OF EXETER  
PRELIMINARY APPLICATION TO CONNECT TO  
WATER, SANITARY SEWER OR STORM DRAINAGE SYSTEMS

IN WITNESS WHEREOF, the parties hereto and hereunto set their hand (and seals) the day and year written below:

WITNESS

\_\_\_\_\_

APPLICANT:

BY: \_\_\_\_\_

TOWN OF EXETER:

BY: \_\_\_\_\_  
PUBLIC WORKS DIRECTOR

DATE: \_\_\_\_\_

NOTE: This application should accompany the Declaration of Sewage Discharge and if applicable, Industrial User Pretreatment Questionnaire and Discharge Permit Request.

COMMERCIAL AND INDUSTRIAL FLOWS MUST BE VERIFIED:

(SAMPLE NUMBER 2, PAGE 3 OF 3)

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TOWN OF EXETER  
Application for Sewer Service Work

Date: \_\_\_\_\_

Job Address: \_\_\_\_\_

Owner: \_\_\_\_\_ Contractor: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Phone No. (Home) \_\_\_\_\_ (Office) \_\_\_\_\_

New Service       Transfer       Replace Existing Service       Repair Work

Residential

Commercial

\_\_\_\_\_ X 120 = \_\_\_\_\_ gal.      \_\_\_\_\_ gal.  
No. of Bedrooms      Discharge      Discharge based on Ws 310.05

I understand and agree that the work requested is my complete financial responsibility and that all financial obligations are complete and that I will only hire a reputable contractor who is licensed with the Town to complete all necessary work. I also certify that all necessary state permits have been obtained and approved. I further agree to pay in accordance with the Selectmen's Schedule of Charges and abide by all sewer system rules, regulations and ordinances.

Signature \_\_\_\_\_  
Lot/Building Owner (New Service)

Signature \_\_\_\_\_  
Contractor (Repair or Replacement Work)

Entrance Fee \_\_\_\_\_

Misc. Fee \_\_\_\_\_

Account No. \_\_\_\_\_

By: \_\_\_\_\_

Date Work Inspected \_\_\_\_\_ Pass \_\_\_\_\_ Fail \_\_\_\_\_

Inspector \_\_\_\_\_

Sketch of work (Please show detail and dimensions)

WHITE-MAIN OFFICE, CANARY-SUPT. OFFICE, PINK-CONTRACTOR, GOLDENROD-APPLICANT  
(SAMPLE NUMBER 3)

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TOWN OF EXETER  
Application for Water Service Work

Date \_\_\_\_\_

Job Address \_\_\_\_\_

Owner \_\_\_\_\_ Contractor \_\_\_\_\_

Billing Address \_\_\_\_\_

Phone No. (Home) \_\_\_\_\_ (Office) \_\_\_\_\_

New Service  Transfer  Replace Existing Service  Repair Work

I understand and agree that the work requested is my complete financial responsibility and that all financial obligations are complete and that I will only hire a reputable contractor who is licensed with the Town to complete all necessary work. I also certify that all necessary state permits have been obtained and approved. I further agree to pay in accordance with the Selectmen's Schedule of Charges and abide by all water system rules, regulations and ordinances.

Signature \_\_\_\_\_  
Lot/Building Owner (New Service)

Signature \_\_\_\_\_  
Contractor (Repair or Replacement Work)

Entrance Fee \_\_\_\_\_

Misc. Fee \_\_\_\_\_

Account No. \_\_\_\_\_

By: \_\_\_\_\_

Date Work Inspected \_\_\_\_\_ Pass \_\_\_\_\_ Fail \_\_\_\_\_

Inspector \_\_\_\_\_

Sketch of work (Please show detail and dimensions)

WHITE-MAIN OFFICE, CANARY-SUPT. OFFICE, PINK-CONTRACTOR, GOLDENROD-APPLICANT

(SAMPLE NUMBER 3)

**TOWN OF EXETER  
EXCAVATION PERMIT**

NO:

NOT VALID UNLESS SIGNED

DATE \_\_\_\_\_ DIG SAFE NO. \_\_\_\_\_  
NAME OF APPLICANT \_\_\_\_\_  
COMPANY \_\_\_\_\_ PHONE \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
LOCATION OF PROPOSED WORK \_\_\_\_\_  
PLANNED STARTING DATE \_\_\_\_\_ ESTIMATED COMPLETION DATE \_\_\_\_\_  
NAME OF INSURER \_\_\_\_\_ DATE POLICY EXPIRES \_\_\_\_\_  
NAME OF SURETY \_\_\_\_\_ DATE POLICY EXPIRES \_\_\_\_\_  
PERMIT FEE \_\_\_\_\_ CHECK NO. \_\_\_\_\_ ADDITIONAL FEE \_\_\_\_\_  
ESTIMATED SQUARE YARD \_\_\_\_\_

THIS IS TO CERTIFY THAT I AM FAMILIAR WITH THE RULES, REGULATIONS AND ORDINANCES OF THE TOWN OF EXETER AND ATTEST THAT I WILL DO ALL WORK IN CONFORMANCE WITH SAID RULES, REGULATIONS AND ORDINANCES.

\_\_\_\_\_  
APPLICANT'S SIGNATURE

\_\_\_\_\_  
PUBLIC WORKS AUTHORIZED SIGNATURE

\_\_\_\_\_  
DATE

ACTUAL SQ. YD. OF TRENCH \_\_\_\_\_  
30 DAY INSPECTION PASS \_\_\_\_\_ FAIL \_\_\_\_\_  
NOTES \_\_\_\_\_  
INSPECTOR \_\_\_\_\_ DATE \_\_\_\_\_

2 YEAR INSPECTION PASS \_\_\_\_\_ FAIL \_\_\_\_\_  
NOTES \_\_\_\_\_  
INFRARED/CRACK SEAL PASS \_\_\_\_\_ FAIL \_\_\_\_\_  
INSPECTOR \_\_\_\_\_ DATE \_\_\_\_\_

2 YEAR INSPECTION PASS \_\_\_\_\_ FAIL \_\_\_\_\_  
NOTES \_\_\_\_\_  
INSPECTOR \_\_\_\_\_ DATE \_\_\_\_\_

HARD COPY: APPLICANT

WHITE COPY: OFFICE  
(SAMPLE NUMBER 4)

YELLOW COPY: INSPECTOR

TOWN OF EXETER  
PUBLIC WORKS DEPARTMENT

20\_\_ UTILITY PIPE INSTALLER'S LICENSE

LICENSE NO. \_\_\_\_\_

A license to lay and/or connect building utility pipe to the Town of Exeter's Water/Sewer/Storm Drain System is hereby granted to:

\_\_\_\_\_  
Contracting Firm Name

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State & Zip Code

\_\_\_\_\_  
Telephone Number

\_\_\_\_\_  
Certified Utility Pipe Installer

\_\_\_\_\_  
Date of Certification

\_\_\_\_\_  
Certified Utility Pipe Installer

\_\_\_\_\_  
Date of Certification

\_\_\_\_\_  
Certified Utility Pipe Installer

\_\_\_\_\_  
Date of Certification

This is to certify that I am completely familiar with the Public Works Department's "Standard Specifications for Construction of Public Utilities" on town streets or within rights-of-way, sewer and water regulations, and/or specifications for the construction of water, sewer and drainage facilities. I attest that I, or my business personnel, will do all work in conformance with said rules, regulations and ordinances. I also agree to not backfill any trench or cover my pipe in any way, until inspected by an authorized representative of the Town's Public Works Department.

\_\_\_\_\_  
Contracting Firm's Owner/Mgr. & Title

\_\_\_\_\_  
Date

This license expires on 31 December, 20\_\_\_\_, unless revoked for just cause.

\_\_\_\_\_  
Town Engineer

\_\_\_\_\_  
Date

(SAMPLE NUMBER 5)

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TOWN OF EXETER  
PUBLIC WORKS DEPARTMENT  
10 FRONT STREET  
EXETER, NEW HAMPSHIRE 03833  
1-603-773-6157

DRIVEWAY PERMIT

PERMIT # \_\_\_\_\_

DATE: \_\_\_\_\_

NAME OF APPLICANT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

DESIRED STARTING TIME: \_\_\_\_\_

LOCATION OF PROPOSED DRIVEWAY: \_\_\_\_\_

Upon receipt of this permit, I agree to build a driveway/road entering upon a public right-of-way in accordance with the regulations and specifications set forth by the Town of Exeter. It is the sole responsibility of the applicant to correct any problems and/or conditions created by the construction. Highway Superintendent to be notified upon completion of construction for final inspection. The location of all driveways approved prior to site plan/subdivision review by the Planning Board may be subject to change in order to comply with the applicable "Site Plan" and "Subdivision Regulations" in which case a permit re-application is necessary.

Applicant's signature: \_\_\_\_\_ Date: \_\_\_\_\_

BELOW, DRAW DRIVEWAY WITH PERTINENT DETAILS TO PROPERTY LINES AND STRUCTURES: (Or attach to application).

APPROVED: \_\_\_\_\_ (HIGHWAY SUPERINTENDENT)

NOTES/CONDITIONS: \_\_\_\_\_  
\_\_\_\_\_

APPROVED: \_\_\_\_\_ (SELECTMEN)

NOTES/CONDITIONS: \_\_\_\_\_  
\_\_\_\_\_

NOTE: NOT VALID UNLESS SIGNED

(SAMPLE NUMBER 6)

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TOWN OF EXETER  
PUBLIC WORKS DEPARTMENT  
10 FRONT STREET  
EXETER, NEW HAMPSHIRE 03833  
1-603-773-6157

PRETREATMENT DEVICE PERMIT

This permit allows the owner to use and maintain one pretreatment device at the premises so indicated below:

Name of establishment:	_____	Date	_____
Address	_____	Manufacturer	_____
Phone	_____	Installation date	_____
Owner/Manager	_____	Type of device	_____
		Size of device	_____

INSPECTION FREQUENCY

One year, announced -- charge: \$25.00\*  
All other, unannounced -- No charge.

\*If annual inspection does not pass, a second inspection will be conducted after a thirty (30) day correction period at a \$25.00 additional charge. If problem fails to be corrected, water service will be terminated.

MAINTENANCE

Cleaning and upkeep of the pretreatment device is the sole responsibility of the establishment. The Town of Exeter is in no way responsible for the costs incurred.

PERMIT CONDITIONS

Permit fee is \$10.00.  
This permit is good for one calendar year from the date of approval.  
This permit is non-transferable.  
This permit shall be renewed by the owner every five years as a condition for continued use of the device.  
This permit shall be subject to revocation when and if the rules and regulations contained herein are not being followed.

Date: \_\_\_\_\_

\_\_\_\_\_  
Public Works Director

\_\_\_\_\_  
Owner of establishment

(SAMPLE NUMBER 7)

TOWN OF EXETER  
Application for Storm Drainage Work

Date \_\_\_\_\_

Job Address \_\_\_\_\_

Owner \_\_\_\_\_ Contractor \_\_\_\_\_

Billing Address \_\_\_\_\_

Phone No. (Home) \_\_\_\_\_ (Office) \_\_\_\_\_

New Service                       Replace Existing Service                       Repair Work

I understand and agree that the work requested is my complete financial responsibility and that all financial obligations are complete and that I will only hire a reputable contractor who is licensed with the Town to complete all necessary work. I also certify that all necessary state permits have been obtained and approved.

Signature \_\_\_\_\_  
Lot/Building Owner (New Service)

Signature \_\_\_\_\_  
Contractor (Repair or Replacement Work)

Entrance Fee \_\_\_\_\_

By: \_\_\_\_\_

Date Work Inspected \_\_\_\_\_ Pass \_\_\_\_\_ Fail \_\_\_\_\_

Inspector \_\_\_\_\_

Sketch of work (Please show detail and dimensions)

WHITE-MAIN OFFICE, CANARY-SUPT. OFFICE, PINK-CONTRACTOR, GOLDENROD-APPLICANT

(SAMPLE NUMBER 8)

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TOWN OF EXETER  
SELECTMEN'S POLICY  
NUMBER 97-21 with Amendment 01-21

STREET ACCEPTANCE

The purpose of this policy is to define the process for the Town to acquire ownership and to provide maintenance for streets that are intended to become public Town streets. Authority to accept such streets was granted to the Board of Selectmen by Town Meeting vote in 1986, Article #41.

1. Application

- A. Applicants requesting the Town to assume ownership and maintenance responsibilities for roadways in a Planning Board approved subdivision or site plan review must submit a request in writing to the Board of Selectmen through the Town Manager. Such requests shall include a copy of the proposed deed along with documentation of Planning Board approval of the street layout. Only streets designed and intended to be conveyed to the Town during the Planning Board process will be accepted by the Board of Selectmen. Other private roads will need Town Meeting approval for Town acceptance. Requests will only be accepted between April 1 and November 15 of each year.

Upon receipt of the request, the Town Manager will request Planning, Public Works, Police and Fire Departments to review the request for Town street acceptance. Once all department reviews are completed and recommendations for acceptance are received, the Town Manager will request the Board of Selectmen to consider Town acceptance of the street.

2. Requirements

- A. Deed - A legal document transferring title of the roadway to the Town. Said deed will provide a property description (metes and bounds) in a form that will be acceptable to Town Counsel. The deed must be recorded at the Rockingham County Registry of Deeds. All expenses incurred by the Town for the deed transfer, including legal costs, shall be the responsibility of the applicant.
- B. Recorded plat - A completed and final legal record plat which shows the road layout must be drawn by a licensed surveyor and recorded at the Rockingham County Registry of Deeds.
- C. "As-Built" Drawings - Three sets of "as-built" drawings for the project must be provided to the Public Works Department prior to inspection. "As-built" drawings must be professionally drawn by a N.H. licensed engineer and be clean, legible and true to scale. The drawings must include the following information:

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1. Street profile and layout,
  2. All utility locations to scale,
  3. All easements and/or rights-of-way,
  4. Water, sewer and drainage systems must show the locations of connections, valves and stubs will all appropriate ties, elevations, class and types of pipe and appurtenances,
  5. Location of right-of-way monument.
- D. Inspection - A complete inspection of the roadway and other proposed public improvements that meets approval of the Planning, Public Works, Fire and Police Departments to ensure compliance with all departments' rules and regulations must be accomplished.
- E. Timing - Planning Board approved streets and associated improvements will not be considered for Town acceptance for a three (3) year period from the date of Town inspection of the binder course of asphalt or the build out of the subdivision lots or site improvements, whichever occurs first. The final course of asphalt on the street shall be installed prior to the written request for Town acceptance and shall only be installed after April 1st and before November 15th of any year. In the case of private streets that need Town Meeting approval for Town acceptance, petition warrant articles must be submitted by the required date.
- F. Maintenance - The applicant will be responsible for posting a financial guarantee in the form of cash, a savings passbook held in the name of the Town, or a letter of credit drawn on an acceptable bank or financial institution (see Selectmen's Policy No. 92-06 for the format of the letter of credit) prior to acceptance by the Board of Selectman and before Planning Board release of the performance guarantee. The time period of the maintenance guarantee will be for a minimum of two (2) years. If the Board of Selectmen accepts the street prior to three (3) years from the date the binder course of asphalt is inspected, the maintenance guarantee will be extended to ensure that all applicants are responsible for guaranteeing improvements for a total of five (5) years.

The amount of the maintenance guarantee shall equal 15% of the roadway construction cost plus other proposed public improvements such as water and sewer lines. The maintenance guarantee is intended to be available to the Town to cover the expense of repairs due to deficiencies in design, materials or workmanship for public improvements.

### 3. Acceptance

After all requirements are met and appropriate Department Heads present a recommendation to the Town Manager for street acceptance, the Town Manager will then schedule the request for the Board of Selectmen at its next regularly scheduled meeting. Selectmen will review the recommendations and make the final decision on acceptance.

Effective 1/22/01

(SAMPLE NUMBER 9, PAGE 2 OF 2)

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**STANDARD DETAILS #4. TYPICAL MANHOLE**

**NOTES\***

1. It is the intention that the manhole, including all component parts, has adequate space, strength and leak proof qualities considered shall be an assembly of precast sections. The complete structure shall be of such necessary for the intended service. Space requirements and configurations, shall be as shown on the drawing. Manholes material and quality as to withstand loads of eight tons (8 tons) (H-20 loading) without failure and prevent leakage in excess of one gallon per day per vertical foot of manhole, continuously for the life of the structure. A period, generally in excess of 25 years, is to be understood in both cases.
2. Barrels and cone sections shall be precast reinforced.
3. Precast concrete barrel sections, cones and bases shall conform to ASTM C478.
4. Leakage test shall be performed in accordance with the specifications.
5. Inverts and shelves manholes shall have a brick paved shelf and invert, constructed to conform to the size of pipe and flow at changes in direction. The inverts shall be laid out in curves of the longest radius possible, tangent to the centerline of the sewer pipes. Shelves shall be constructed to the elevation of the highest pipe crown and slope to drain toward the flowing through channel. Underlayment of invert and shelf shall consist of brick masonry.
6. Frames and covers: manhole frames and covers shall be of heavy duty design and provide a thirty inch (30") clear opening; minimum height three inch (3") letters with the word, "SEWER" or "DRAIN" shall be plainly cast into the center of each cover.
7. Bedding screened gravel and/or crushed stone free from clay, loam, organic matter and meeting ASTM C33.

Passing Percentage	Item
100 %	1 inch screen
90-100%	3/4 inch screen
20-55%	3/8 inch screen
0-10%	#4 sieve
0-5%	#8 sieve

8. Where ordered by the engineer to stabilize the base, screened gravel or crushed stone, one and one half inch (1 1/2") to half inch (1/2"), shall be used.
9. Concrete for drop support shall conform to the requirement for class a (3000#) concrete of the New Hampshire Department of Public Works and Highways standard specifications, as follows:
  - a. Cement - 6.0 bags per cubic yard
  - b. Water - 5.75 gallons per bag cement
  - c. Maximum size of aggregate - 1 inch.
10. Flexible joint: a flexible joint shall be provided within forty-eight inches (48") of the manhole.
11. Shallow manhole: in lieu of a cone section, when manhole depth is less than six feet (6'), a reinforced concrete slab cover, having an eccentric entrance opening and capable of supporting H-20 loads, may be used.
12. Manhole steps are not permitted.

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## STANDARD DETAILS #5. TYPICAL HOUSE SEWER

### NOTES\*

1. Minimum size pipe for house service shall be four inches.
2. Pipe and joint materials
  - A. Poly-Vinyl Chloride (PVC) pipe and fittings shall conform to the following standards of the American Society for Testing and Materials (ASTM), D2729 poly vinyl chloride (PVC), sewer pipe fittings.
  - B. Cast-iron pipe fittings and joints
    1. Cast iron pipe and fittings shall conform to the following standards of the American National Standards Institute.
      - a. A21.1 - Thickness design of cast iron pipe
      - b. A21.4 - Cement mortar lining for cast iron pipe
      - c. A21.6 - Cast iron pipe centrifugally cast in metal molds for water or other liquids
      - d. A21.8 - Cast iron pipe centrifugally cast in sand lined molds for other liquids
      - e. A21.10 - Cast iron fittings, 2" through 48" for water and other liquids.
    2. Joints shall be of the mechanical or push-on type. Joints and gaskets shall conform to A21.11 rubber gasket joints for cast iron pressure pipe and fittings.
  - C. Ductile iron pipe, fittings and joints.
    1. Ductile iron pipe and fittings shall conform to the following standards of the United States of American Standards Institute.
      - a. A21.50 - Thickness design of ductile iron pipe and with ASTM A-536 ductile iron castings.
      - b. A21.51 - Ductile iron pipe, centrifugally cast in metal molds or sand-lined molds for water, or other liquids.
    2. Joints shall be specified in C2 above, cast iron pipe joints.
    3. Damaged pipe shall be rejected and removed from the job site.
    4. Joints shall be dependent upon a neoprene or elastomeric gasket for water tightness. All joints shall be properly matched with the pipe materials used. Where differing materials are to be connected, as at the street, sewer wye or at the foundation wall, appropriate manufactured adapters shall be used.
    5. Tees or wyes: Where a tee or wye is not available in the existing street sewer, an appropriate connection shall be made, following manufacturer's instructions using a bolted, clamped, or epoxy cemented saddle, tapped into a smoothly drilled or with a sledge hammer, stuffing cloth or other such material around the joint, or applying mortar to hold the connection, and any other similar crude practices or inept or hasty improvisations, will not be permitted.
    6. Pipe installation: The pipe shall be handled, placed and jointed, in accordance with installation guides of the appropriate manufacturers. It shall be carefully bedded on a four-inch (4") layer of crushed stone and/or gravel, as specified in note 10. Bedding and re-fill for a depth of twelve-inches (12") above the top of the pipe shall be carefully and thoroughly tamped by hand, or with appropriate mechanical devices.
    7. Testing: The completed house sewer, prior to backfilling, shall be subjected to a leakage test in any of the following manners:

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- A. An observation tee shall be installed, as shown, and when ready for testing an inflatable bladder or plug shall be inserted just upstream from the opening in the tee after inflation, water shall be introduced into the system above the plug to a height of five feet (5') above the level of the plug.
  - B. The pipe shall be left exposed and liberally hosed with water to simulate, as nearly as possible, wet trench conditions, or if the trench is wet, the ground water shall be permitted to rise in the trench over the pipe. Inspections for leaks shall be made through the cleanout with a flashlight.
  - C. Dry fluorescent dye shall be sprinkled into the trench over the pipe. If the trench is dry, the pipe shall be liberally hosed with water, or if the trench is wet, ground water shall be permitted to rise in the trench over the pipe. Observation for leaks shall be made in the first downstream manhole.
  - D. Leakage observed, in any of the above alternate tests, shall be cause for non-acceptance and the pipe shall be dug-up, if necessary, and re-laid so as to assure water tightness.
8. Illegal Connection: Nothing but sanitary waste flow from house toilets, sinks, laundry, etc., shall be permitted rood leaders, footing drains or sup pumps or any other similar connection carrying rain water, drainage or ground water, shall not be permitted.
9. House water service should not be laid in same trench as sewer service, but when necessary, shall be placed above and to one side of the house sewer, as shown.
10. Bedding: Screened gravel and/or crushed stone, free from clay, loam, organic material and meeting ASTM C33-67

Passing Percentage	Item
100 %	1 inch screen
90-100%	3/4 inch screen
20-55%	3/8 inch screen
0-10%	#4 sieve
0-5%	#8 sieve

11. Where ordered by the engineer to stabilize the trench base, screened gravel or crushed stone 1 1/2 inch to 1/2 inch shall be used.
12. Location: The location of the tee or wye shall be recorded and filed in the municipal records. In addition, a ferrous metal rod or pipe shall be placed over the tee or wye, as described in the typical "Chimney" detail, to aid in locating the buried pipe with a dip needle or pipe finder.

STANDARD DETAILS #6. TYPICAL TRENCH SECTION

NOTES

1. Ordered Excavation of Unsuitable Material: Below grade, refill with bedding material.
2. Bedding: Screened gravel and/or crushed stone, free from clay, loam, organic matter and meeting ASTM C33 stone size No. 67.

Passing Percentage	Item
100 %	1 inch screen
90-100%	3/4 inch screen
20-55%	3/8 inch screen
0-10%	#4 sieve
0-5%	#8 sieve

3. Where ordered by the engineer to stabilize the trench base, screened gravel or crushed stone 1/2 inch to 1/2 inch shall be used.
4. Sand Blanket: Clean sand, free from organic matter, so graded that 90-100% passes a one-half inch (1/2") sieve and not more than 15% will pass a #200 sieve. Blanket may be omitted for cast-iron, ductile iron and reinforced concrete pipe - provided, however, that no stone larger than two-inch (2") is in contact with the pipe.
5. Suitable Material: In roads, road shoulders, walkways and traveled ways, suitable material for trench backfill shall be the natural material excavated during the course of construction, but shall exclude debris, pieces of pavement, organic matter, top soil, all wet or soft muck, peat or clay, all excavated ledge material which, as determined by the engineer, will not provide sufficient support or maintain the completed construction in a stable condition. In cross country construction, suitable material shall be as described above, except that the engineer may permit the use of top soil, loam, muck or peat, if they are satisfied that the completed construction will be entirely stable and provided that easy access to the sewer for maintenance and possible reconstruction, when necessary, will be preserved.
6. Base Course: If ordered by the engineer, shall meet the requirements of division 300 of the latest edition of the standard specifications for road and bridge construction of the State of New Hampshire Department of Public Works and Highways.
7. Wood Sheeting: If required, where sheeting is placed alongside the pipe and extends below mid-diameter, it shall be cut-off and left in place to an elevation not less than one foot above the top of the pipe. Where sheeting is ordered by the engineer to be left in place, it shall be cut-off at least three feet below finished grade, but not less than one foot above the top of the pipe.
8. "W": Maximum allowable trench width to a plane twelve-inches (12") above the pipe for pipes fifteen-inches (15") nominal diameter or less. "W" shall be no more than thirty-six inches (36"). For pipes greater than fifteen-inches (15") nominal diameter, "W" shall be twenty-four inches (24") plus pipe O.D. "W" shall also be the payment width for ledge excavation and for ordered excavation below grade.
9. For cross country construction, backfill or fill shall be mounded to a height of six-inches (6") above the original ground surface.
10. New Hampshire Department of Environmental Services design standards require ten-feet (10') separation. However, should construction operations reveal or expose a waterline (main or

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service) running approximately parallel and less than ten-feet (10') horizontally from the proposed sewer installation and where it is not practicable to relocate the sewer, the following methods of protection must be employed.

- A. If the waterline can be kept at least eighteen-inches (18") above and three-feet (3') to one side of the sewer, as shown and supported on a bench of original soil, no other protection is required.
- B. If the above separation cannot be achieved, the sewer ductile iron pipe of the same size shall be utilized. Appropriate manufactured fittings shall be employed to adapt the iron pipe to the contract sewer pipe.

Should the waterline cross-over the new sewer with less than an eighteen-inch (18") separation, the sewer - for a distance of ten-feet (10') on each side of the water line - shall be ductile iron pipe. Appropriate manufactured fittings shall be employed to adapt the iron pipe to the contract sewer pipe. As an alternative, the water line may be raised, if feasible, to achieve the required separation.

Should the water line be at or below, the sewer elevation, the water line or the sewer must be relocated to achieve ten-feet (10') horizontal separation, or the water line raised to achieve the required vertical separation.

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Allowable Leakage per 1000 ft (305 m) of Pipeline\*—gph†

Avg. Test Pressure psi (Bar)	Nominal Pipe Diameter—in.															
	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54
450 (31)	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82	4.78	5.73	6.69	7.64	8.60
400 (28)	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60	4.50	5.41	6.31	7.21	8.11
350 (24)	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37	4.21	5.06	5.90	6.74	7.58
300 (21)	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12	3.90	4.68	5.46	6.24	7.02
275 (19)	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99	3.73	4.48	5.23	5.98	6.72
250 (17)	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85	3.56	4.27	4.99	5.70	6.41
225 (16)	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70	3.38	4.05	4.73	5.41	6.03
200 (14)	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55	3.19	3.82	4.46	5.09	5.73
175 (12)	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38	2.98	3.58	4.17	4.77	5.36
150 (10)	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76	3.31	3.86	4.41	4.97
125 (9)	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01	2.52	3.02	3.53	4.03	4.53
100 (7)	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80	2.25	2.70	3.15	3.60	4.05

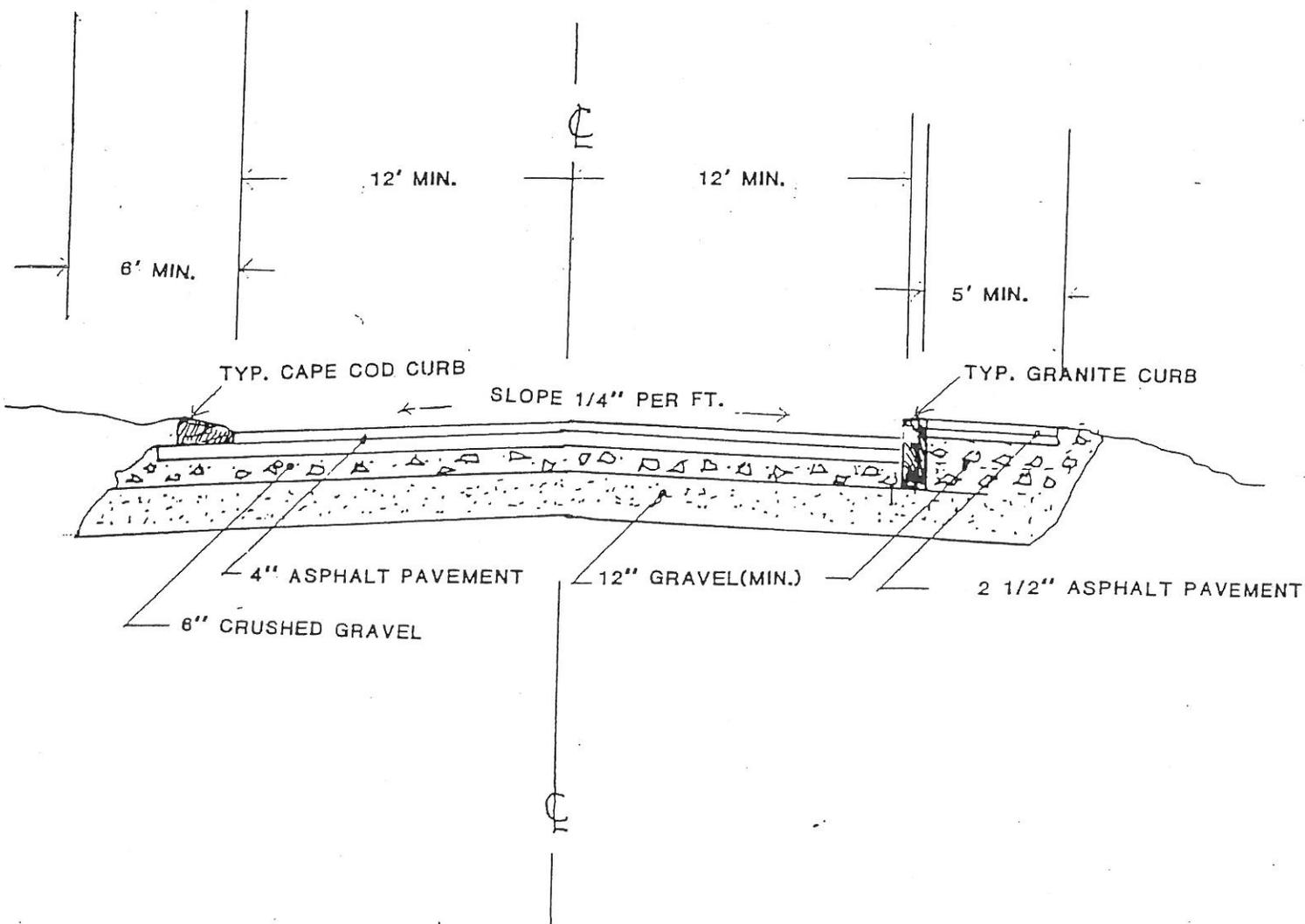
\*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

†To obtain leakage in litres hour, multiply the values in the table by 3.785.

STANDARD DETAILS

TOWN OF EXETER

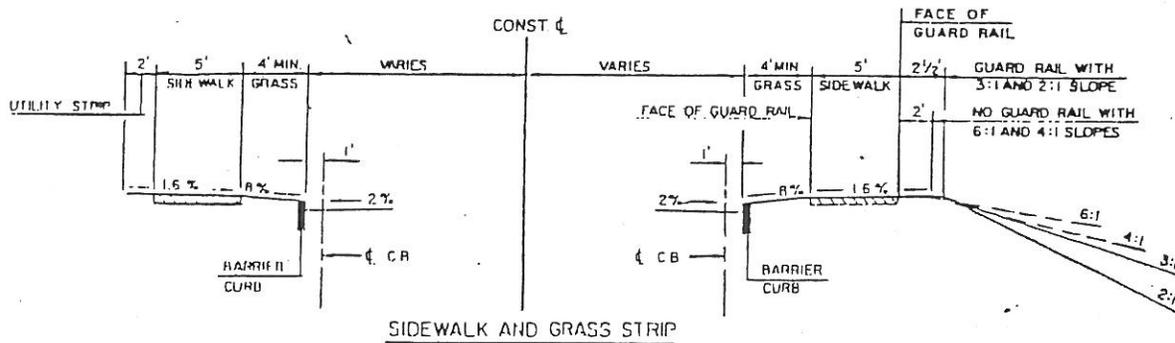
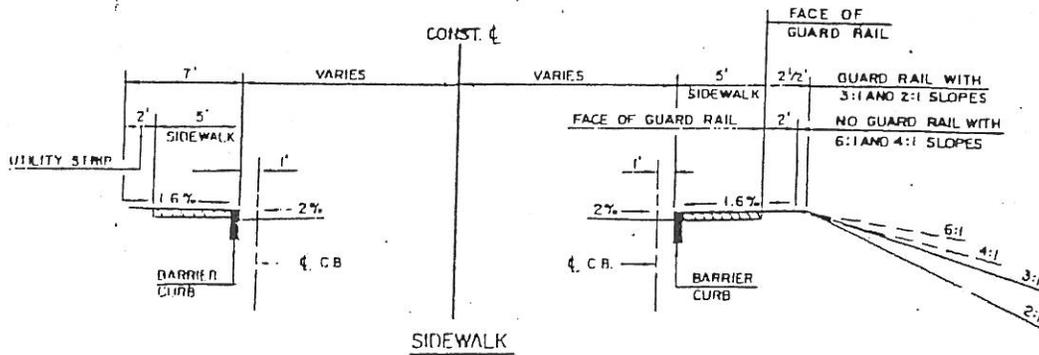
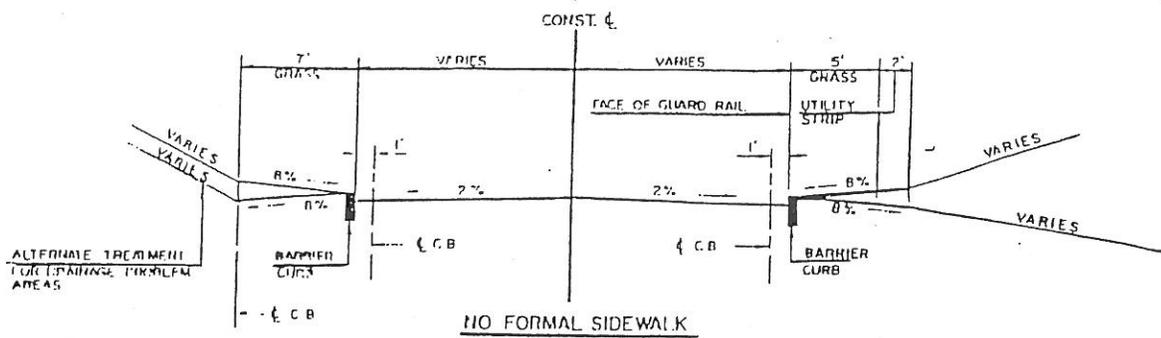
7. ALLOWABLE LEAKAGE PER 1000 FT. OF WATER LINE



1. CURBS TO BE CAPE COD OR GRANITE
2. ROADWAY PAVEMENT: 3" TYPE "B" BASE  
1" TYPE "E" TOP
3. SIDEWALK PAVEMENT: 1 1/2" TYPE "B" BASE  
1" TYPE "E" TOP

# STANDARD DETAILS

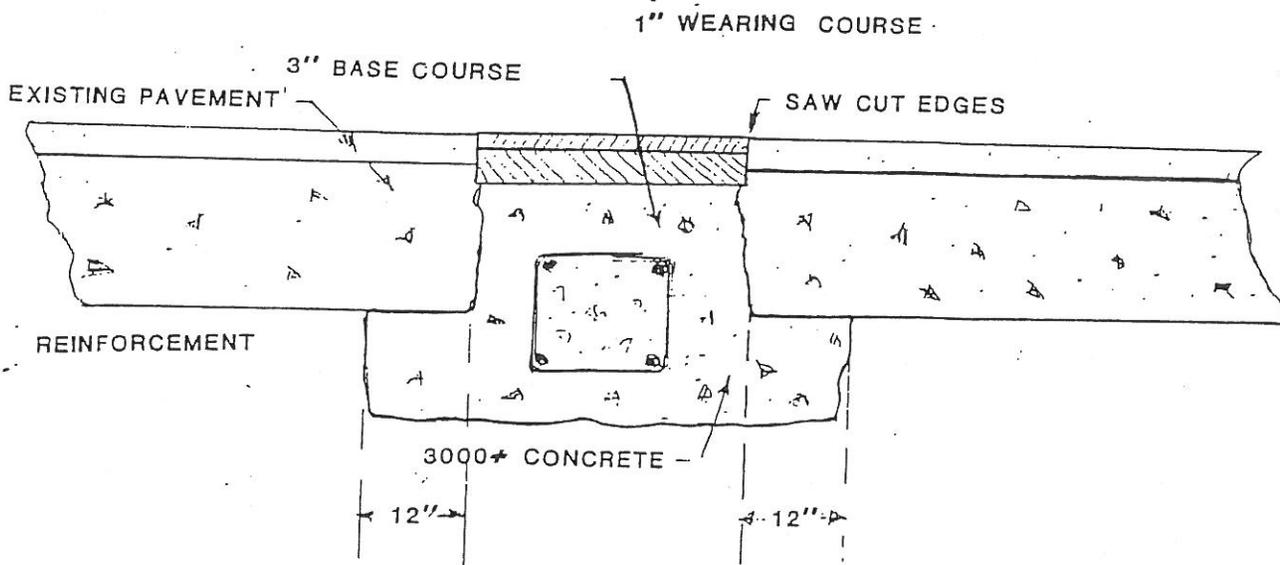
# TOWN OF EXETER



NOTES:

- 1) ON MULTILANE TYPICAL 5, A 10' (MIN.) PANEL ADJACENT TO THE CURB SHOULD BE PROVIDED FOR SNOW STORAGE WHEN PRACTICABLE.
- 2) WHEN PRACTICABLE A 4' (MIN.) GRASS STRIP WILL BE PLACED IN ADVANCE OF ALL SIDEWALKS.
- 3) DIMENSIONS SHOWN ARE DESIRABLE BUT MAY BE VARIED WHERE CONDITIONS WARRANT.
- 4) 8% SLOPE ON GRASS STRIPS SHOWN, MAY BE VARIED TO IMPROVE MATCH TO ADJACENT PROPERTIES.
- 5) CURB REVEAL NORMALLY: 7" BARRIER CURB - AT SIDEWALK LOCATIONS. (TAPER ENDS 0" TO 7" IN 8')
- 6" SLOPE CURB - ON URBAN ISLANDS. (TAPER ENDS 0" TO 6" IN 8')

1. After proper backfilling and compaction, the edges shall be "saw cut" (straight cuts) around the excavation and pavement removed.
2. When the concrete has set, place 3" of base course, type "B" bituminous concrete.
3. After inspection by the Highway Superintendent or his representative the 1" of wearing course, type "A" may be placed.
4. Apply emulsion sealant at perimeter of joint overlapping the base course. Apply light sand to absorb excess joint sealant.
5. This typical procedure may be modified to meet certain conditions, with approval by the Highway Superintendent.

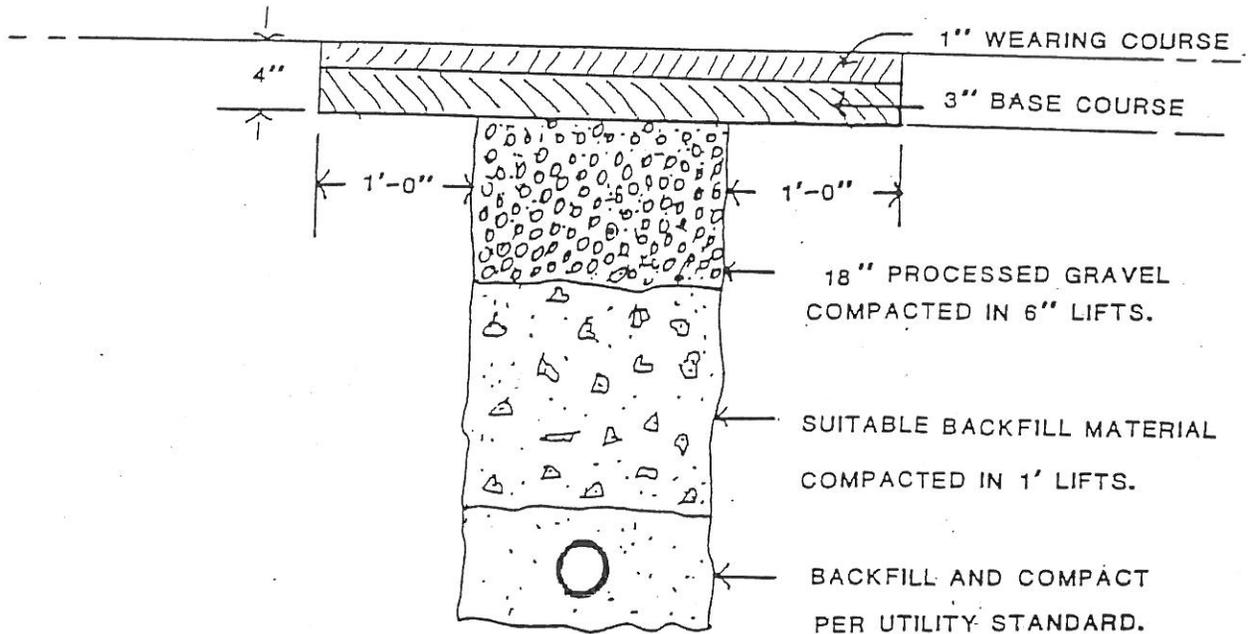


STANDARD DETAILS

TOWN OF EXETER

9. TYPICAL PATCH, CONCRETE PAVEMENT

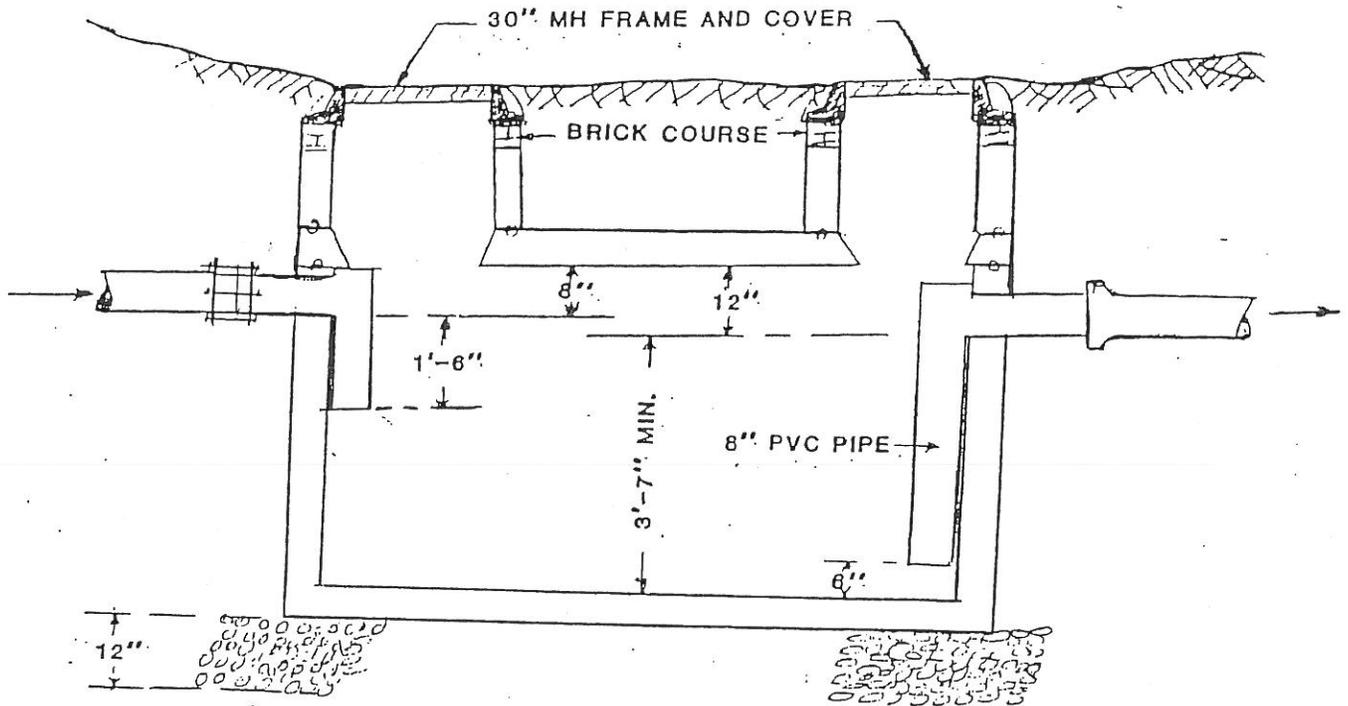
1. After proper backfilling and compaction, adjacent pavement must be "saw cut" (straight cuts) a minimum of one foot around the perimeter of the excavation. Pavement must be removed.
2. Install a three inch base course of "Type B" asphalt, leaving a one inch reveal.
3. After fourteen days, and before thirty days, install wearing course.
4. Apply emulsion sealant and perimeter of joint overlapping base course. Install one inch wearing course of "Type F" asphalt to grade. Apply light sand to absorb excess joint sealant.



## STANDARD DETAILS

## TOWN OF EXETER

### 10. TYPICAL PATCHING STANDARDS

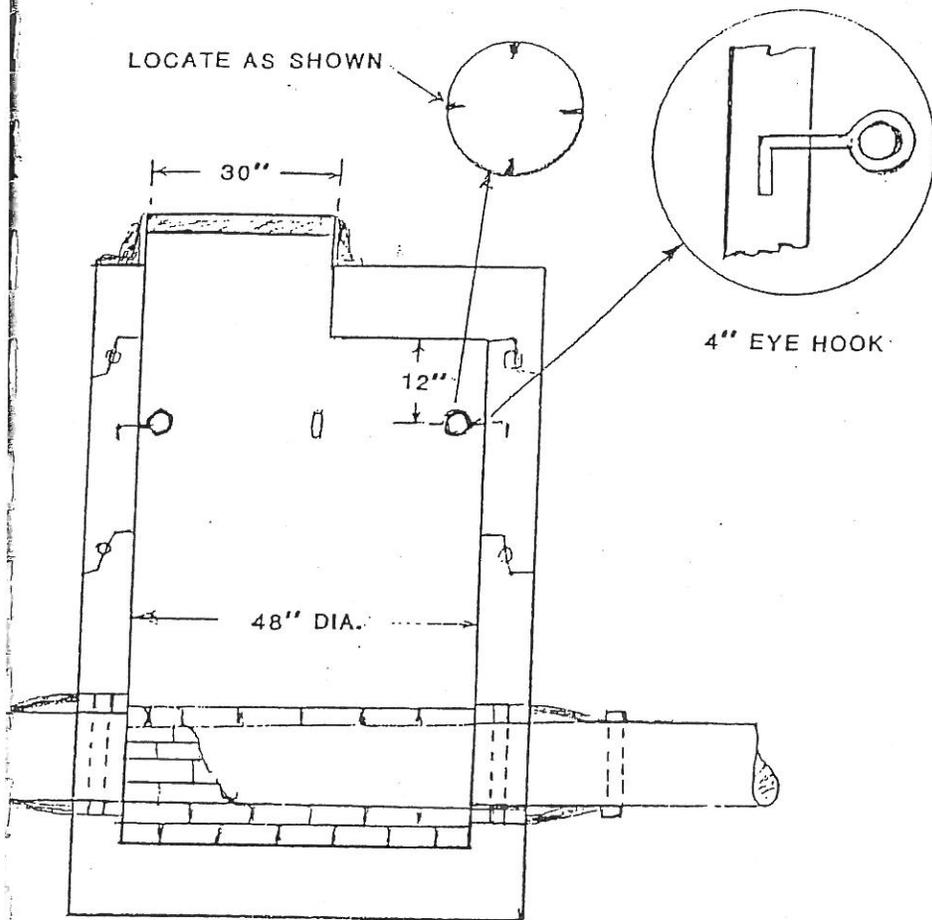


1. For eating establishments the size of the tank shall be based on 2.5 gallons per patron served at the largest seating of the day. The minimum size shall be 125 gallons.
2. Design load shall be H-20.
3. Seal the outside of the tank and manhole with two bituminous coatings.
4. Seal, precast section joints, with 1" Butyl rubber or equal.
5. See Standard Detail #13 for the typical oil and grit trap to be used for floor drains.

STANDARD DETAILS

TOWN OF EXETER

11. TYPICAL PRECAST CONCRETE GREASE TRAP



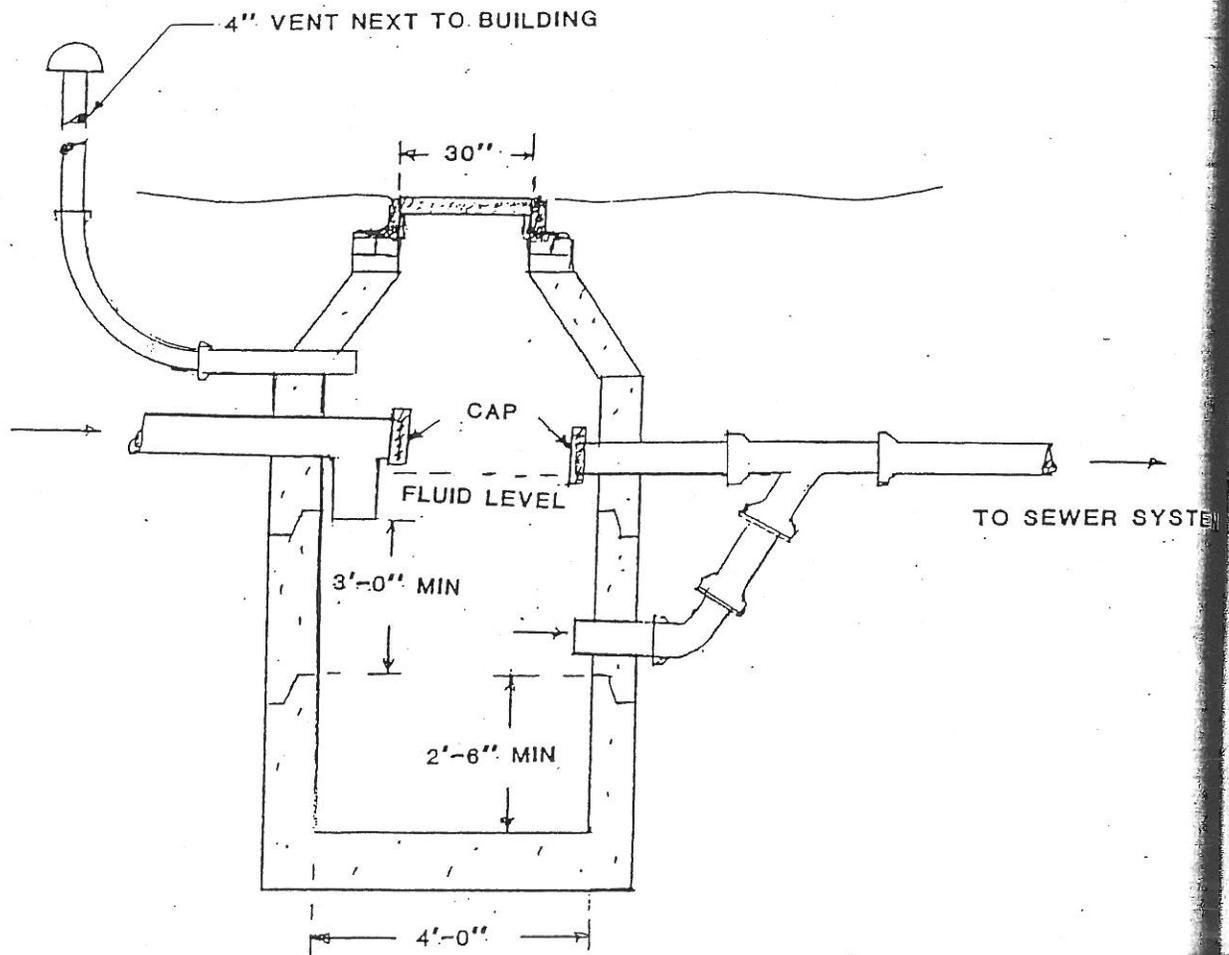
1. Manhole sections shall be precast reinforced concrete. The manhole shall meet H-20 loading.

2. Four stainless steel, 4" eye hooks shall be located 1' from the concrete top slab, at four equal intervals.

3. Inverts, shelves, and connections shall be constructed as shown on Standard Detail #4.

STANDARD DETAILS TOWN OF EXETER

12. TYPICAL SAMPLING MANHOLE



1. See Standard Detail #4, sheet 1 & 2, for details of joints, gaskets, and sleeves.

2. For use with automotive garages, industrial facilities, and others that generate oil or grit that will enter a sewer system.

3. Loading to be H<sub>2</sub>O.

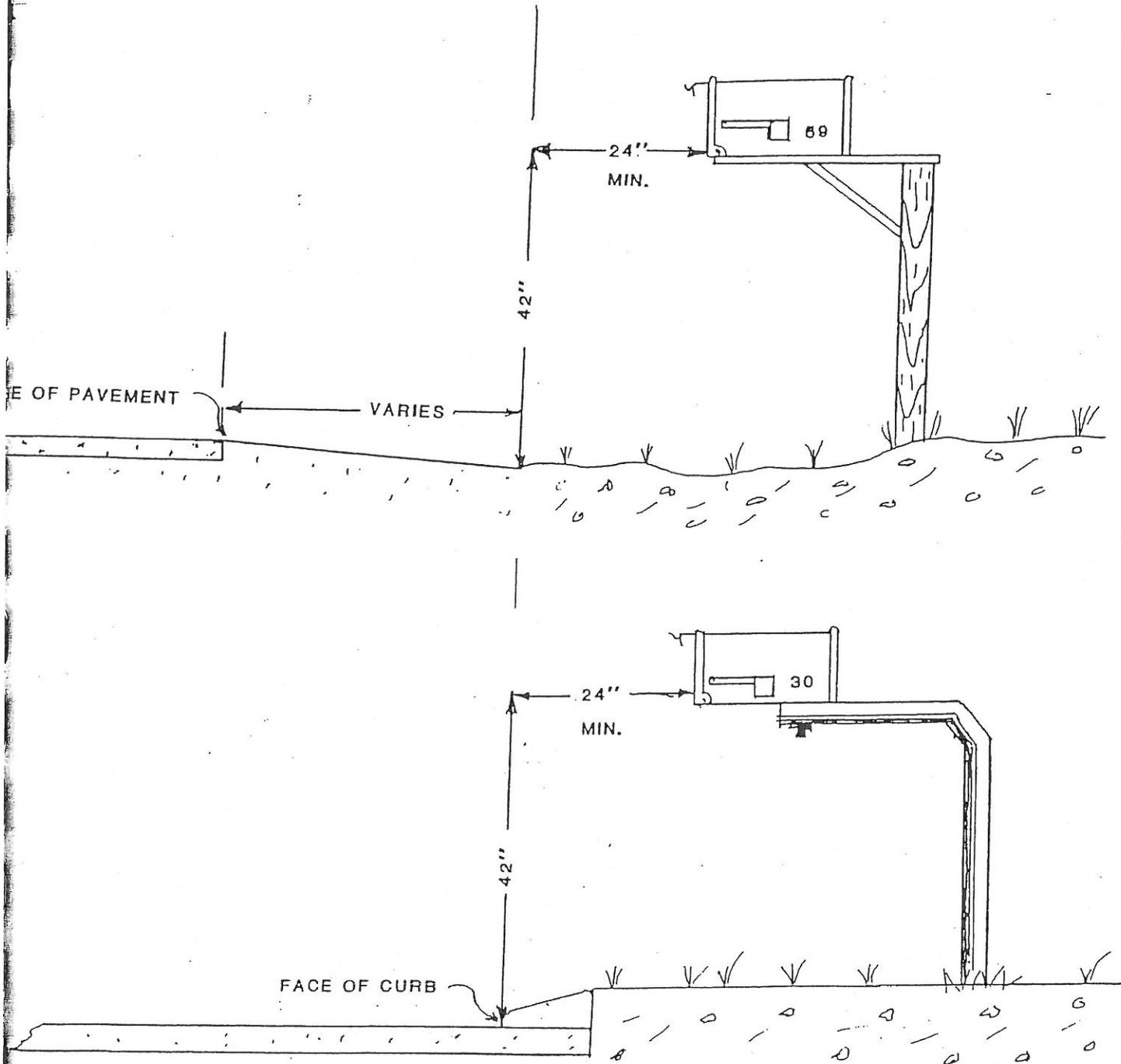
STANDARD DETAILS

TOWN OF EXETER

13. TYPICAL OIL & GRIT TRAP

# TOWN OF EXETER, NH

## TYPICAL MAIL BOX INSTALLATION



In accordance with Town Ordinance #502, mail boxes may not be placed in or obstruct the travel way of any sidewalk in Exeter.