

PART II

PUBLIC IMPROVEMENTS

PART II, Section 1 - General. Requirements

SECTION 1 - GENERAL REQUIREMENTS

- 1 Two (2) sets of plans and specifications for all public improvement work involving roadways, sewers, drains, sidewalks, etc. shall be submitted to the Department of Highways for review. When necessary, two (2) additional sets of plans shall be furnished for submission to the Division of Water Supply & Pollution Control, State of NH Department of Environmental Services (EPA).
- 2 Plans and specifications relative to public improvements included in site development and subdivision projects shall be submitted to the Department of Highways through the City of Manchester Planning Board. One set of plans and specifications shall also be provided to respective utility companies for their review as necessary.
- 3 Site development and subdivision plans shall conform to the requirements of the City of Manchester Planning Board.
- 4 A federal storm water discharge permit must be obtained for all construction activity that disturbs one or more acres of land. This includes the submission of a Notice of Intent (NOI) to the EPA at least seven days before the start of construction, and preparation a Storm Water Pollution Prevention Plan (SWPPP) to be kept onsite. Within 30 days after the project is complete, a Notice of Termination must be filed to the EPA.
- 5 All plans, specifications and calculations shall be prepared by a professional engineer currently licensed in the State of New Hampshire and shall be appropriately stamped.
- 6 All public improvement work shall conform to the requirements of the following agencies, where applicable.
 - American Association of State Highway & Transportation Officials (AASHTO)
 - United States Environmental Protection Agency (EPA)
 - State of New Hampshire
 - Department of Transportation
 - Department of Environmental Services
 - City of Manchester
 - Department of Highways
 - Planning Board
 - Building Department
 - Water Works
- 7 All public improvements shall be constructed according to the City of Manchester, Department of Highways Standard Specifications for Road, Sewer and Drain Construction. This shall be noted on the plans.
- 8 Any change in or variation from the Department of Highways Standard Specifications shall be submitted for review and approval.
- 9 Construction Plans.

PART II, Section 1 - General. Requirements

- 9.1** Construction plans for all public improvements shall contain all horizontal and vertical data necessary for the construction of the roadway, drainage facilities and public utilities.
- 9.2** Plan sheet size shall be 36 inches by 24 inches with the exception of plans required to be recorded at the Hillsborough County Registry of Deeds. Plans to be recorded shall meet the requirements of the Registry.
- 9.3** Plan scale shall be either 1"=20' or 1"=40'.
- 9.4** The horizontal scale of profiles shall correspond to the plan scale. For twenty-scale plans, the vertical scale shall be 1"=2'. For forty-scale plans, the vertical scale shall be 1"=4'.
- 9.5** Cross section scales shall be 1"=5'.
- 10** Vertical granite curbing shall be required for all public roadways.
- 11** All public utilities within the limits of the roadway shall be laid out according to the requirements of the governing utility authority.
- 12** Upon final acceptance and approval by the City of Manchester Planning Board, two (2) complete sets of site development or subdivision plans shall be furnished to the Department of Highways.
- 13** Upon final completion and acceptance of the public improvement work, the following shall be submitted:
- 13.1** One complete set of mylar "as-built" plans prepared by a professional engineer or land surveyor currently licensed in the State of NH, shall be furnished to the Department of Highways. The as-built drawings shall incorporate the following:
- 12.1.1** Final road grades and elevations
 - 12.1.2** Drainage structures and sewers shown on the plan and profile views.
 - 12.1.3** Edges of pavements and curbing shown on the plan view .
 - 12.1.4** All drainage structures should be shown on the plans with Rim, Invert and Sump information. Rims should be reported to the nearest 0.1' and Inverts and Sumps to the nearest 0.01'.
 - 12.1.5** All sewer structures identified by station and offset. Inverts shall be shown to the nearest 0.01' and the Rims to the nearest 0.1'.
 - 12.1.6** The type, size and slopes of all pipes shall be shown.
 - 12.1.7** All structures shall be identified by station and offset.
 - 12.1.8** Tyes to all sewer services shall be provided.
 - 12.1.9** Final location and topography of all treatment swales, detention ponds and other storm water treatment devices shall be shown.
 - 12.1.10** All easements should be clearly shown and defined.

PART II, Section 1 - General. Requirements

12.1.11 All as-built plans should show both the original design and the final design. For example, if structure location, inverts, roadway grades, etc. have significantly deviated from the original design, the old data shall be crossed or grayed out and new data shall be shown.

12.2 A digital copy of the plans described in 3.5.2 in the current release of "Autocad" (or in a format that can be readily converted to Autocad or in any other equivalent file format that is acceptable to the Department of Highways). The following shall be incorporated:

12.2.1 Digital project files shall be based on N.H. State Plane Coordinate System;

12.2.2 Vertical Datum shall be N.V.D. 1988/1992.

12.2.3 Submissions shall be made via 3.5" disk, compact disk, or by attachment to electronic mail.

SECTION 2 -- ROADWAY REQUIREMENTS

2.1 General

2.1.1 The typical cross section of new roadways shall conform to Fig. II-1.

2.2 Horizontal Alignment

2.1.1 The alignment design shall be consistent with acceptable engineering practices and should be such that the safety of the facility is not compromised. Every effort should be made to meet the requirements for a minimum design speed of 30 m.p.h.

2.1.1.1 Street curves shall be designed with as large a radius as feasible, the minimum radius being 200 feet.

2.1.1.2 Streets shall preferably intersect at a 90 degree angle, but in no case, less than 70 degrees.

2.1.1.3 No more than two proposed streets shall intersect at any one location. Closely spaced offset intersections shall also be avoided.

2.1.1.4 Right-of-way bounds shall be required at all angle points, at the PC and PT points of all curves and at the PC and PT points of right-of-way radii at intersections. Bounds shall conform to Section 622 of the Standard Specifications.

2.1.2 At street intersections, the minimum radius of curb return where curbs are used or the outside edge of pavement where curbs are not used, shall be 25 feet.

2.1.2.1 The minimum right-of-way radii at intersections shall be 18 feet.

2.1.2.2 Sight distance calculations may be required for intersections and changes in alignment on a case-by-case basis. Sight distance analysis shall be as outlined in "A Policy on Geometric Design of Highways and Streets 1984", as amended and published by AASHTO.

2.1.3 Cul-de-sacs shall be of the circular, all-paved type and shall have a minimum curb radius of 50 feet (See Fig. II-2).

2.1.3.1 The maximum length for roadways ending at cul-de-sacs shall be 600 feet, measured from the curb line of the intersecting roadway to the beginning of the pavement transition at the cul-de-sac.

2.1.3.2 Turnarounds other than the specified cul-de-sac will be allowed only as a temporary measure (See Fig. II-3).

2.3 Vertical Alignment

2.3.1 Grades shall be no flatter than 0.75 percent. Desirable maximum grades shall be 6 percent with an absolute maximum of 9 percent.

2.3.1.1 Except for stop conditions at intersections, the minimum K values for vertical curves shall be 40 for sags and 30 for crests. The length of vertical curve and corresponding K value shall be shown on the profile.

2.3.1.2 Existing ground elevations and proposed finished centerline grades, shall be shown on the profile at increments of 50' or less.

2.3.2 The gradients of intersecting roadways shall be as flat as practical, in order to provide approach platforms for stopped vehicles.

2.3.2.1 Approach platforms shall extend back from the intersecting roadway a minimum of 100 feet. The platforms shall not exceed a grade of 3 percent unless approved by the Director of Public Works.

2.4 Cross Sections

2.4.1 Cross sections shall be required for all new construction and for improvements to existing roadways for projects 500 linear feet or greater in length. The necessity for cross sections for projects less than 500 linear feet in length shall be at the discretion of the Department of Highways.

2.4.1.1 Cross sections shall be required at intervals no greater than 50 feet. Cross sections shall also be required for all intersecting streets and at all proposed driveways. Additional cross sections may be required at the discretion of the Public Works Director.

2.4.1.2 The roadway template shall conform to the City of Manchester, Department of Highways typical roadway section for all subdivision and site improvement projects. (See Fig. II-1) Any change in or variation from the typical roadway section relative to improvements of existing roadways shall be submitted for review and approval.

2.4.1.3 Sufficient cross section data shall be obtained and gutter line grades shown in those areas where the normal cross slope of the roadway changes.

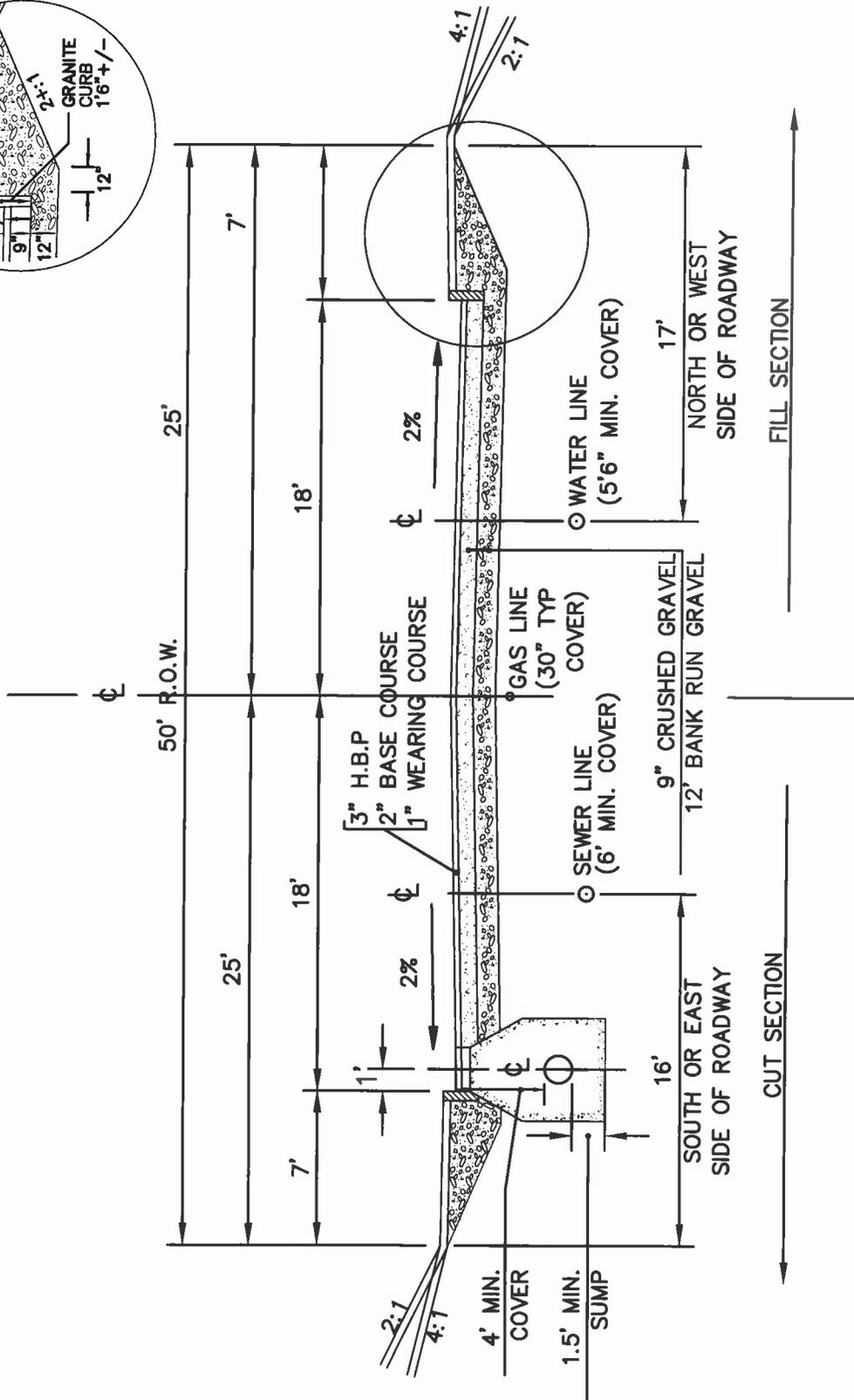
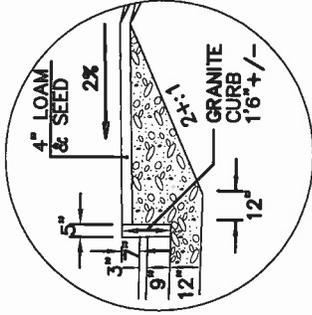
2.5 Driveways

2.5.1 Driveways shall conform to the requirements of the City of Manchester Building Department and the State of New Hampshire Department of Transportation "Policy and Procedure for Driveways and Other Accesses."

PART II, Section 2 - Roadway Requirements

2.5.1.1 All driveways shall have a minimum positive pitch of 2 percent for a distance of 7 feet from the gutter line. Driveway treatment for cut and fill conditions, shall be as shown in Fig. 610-1.

2.5.1.2 All driveways shall be paved to the limits of the right-of-way with a minimum of 3" of pavement.

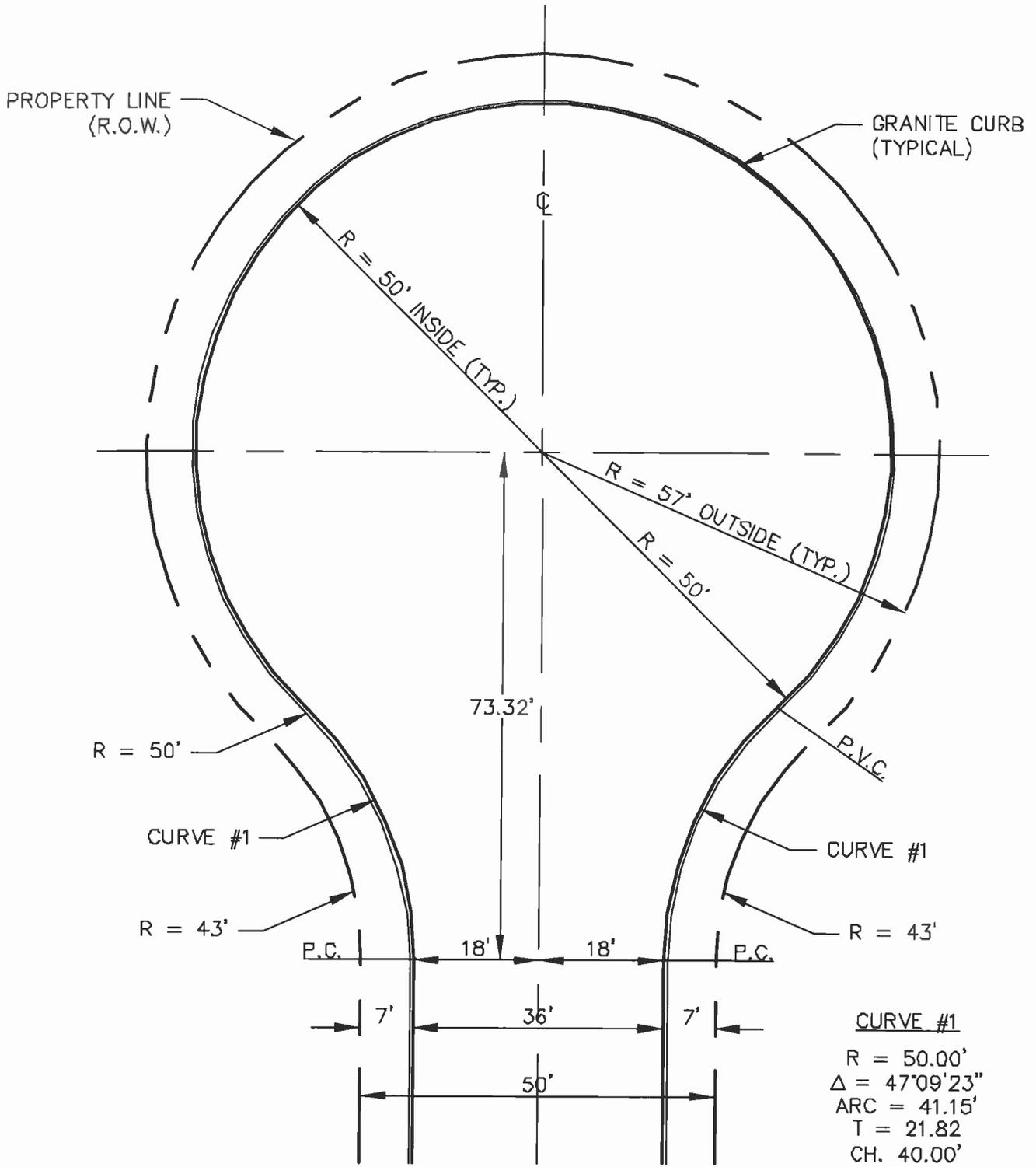


STATIONING
SOUTH TO NORTH
WEST TO EAST

TYPICAL ROADWAY SECTION

S:\DWG\DETAILS\2-1 ROADWAY.DWG

NOT TO SCALE
FIGURE II, 2-1



TYPICAL CUL-DE-SAC

SP:\DWG\DETAILS\2-2 CULDESAC.DWG.

NOT TO SCALE
FIGURE II, 2-2

SECTION 3 - SEWER REQUIREMENTS

3.1 General

3.1.1 Design sanitary flow calculations shall be prepared by a professional civil engineer currently licensed in the State of New Hampshire.

3.1.2 All calculated flows shall be in gallons per day.

3.1.3 All sewer systems and appurtenances shall be constructed in accordance with Sections 601 and 602 of the Standard Specifications Technical Specifications.

3.2 Horizontal Alignment

3.2.1 Sanitary sewer lines shall be located on the south or east side of the roadway (See Typical Roadway Section, Fig. 2-1).

3.2.2 During design, sewer lines shall be located at least 10 feet horizontally from any existing or proposed water line. A deviation from the separation requirement will be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed as follows:

3.2.2.1 Sewer pipe shall be class 52 ductile iron; and

3.2.2.2 Joints shall be pressure tested with zero leakage at 25 pound per square inch for gravity sewers, and at 1 ½ times working pressure for force mains.

3.2.3 Sewers crossing streams or located within 10 feet of a stream embankment shall be protected against erosion.

3.2.4 Manholes shall be placed at the end of each sewer line, at all pipe intersections and at all changes in alignment. Desirable spacing of manholes shall be no more than 300 feet.

3.2.4.1 Manhole locations and the horizontal distance or stationing between manholes shall be shown on the plans.

3.2.5 All pipes shall be laid on a direct line between manholes.

3.2.5.1 The size, type of material and class of pipes shall be shown on the plans.

3.3 Vertical Alignment

3.3.1 Sewers shall be of sufficient depth to receive sewage from below basement floors and to preclude freezing.

PART II, Section 3 - Sewer Requirements

3.3.1.1 The minimum depth of cover in roadways shall be 6 feet and for cross-country installations, shall be 4 feet.

3.3.1.2 Whenever sewers unavoidably must cross under water mains, the sewer shall be located at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. In no case shall the water main pass under the sewer. Whenever sewers must cross water mains, sewer pipe joints shall be located at least 9 feet horizontally from the water main . Joints shall be pressure tested with zero leakage at 25 pounds per square inch for gravity sewers and 1 ½ times working pressure for force mains.

3.3.2 Based on the Manning formula, all sewers shall be designed such that a minimum velocity of 2 feet per second will be maintained when flowing full. Roughness coefficients shall be .009 for PVC pipe and .013 for all other specified pipe materials.

3.3.2.1 Velocities in excess of 10 feet per second shall be avoided whenever possible. Where velocities greater than 10 feet per second may be attained, special provisions shall be made to protect against displacement by erosion and shock.

3.3.2.2 Sewers shall be uniformly graded between manholes and the size, slope, type of material and class of all pipes shall be shown on the profiles. Minimum slopes are noted on Table 2-1 as follows.

TABLE 2 - 1

MINIMUM SEWER SLOPE REQUIREMENT

<u>Sewer Size</u>	<u>Min. Slope (ft/ft)</u>
8"	0.0040
10"	0.0028
12"	0.0022
14"	0.0017
15"	0.0015
16"	0.0014
18"	0.0012
21"	0.0010
24"	0.0008
27"	0.0007
30"	0.0006
36"	0.0005

3.3.3 Manholes shall be located at all changes in grade or pipe size.

PART II, Section 3 - Sewer Requirements

3.3.3.1 A drop entry pipe shall be provided for any sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation will be less than 24 inches, the slope of the incoming pipe sewer shall be adjusted to meet the manhole invert elevation (See Figures 601-4 and 601-5).

3.3.3.2 A drop of at least 0.1 feet shall be provided between incoming and outgoing pipes in all manholes.

3.3.3.3 The minimum diameter of manholes shall be 48 inches. For pipes larger than 24 inches in diameter, manhole diameters shall be increased accordingly in order to provide at least a 12 inch shelf on both sides of the invert.

3.3.3.4 Where the pipe size is increased, the invert of the larger pipe shall be sufficiently lowered to maintain the same hydraulic gradient.

3.3.3.5 Profiles shall indicate all manholes. All pipe invert and rim elevations shall be shown.

3.3.3.6 The locations and depth of other existing or proposed underground utilities shall be shown on the plans and profiles in order to avoid conflicts during construction.

3.4 Pump Stations

3.4.1 City owned sewage pump stations are not encouraged by the Department of Highways.

3.4.2 Private Pump Stations shall conform to the requirements of the State of New Hampshire Water Supply and Pollution Control Division, the City of Manchester Code of Ordinances, Chapter 52 – Sewers, the City of Manchester Standard Specifications, and the following guidelines. Detailed shop drawings, catalog cuts and design calculations shall be submitted and approved by the City. All private pump stations shall be inspected by the Highway Department prior to being placed into operation. A complete set of operation and maintenance manuals will be included with every pump station.

3.4.2.1 Industrial or Commercial Sites:

3.4.2.1.1 Any type of sewage pump station conforming to the requirements of section 3.5.2, shall be permitted for use in order to provide service for one building.

3.4.2.1.2 A site with the potential of being subdivided:

3.4.2.1.2.1 The site and service area must be defined and approved.

3.4.2.1.2.2 Design sanitary flows must be approved.

3.4.2.1.2.3 Submersible pumps will not be permitted unless approved in advance by the Public Works Director.

PART II, Section 3 - Sewer Requirements

3.4.2.1.2.4 A private service agreement must be set up by the Developer of the project and shall define operation, maintenance, cost and cost sharing responsibilities. This agreement must be reviewed and approved by the City.

3.4.2.1.2.5 No site outside the original service area may be added without approval of the Public Works Director.

3.4.2.2 Residential Apartments and Condominiums:

3.4.2.2.1 The sewage pump station will be designed to provide service for only the apartment or condominium site.

3.4.2.2.2 Design sanitary flows must be approved.

3.4.2.2.3 Submersible pumps will not be permitted unless approved in advance by the Public Works Director.

3.4.2.2.4 Standby power and an alarm system must be provided.

3.4.2.2.5 In the case of condominium developments, the Developer may be required to set up and/or participate in a mechanism to fund the cost of operation, maintenance and equipment replacement to assist the Homeowners Association.

3.4.2.3 Single Family Residential Developments:

3.4.2.3.1 Private sewage pump stations proposed in single family residential developments having public roadways and other public utilities will be discouraged.

3.4.2.3.2 Submersible pumps will not be permitted unless approved in advance by the Public Works Director.

3.4.2.3.3 The sewage pump station shall be of wet well/dry well construction, having approved ventilation and provisions for emergency power as a minimum.

3.4.2.3.4 The Developer will be required to set up and participate in a mechanism to fund the cost of operation, maintenance and equipment replacement for the pump station to assist the Homeowners Association. A copy of the pump station maintenance contract for the Homeowners Association will be placed on file at the Highway Department prior to the pump station being placed into service.

3.4.2.3.5 Suction lift pump stations with emergency power may be permitted, depending on the size of the project.

3.4.2.4 Pumped Building Connection:

3.4.2.4.1 Pumped building connections to the public sewers will only be permitted if they conform to this regulation, the City's Sewer Use Ordinance or approved in advance by the Public Works Director.

PART II, Section 3 - Sewer Requirements

3.4.2.4.2 A building connection from an individual sewage lift system for an existing structure will be permitted, if the connection to the public sewer is within 200 feet of the property line.

3.4.2.4.3 A sewage lift building connection for new construction will only be considered if the requesting party can demonstrate that all gravity sewer options have been exhausted and the connection is within 100 feet of their property line.

3.4.2.4.3.1 Multi-lot sewage lift building connections are discouraged. Use may be approved at the sole discretion of the Public Works Director.

3.4.2.4.4 Individual sewage lift systems that are approved, must have separate effluent lines (force mains). Common force mains for individual building connection may only be approved at the sole discretion of the Public Works Director.

3.5 Force mains

3.5.1 Force mains shall be sized to yield a cleansing velocity of 3 feet per second or greater at design flow.

3.5.2 Force mains shall be provided with automatic air relief valve(s) at high points to prevent air locking.

3.5.3 Force mains shall enter the gravity sewer system at a point not more than 2 feet above the flow line on the receiving manhole.

3.5.4 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.

3.5.5 Force mains shall be constructed of ductile iron, polyethylene or PVC material.

3.5.6 Thrust blocks shall be placed at all bends, elbows, tees, and junctions.

3.5.7 Force mains shall be treated as gravity sewers for purposes of foundations bedding and backfill requirements.

SECTION 4 - STORM DRAINAGE REQUIREMENTS

4.1 Calculations. Design storm runoff calculations shall be prepared by a professional civil engineer currently licensed in the State of New Hampshire and shall be submitted to the Department for review. The calculations shall include:

4.1.1 A topographic plan with contours sufficient to show storm runoff areas tributary to and including the site shall be prepared and submitted to the Department of Highways for review.

4.1.2 A storm drain design based on a 10-year storm for laterals and a 25-year storm for main line pipes and culverts.

4.1.3 Plans that include areas tributary to the site as well as for the site itself.

4.1.4 Design calculations for the proposed systems to control runoff from the site

4.1.5 The design of the drainage system shall include an analysis of any adverse effects on upstream and downstream public and private lands or facilities including but not necessarily limited to the following:

4.1.5.1 Contamination of public and private water supplies, ponds or pools and wells;

4.1.5.2 Increased flows in existing drainage channels;

4.1.5.3 New drainage outlets on public or private property

4.1.5.4 Disruption of existing public or private surface or subsurface drainage systems;

4.1.5.5 Temporary or permanent flooding of public or private property, and

4.1.5.6 Erosion of or deposition on public or private property.

4.1.6 Drainage systems for proposed site developments and subdivisions involving the construction of new roadways shall meet the requirements of Section 6.5 of the Subdivision and Site Plan Regulations of the City of Manchester, dated January 13, 2000.

4.1.7 Temporary and permanent erosion and sediment control measures shall be implemented in accordance with the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, dated August, 1992 prepared for the New Hampshire Department of Environmental Services.

4.2 Drainage Pipe

4.2.1 All drainage pipe shall be reinforced concrete pipe (RCP) or high density polyethylene (HDP) pipe.

4.2.2 Under roadways, when the cover over the pipe is less than 15 feet, HDP or Class IV RCP pipe may be used. Class III reinforced concrete pipe or HDP pipe shall be

PART II, Section 4 - Drainage Requirements

allowed for all other locations. When the cover over the pipe is 15 feet or greater, reinforced concrete pipe shall be used.

4.2.2.1 Minimum cover for all drain pipes shall be 4 feet. Where the minimum cover requirement cannot be met, the strength of the pipe should be checked. In no case will HDP pipe be allowed with less than 4 feet of cover.

4.2.2.2 Minimum size for drain pipes shall be 12 inches.

4.2.2.3 The maximum size for HDP pipe shall be 24 inches

4.2.2.4 All storm drain lines shall be designed such that a minimum velocity of 2.5 feet per second will be maintained when flowing 1/3 full. A Manning roughness coefficient of 0.015 shall be used for reinforced concrete pipe and 0.009 shall be used for HDP pipe. For open ditches, a minimum desirable grade of 0.5 percent shall be employed where possible in order to keep the ditch self-cleaning.

4.2.2.5 Approved headwalls shall be constructed at all pipe outlets and flows directed through stabilized channels. The velocity at all pipe outlets shall be determined and proper precautions taken against predictable downstream erosion and deposition. Protection grates shall be installed on all headwall openings or outlets of 12" diameter or greater. (See Section 606 – Storm Drains)

4.2.2.6 Pipe culverts shall be designed as open flow channels. They shall either be under inlet or outlet control. It is preferred that culverts be located to fit natural channels in line and grade.

4.2.2.7 Where velocities in excess of 10 feet per second may be attained, special provision shall be made to protect against erosion and displacement by shock.

4.3 Drainage Structures

4.3.1 Drainage Structures shall be placed at all pipe intersections and at all changes in alignment, grade and pipe size but, in any case, a storm drain shall not have a manhole or catch basin more than 300 feet apart. The maximum desirable length for open ditches out-letting at culverts or catch basins shall be 400 feet.

4.3.2 Catch basins shall have 2'x2' Type "B" grates and shall be installed with granite curb inlets (where vertical granite curb is being used) and shall have sumps a minimum of 18 inches deep.

4.3.3 At least one catch basin will be located at the bottom of a sag. Depending on roadway design considerations, an additional catch basin on either side could be necessary. The spacing between the three catch basins will be such as to prevent ponding in the roadway.

4.3.4 Surface runoff shall be intercepted upgrade from all roadway intersections. Catch basins shall be located on the tangents preceding the curb returns.

PART II, Section 4 - Drainage Requirements

4.3.5 Drainage Structure outlet pipes should be at least 3 inches lower than the lowest inlet pipe. Increases in pipe size through a drainage structure shall be accomplished by keeping the crowns of the pipes at an equal elevation.

4.3.6 All pipes shall be laid on a direct line and shall be uniformly graded between drainage structures.

4.4 Detention Basins

4.4.1 City owned detention and retention basins for public improvements are not encouraged. They may be allowed only after it has been demonstrated that no other alternative exists and as approved by the Department of Highways.

4.4.2 Detention basins shall have a buffer of dense vegetation or fencing to limit access. Vehicular access for maintenance shall be maintained.

4.4.3 Outlets from detention basins shall have a minimum pipe size of 12" diameter. Removable orifice plates to restrict flow are allowed and if used, shall be placed at the invert of the outlet pipe.

SECTION 5 - STREET EXCAVATION REQUIREMENTS

5.1. GENERAL

5.1.1. Street Excavation permits shall be issued by the Department of Highways of the City of Manchester.

5.1.2. Anyone wishing to open or excavate any street, must obtain a permit on a form provided by the Department of Highways.

5.2. Inspection Permit Fees and Requirements. All applications for a permit to excavate in, or open a public right-of-way or public property, shall include a fee for each permit applied for. The fee for an excavation permit, payable in advance, is as follows:

5.2.1. An administrative and inspection charge of \$200.00 per permit for all excavations within the public right-of-way or on City property.

5.2.2. A street damage charge of \$5.00 per square foot of excavation occurring within the paved portions of the public right-of-way or on City property.

5.2.3. An infrastructure damage charge of \$1.50 per square foot of excavation occurring within the greenbelt or unpaved sidewalk areas of the public right-of-way or on unpaved portions of City Property.

5.2.4. All street damage and infrastructure damage charges shall be based upon final measurements of patches or disturbances subject to verification of actual excavation impacts by the City's inspection representatives.

5.2.5. If a contractor disputes a final measurement provided by the City he may request to meet with the inspector on site to re-measure the patch. If the City and the Contractor still cannot agree on the patch size, the Contractor may elect to hire at his own cost, a Licensed Land Surveyor to provide the patch size measurement. The City may elect to agree with the survey provided or conduct it's own.

5.2.6. Street excavation permit fees may be annually adjusted by Board of Mayor and Aldermen resolution on July 1st (start of fiscal year) and listed on Schedule I of Article 1-5 of the Code of Ordinances.

5.2.7. The fees for the administrative and inspection charge of the permit may be increased if the work results in additional administrative and inspection time required to complete the work. The base administrative and inspection charge includes 2 hours of on-site inspection. Additional charges will be billed and due upon presentation.

PART II, Section 5 - Street Exc. Requirements

5.2.8. The Public Works Director reserves the right to allow alternative means of repair or restoration or other roadway improvements in lieu of the required infrastructure damage charge.

5.2.9. A Late Permit fee of Two Hundred Dollars (\$200.00), will be charged if any excavation is begun without a Street Excavation Permit (other than those approved as an Emergency Excavation) which is in effect at the time to the excavation.

5.2.10. In the event of an emergency, excavations or closing of City streets due to a utility leak or like situation, the Police Department, Fire Department and Department of Highways Dispatcher shall be notified immediately by telephone. **At the earliest opportunity available**, a representative of the Permittee shall obtain a regular permit at the office of the Department of Highways.

5.2.11. If work is done on a street that is currently under moratorium as described in the Street Restoration and Patching Guidelines, the Permittee will be responsible for paying an additional pavement life reduction factor to be billed and due upon presentation. This factor shall be assessed as follows:

- Street pavement overlay less than 3 years old – two times the street damage charge.
- Street pavement of a reconstructed street less than 5 years old – two times the street damage charge.

5.2.12. Inspection Agreement. The Contractor may be required to obtain an inspection agreement per the requirements of the General Provisions for Construction of Public Improvements, Section 6.2.9, of the **Standard Specifications for Road, Drain and Sewer Construction**.

5.2.13. Work authorized by a permit shall be performed between 7:00 a.m. and 9:00 p.m., Monday through Friday from April 1st through November 15th, unless the permittee obtains written consent from the public works director to do the work during another time. Such permission shall be granted only in case of an emergency or in the event the work authorized by the permit is to be performed in traffic congested areas. In case of an emergency, the “Emergency Provisions” section of the regulation shall apply.

5.2.14. The permittee shall notify the Department of Highways the day construction has begun.

5.2.15. If the construction ceases for more than a day, the Contractor must notify the Department of Highways in advance, when the work will resume. Failure to do so may cause work to be redone so inspections can be performed.

5.2.16. The location of all utility facilities shall be determined sufficiently ahead of excavation work to avoid damage to those facilities and permit their relocation if necessary. The permittee shall, as specified by New Hampshire Law, RSA 374:51 and

PART II, Section 5 - Street Exc. Requirements

374:55, call **DIG SAFE at (1-888-344-7233)** at least **72 hours prior** to any excavation. The permittee shall also notify the Manchester Police and Manchester Fire Department, Manchester Transit Authority and Ambulance Services.

5.2.17. The permit shall be kept with the foreman at the place where the work is being performed and shall be produced for examination upon request of any member or officer of the Department of Highways or any police officer of the City of Manchester.

5.2.18. The Public Works Director may revoke any permit issued under this regulation at any time.

5.3. ENCUMBRANCES AND TRAFFIC CONTROL

5.3.1. No more than 200 feet measure longitudinally shall be opened in any street at one time, except by special permission of the Department of Highways. No opening or excavation in any street shall extend beyond the centerline of the street before being backfilled and the surface of the street made passable to traffic.

5.3.2. A Street Excavation permit gives the right to encumber a roadway with proper traffic control, as long as a minimum of one lane of traffic (11 feet wide) is provided on the street at all times. Access shall be provided to all properties at night and on weekends and to all places of business at all times.

5.3.3. Any street excavation restricting complete traffic movement must have an **“ENCUMBRANCE PERMIT”** in addition to the Street Excavation permit. This Encumbrance Permit will only be issued with an approved traffic control plan. If a complete street closure is necessary, at least seven (7) working days advance notice is required with confirmation of the proposed closure three (3) working days in advance of the actual street closure. The Public Works Director will review and approve any detours required.

5.3.4. If an emergency necessitates the complete closing of a street, the closing will be governed by the **“Emergency Provisions”** section of this regulation.

5.3.5. Every permittee will be required to place around openings, excavations, encumbrances or obstructions, such barriers, barricades, lights, warning flags, danger signs and traffic control personnel as may be required by the Department of Highways or the Manchester Police Department to protect the safety of the general public. Adequate artificial lighting devices are required to call attention to and indicate the actual location of obstructions and hazards.

5.3.6. All barricades, warning signs, lights, temporary signals and other protective devices shall conform with the current edition of the “Manual on Uniform Traffic Control Devices for Street and Highways” which is approved by the Federal Highway Administrator as the national standard for all highways open to public travel.

PART II, Section 5 - Street Exc. Requirements

5.3.7. Traffic control devices shall be set up prior to the start of construction or maintenance operations and shall remain in place only as long as needed, or required by the Department of Highways. Advertisements, notices and signs other than for traffic control shall not be displayed on or attached to any barricade or fence in any highway.

5.3.8. When the work area encroaches upon a sidewalk, walkway or crosswalk area, protective barriers, together with appropriate warning and guidance devices and signs must be utilized so that the passageway for pedestrians is safe and well defined.

5.4. PROTECTION OF WORK AREA

5.4.1. Street line monuments, survey reference points and permanent survey bench marks, shall not be removed or disturbed, unless specifically permitted in writing by the Department of Highways.

5.4.2. Provisions shall be made to provide for proper drainage during construction and the permittee shall be responsible for all claims for damage or injury that may arise from the obstruction or use of any public sewer or drain in connection with the work conducted under the permit.

5.4.3. Shade trees shall not be cut down, trimmed or otherwise injured. Where it is necessary to cut and remove pavement, curb, sidewalk and/or other surface improvement, the material shall be cut and removed by means of equipment suitable to the type of material to be removed and in a manner which results in a minimum amount of damage to adjacent improvements.

5.4.4. As the work progresses, all streets shall be thoroughly cleaned of all rubbish, excess earth, rock and other debris resulting from such work.

5.4.5. Dust control shall be provided as necessary to prevent a nuisance to abutters and surrounding areas. Dust control shall be by wetting or use of calcium chloride or other approved methods.

5.5. PROOF OF COMPLIANCE:

5.5.1. In general, where compliance to the requirements of these regulations and their intent is in question, the permittee, at his expense, shall provide any and all proof of compliance to the Department of Highways. Acceptable proof shall be by, but not limited to, approved independent laboratory tests, approved independent field tests, shop drawings and certificates of compliance from manufacturers. Specific tests as required by regulations and specifications shall be performed as ordered.

5.6. PAVING POLICY:

PART II, Section 5 - Street Exc. Requirements

5.6.1. After an excavation is commenced, the work shall proceed in a continuous manner with diligence and expedition and shall be completed and the street restored, as nearly as possible to its original condition, so as not to obstruct the public places of travel thereon more than is reasonably necessary. Upon completion of final pavement restoration, any pavement markings disturbed during excavation or construction activities associated with the Excavation Permit shall be replaced at no cost to the City.

5.6.2. Trench Projects: Permanent base pavement shall be installed within five (5) days from the date of completion of the work. The final wearing course of the street shall be permanently restored within a period of time not to exceed five (5) days from the date of completion of the project for main streets, and ten (10) days from the date of completion of the project for side streets. On large projects, all trench excavations must be based flush by the end of the work week. It will be the responsibility of the Contractor to take into consideration weather forecasts in planning the work. In the event that these timetables are not met, the Department after notifying the utility will withhold all permits beginning 24 hours after issuing the "late notice".

5.6.3. The permittee shall place and maintain temporary pavement immediately upon backfilling and shall maintain the pavement on a daily basis. Department of Highways inspectors will require temporary "hot-patch" or "cold-patch" dependent upon the location of the opening.

5.6.4. Dual Excavations in the Same Street.

- When main replacements or extensions are made by one or more utilities, the Highway Department may require an overlay of the street. Utilities must submit plans of proposed main extensions to the Department for review, after which a decision will be made. Determination will be made by the Department and will be based upon the number of excavations in the street and/or the percent of the street disturbed.
- If the utilities can coordinate their work and be in the same street within 3 calendar days, no temporary pavement will be required. If the 3 calendar days are not attainable, the first utility to disturb the pavement must place temporary hot mix by the end of the third day. Trenches will be based flush with all structures adjusted to the new grade. The entire street shall then be overlaid.

5.6.5. The Public Works Director, as a condition of the permit, reserves the right to restore the highway or cause the same to be restored under his directions and the permittee shall reimburse the City for any or all liability and expense suffered by reason of such work. If the final restoration is not completed in a prompt manner, department forces will, after notice has been given to the permittee, make final restoration which may be done after their normal working hours (overtime rate). The permittee shall reimburse the City for any liability and expense suffered by reason of such work.

PART II, Section 5 - Street Exc. Requirements

5.6.6. The permit shall be kept with the foreman at the place where the work is being performed and shall be produced for examination upon request of any member or officer of the Department of Highways or any police officer of the City of Manchester.

5.7. STREET RESTORATION AND PATCHING GUIDELINES:

5.7.1. Cuts shall be parallel or perpendicular to the line of the trench. In the case of transverse or diagonal trenching, the pavement shall be sawn to provide a flat diamond shaped patch with a two (2) foot minimum overlap on undisturbed material. It shall be cut at a minimum 1:6 ratio to ensure that only one wheel of a vehicle at a time to strike the patch area (See Fig. 5-1). Within the sawn limits of the final patch, the existing pavement and any temporary material shall be removed and replaced to an equal depth with a minimum of three inches (consisting of two inches of bituminous base pavement and one inch of bituminous wearing course pavement. The pavement shall be laid and compacted in a maximum of two inch thick layers to meet the existing pavement edge exactly. The face of all joints shall be painted with asphalt emulsion.

5.7.2. In cases where multiple excavations are made in a street which would result in the edge of patches being closer than 20 feet, the Department of Highways Inspectors may require a continuous patch.

5.7.3. On surface treated gravel highways, feathering the edges of patches shall be allowed.

5.7.4. Excavations shall be backfilled in layers not to exceed 12 inches and shall be compacted to not less than 95% maximum dry density at optimum moisture content using pneumatic tampers, vibratory compactors or other approved means. Puddling will not be allowed.

5.7.5. The material compacted shall be determined by the standard proctor method in accordance with standard specifications.

5.7.6. If unsuitable for backfill, excavated material shall be replaced with granular backfill gravel as specified in the **“Standard Specifications for Road and Bridge Construction, State of New Hampshire, Department of Public Works and Highways”**, hereinafter referred to as the **“New Hampshire Standard Specifications”**.

5.7.7. The minimum depth to any substructure, except manholes, vault entrance tubes, valve casings and catch basins, shall be 24 inches (30 inches desirable) below the surface of the nearest edge of the traveled portion of the street and no excavation shall be less than 20 inches in width to allow for compaction.

5.7.8. Permanent Pavement Patch. Within the paved roadway areas, the 12 inches of gravel sub-base material shall be placed and compacted in two six inch layers, to achieve 95% density. Following the gravel base, nine inches of crushed gravel base shall be placed and compacted to achieve 95% density. The 12 inch gravel layer may be substituted with a nine (9) inch crushed gravel layer. This will provide a total of 18 inches of crushed gravel road base. However, if existing road base is constructed to current city standard (9 inches of crushed gravel and 12 inches of gravel), it shall be replaced with the same (See Fig. 5-2). Both crushed gravel and gravel shall conform to Department of Highways Standard Specifications.

5.7.9. Temporary Pavement Patch. The surface of the street shall be permanently restored within a period of time not to exceed five (5) days from the date of completion of the project. In any event, the permittee shall place and maintain temporary pavement immediately upon backfilling which shall be maintained on a daily basis (See Fig. 5-3). Department of Highways inspectors will require temporary “Hot-Patch” or “Cold-Patch” dependent upon the location of the opening. All temporary pavement patches shall be painted with 10” (minimum) lettering template that legibly states the name of the Contractor doing the work. The color of the template shall be yellow for the gas, oil and steam utilities, blue for water utilities, red for electric utilities, orange for communications utilities, and green for sewer or drainage utilities.

5.7.10. Within areas of cement concrete or stone base overlaid with asphalt, the Department of Highways will require the replacement of the cement concrete or stone base with class “A” Portland Cement Concrete, reinforced or non-reinforced, as specified in the New Hampshire Standard Specifications to a depth equal to that removed and then overlaid with hot bituminous pavement as specified above (see Fig. 5-4).

5.7.11. In sidewalk and driveway areas, six inches of crushed gravel base shall be placed and compacted to achieve 95% density. Any asphalt or concrete sidewalk surface shall be restored to depth equal to existing with three inches minimum. In case of longitudinal trenches in a sidewalk area, full width restoration may be required (See Fig. 5-5).

5.7.12. In other areas, the excavation shall be restored to the condition that existed before the excavation or as directed by the Department of Highways inspectors. Any existing grassland shall be restored with four (4) inches of sifted loam which shall be fertilized and seeded (See Fig 5-5).

5.7.13. Number of Permits Issued. The Highway Department will deny permits to those Contractors or utilities with an excessive numbers of unfinished patches. The number of permits issued shall be limited as follows:

5.7.13.1. Spring Start-Up. When paving plants open, permits will be issued at the following rates:

PART II, Section 5 - Street Exc. Requirements

No. of Outstanding Patches	No. of Permits Issued/Week
Greater than 25	0 (Including Emergencies)
25 or Less	10 (Including Emergencies)
10 or Less	Unlimited

5.7.13.2. End of Year. The following paving milestones must be met or additional permits will be denied.

Date	No. of Outstanding Patches
1rst Monday in October	50
3rst Monday in October	40
1rst Monday in November	20
November 15th	0
After November 15 th	Issued on a “day to day” basis

The Highway Department will determine whether or not these milestones are met. Decisions on issuing permits **after** Nov. 15th will be on a “day-to-day basis” as weather permits.

5.7.14. Moratorium.

5.7.14.1. After a City street had been overlaid, no excavation permits will be issued for a period of three years unless approval is given by the Director of Public Works or his designee.

5.7.14.2. After a City street has been newly constructed or reconstructed, no excavation permits will be issued for a period of five years unless approval is given by the Director of Public Works or his designee.

5.7.14.3. Protection of Streets – In an effort to protect the City’s investment in its infrastructure, excavations in areas under moratorium within the public right-of-way or on City property, are prohibited except as follows:

- a. Excavations to remedy a public emergency or a situation that creates an imminent threat to the public safety, health or welfare.
- b. Repair or modification to prevent interruption of essential utility services where no reasonable alternatives are available to avoid excavation in new pavements.
- c. Relocation work that is mandated by State or Federal legislation.
- d. Utility services for new buildings or parcels without existing utility services where no other reasonable means of providing service exists, as determined by the City Engineer.
- e. Excavations within protected streets where the City has scheduled the reconstruction within one year due to the failure of the original pavement.

PART II, Section 5 - Street Exc. Requirements

- f. Other situations deemed by the Public Works Director to be in the best interest of the general public.

5.7.14.4. The Highway Department will notify utilities of its schedule of overlay and reconstruction activities. This notification will allow time for utilities to perform work as needed prior to the Highway Department's work. If the Department does not notify the utility of their intent to overlay/reconstruct prior to 60 days of work, then excavations may be granted at the discretion of the Public Works Director or his designee.

5.7.14.5. When excavations are made in streets closed by moratorium due to emergency or the decision of the Department of Public Works, street restoration will be made utilizing methods dictated by the Department. The methods may include but are not limited to infra-red treatment, coldplaning and overlay and/or full width overlay.

5.8. INSURANCE REQUIREMENTS:

5.8.1. The permittee agrees to furnish a continuing surety bond for a period of Thirty (30) months in the amount of five thousand dollars (\$5,000). (Except that the Public Works Director may require up to ten (10) times that amount depending upon the volume of the work being performed by the permittee) guaranteeing the fulfillment of the provisions, instructions and regulations prescribed above and later instructions issued by the Department of Highways during the performance of the work and satisfactory maintenance of the disturbed areas for a period of Thirty (30) months following the completion's of the work and the payment of the charges owed the Department of Highways.

5.8.2. The person, partnership, firm, corporation, etc. who obtains the permit to excavate a city highway, shall be responsible for said excavation for thirty (30) months after all work conducted under the permit has been completed, and may be ordered by the Department of Highways at any time during the thirty (30) month period to improve or replace the work.

5.8.3. The permittee agrees to meet all insurance requirements, terms and conditions of Section 106.13 of the current **Standard Specifications for Road, Drain and Sewer construction**.

5.9. EMERGENCY PROVISIONS:

5.9.1. Emergency excavations or closing of City streets shall be done by obtaining an emergency permit from the Department of Highways.

5.9.2. If such an emergency exists, the Police Department, Fire Department and Department of Highways Dispatcher, as a minimum, shall be notified immediately by telephone. Failure to notify the Highway Department immediately will result in the Contractor be required to re-excavate the excavation to allow the City to confirm that proper construction techniques are used. **At the earliest opportunity available, a**

PART II, Section 5 - Street Exc. Requirements

representative of the permittee shall obtain a regular permit at the office of the Department of Highways.

5.9.3. The Public Works Director reserves the right to waive any of the provisions of this regulation in case of an emergency, and to impose such conditions as he may require as part of an emergency permit.

5.9.4. After an excavation is commenced, the work shall proceed in a continuous manner with diligence and expedition and shall be completed and the street restored, as nearly as possible to its original condition so as not to obstruct the public places or travel thereon more than is reasonable necessary. The surface of the street shall be permanently restored within a period of time not to exceed five (5) days from the date of completion of the project for main streets, and ten (10) days from the date of completion of the project for side streets. In any event, the permittee shall place and maintain temporary pavement immediately upon backfilling and shall be maintain the pavement on a daily basis (See Fig. 5-3). Department of Highways inspectors will require temporary "Hot-Patch" or "Cold-Patch" dependent upon the location of the opening.

5.9.5. Upon completion of the pavement restoration, the Department of Highways shall be immediately notified as to the location and time of completion.

5.10. STREET EXCAVATION GENERAL INSTRUCTIONS:

5.10.1. An Application and Permit form, prepared in accordance with Department procedures, is required for every excavation within the cities right of way and must be accompanied by the required permit fee.

5.10.2. A set of plans showing the work to be performed must accompany each request for a permit.

5.10.3. The original copy of the approved Application and Permit form and an approved set of work and plans (marked "approved") must be kept on the job at all times.

5.10.4. If work for which any Highway Department permit has been issued does not commence within five (5) days from the date of the permit or the proposed construction start date if given, the Permit becomes "void". The permit may be extended by the Department of Highways if a request for an extension is made prior to the permit becoming void. Once a permit has become void, it will be considered as if the permit was never issued, but the fee will not be refunded.

5.10.5. Each applicant must obtain from the Department of Highways, a copy of the Specifications and Regulations governing street excavations in Manchester streets.

PART II, Section 5 - Street Exc. Requirements

5.10.6. The Public Works Director is authorized to revoke any permit if he finds that the City of Manchester Street Excavation Ordinance or the Regulations and Specifications are being violated.

5.10.7. Construction plans for major and minor underground installations submitted to the Department of Highways for permits shall contain the following:

5.10.7.1. MAJOR UNDERGROUND INSTALLATIONS - These projects are defined as follows:

- Those involving more than one conduit.
- Those electric conduits four (4) inches and larger.
- Electrical cable system of 34 KV or higher.
- Gas main two (2) inches in diameter or larger.
- Water mains six (6) inches in diameter or larger.
- Sewer mains eight (8) inches in diameter or larger.

5.10.7.1.1 Plans and Profile Requirements: Drawing should be 24" x 36" with horizontal scale of one (1) inch = 20 feet and vertical scale of one (1) inch = four (4) feet or two (2) feet, (whichever is best) and provide the following:

- Locations of proposed construction.
- All existing facilities, right-of-ways and property lines.
- All construction details.
- Elevations for the entire length of the profile including:
 - Existing roadway;
 - Proposed installations;
 - Existing facilities.

5.10.7.1.2 Elevation datum shall be USC & GS or Manchester City Base.

5.10.7.1.3 "As-Built" Drawings: "As-Built" drawing shall be provided on all major underground installations per the general requirements listed in Part II, Public Improvements of the Standard Specifications.

5.10.7.2. MINOR UNDERGROUND INSTALLATIONS. All proposed underground installations not described above as major installations.

5.10.7.2.1 Plan Requirements: Complete set of drawing shall be provided showing:

PART II, Section 5 - Street Exc. Requirements

- Locations of proposed construction.
- All existing facilities that the proposed construction would cross or parallel in public right-of-way.
- Dimensional ties to monument lines in streets and to property lines.
- A scale of one (1) inch = 20 feet is desired.
- Depth of proposed installations by notes on the permit drawings.

5.10.7.2.2 “As-Built” Drawings: “As-Built” drawings, shall be provided per the general requirements listed in Part II, Public Improvements of the Standard Specifications.

5.11. WINTER EXCAVATION PERMITS:

5.11.1. Application Procedure

5.11.1.1. Between November 15th and April 1st - Permits will be issued on a case by case basis for any Street Excavation with the exception of emergencies. Emergency requests must conform to the following:

1) The permit must be signed by the Public Works Director and there must be a plan with each permit request. New work must also be signed by the Public Works Director.

2) The request must be in a letter form, stating:

- a) Date of request.
- b) Name of Contractor.
- c) Name of customer/homeowner, business, and/or other interested parties.
- d) Detailed description of project..
- e) Reason why it has to be done now.
- f) Method of temporary restoration.
- g) Who will maintain patch until permanently restored with 24 hour contact number.
- h) When will excavation be permanently restored.
- i) Company that will effect restoration.

5.10.2. Winter Construction Procedures

The procedure outlined in the Department of Highways Street Excavation General Instructions, shall be followed **except** for the placing of asphaltic pavement.

PART II, Section 5 - Street Exc. Requirements

5.10.2.1. If hot bituminous concrete asphalt is available, three (3) inches of **temporary** hot bituminous pavement (1/2" aggregate) shall be used. If hot bituminous concrete asphalt is not available, then, QPR 2,000 high performance cold patch shall be placed over a prepared crushed gravel base.

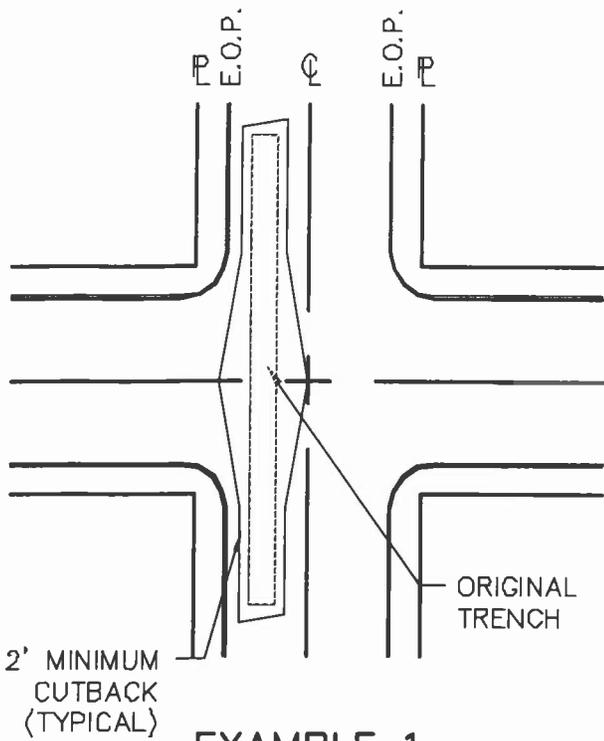
-OR-

5.10.2.2. Three (3) inches of class "A" (3000 PSI) concrete shall be placed over a prepared crushed gravel base.

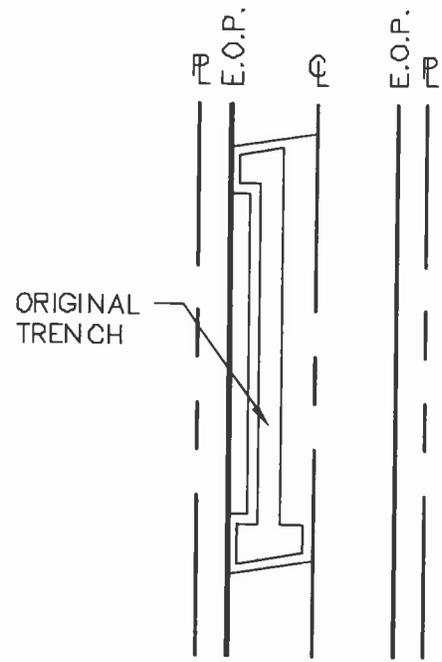
- a) The concrete shall have a one percent (1%) calcium chloride added to accelerate curing.
- b) The concrete placed shall be brought up even with the elevation of the existing asphalt pavement.
- c) The surface of the pavement will have a rough broom-type finish placed perpendicular to the flow of traffic.
- d) The concrete pavement shall be protected from freezing for a minimum of two (2) days by covering it with polyethylene plastic or hay and polyethylene plastic. The length of protection and curing, may be increased or decreased by the Department of Highways depending on the daily temperature.

5.10.2.3. The following spring when hot bituminous pavement becomes available, the **temporary** patch shall be removed and replaced with pavement as required in the Department of Highways Street Excavation General Instructions.

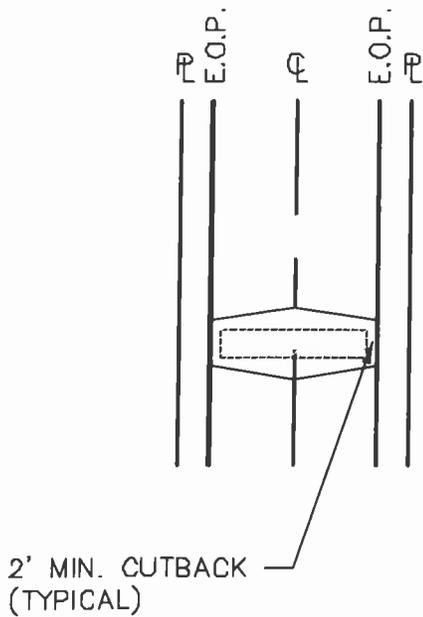
5.10.2.4. The permittee must maintain the temporary patch until permanent restorations can be performed.



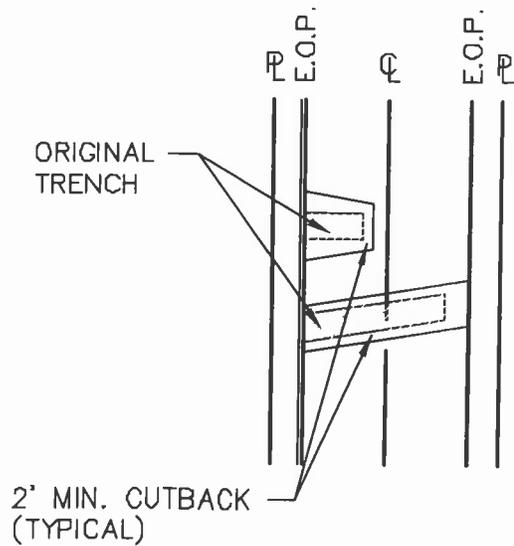
EXAMPLE 1



EXAMPLE 3



EXAMPLE 2



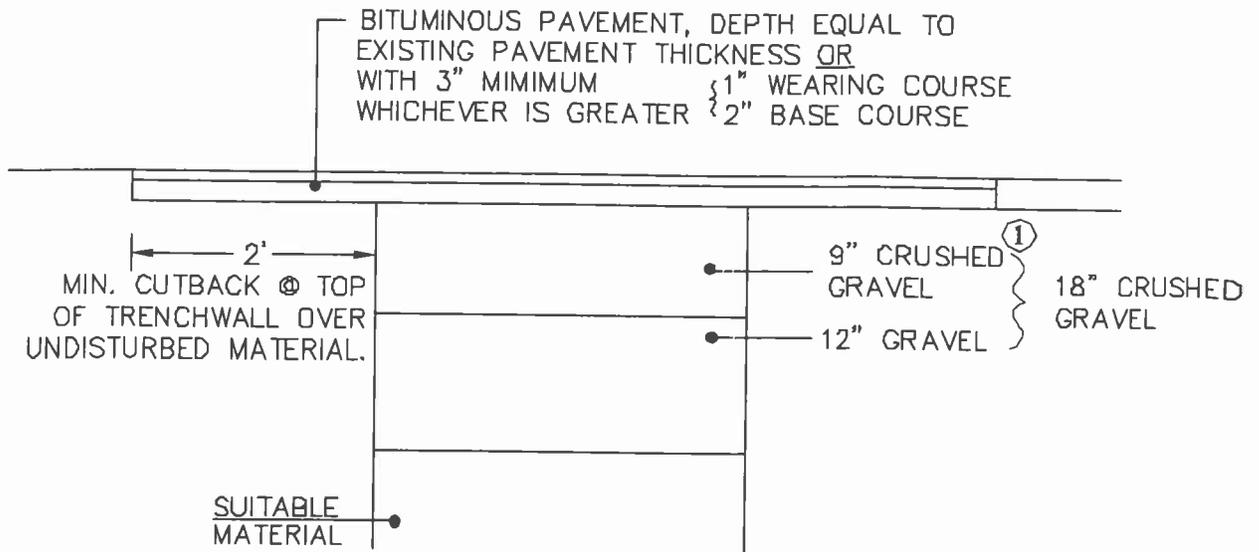
EXAMPLE 4

PATCHING GUIDELINES

□ \\DWC\DETAILS\0-1 PATCH.DWG

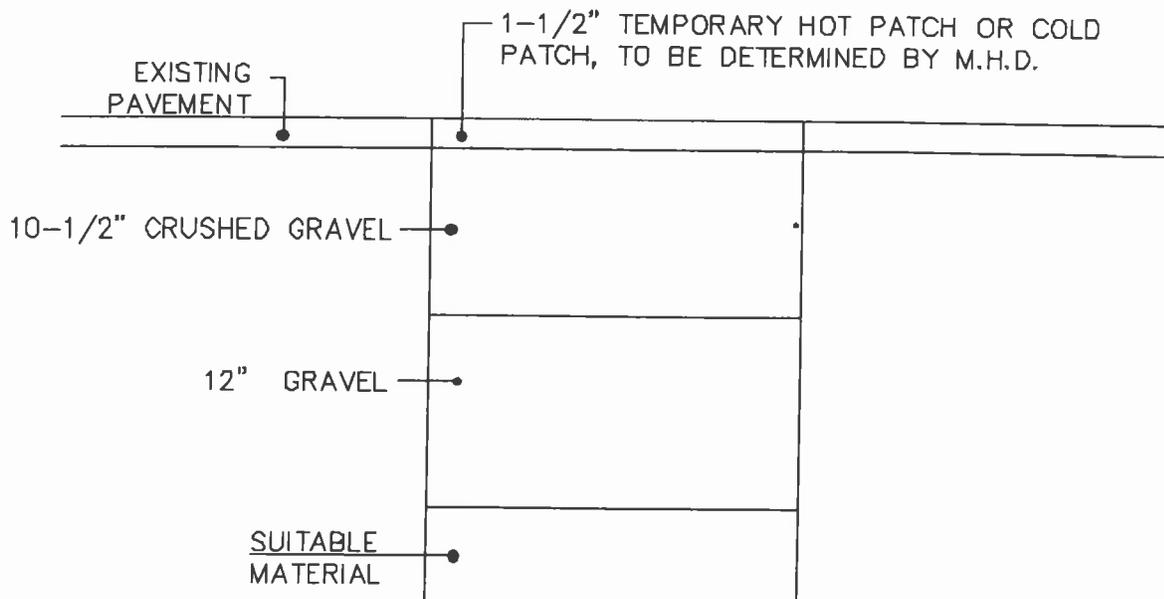
NOT TO SCALE
FIGURE II, 5-1

DIAMOND PATCH CUT AT 1:6 RATIO TO ENSURE THAT ONLY ONE WHEEL OF TRAFFIC CROSSES AT ONCE. IF TRENCH IS ON AN ANGLE DIAMOND CAN BE ELIMINATED AND THE TRENCH CUT AT 1:6.



PERMANENT PAVEMENT REPAIR

FIGURE 5-2



TEMPORARY PAVEMENT REPAIR

FIGURE 5-3

- 1) MATERIALS SHOULD BE REPLACED IN-KIND, WITH MINIMUM THICKNESS AS SHOWN.
- 2) PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REQUIREMENTS.
- 3) ROADWAY CONSTRUCTION SHALL CONFORM TO CITY OF MANCHESTER STANDARD SPECIFICATIONS.

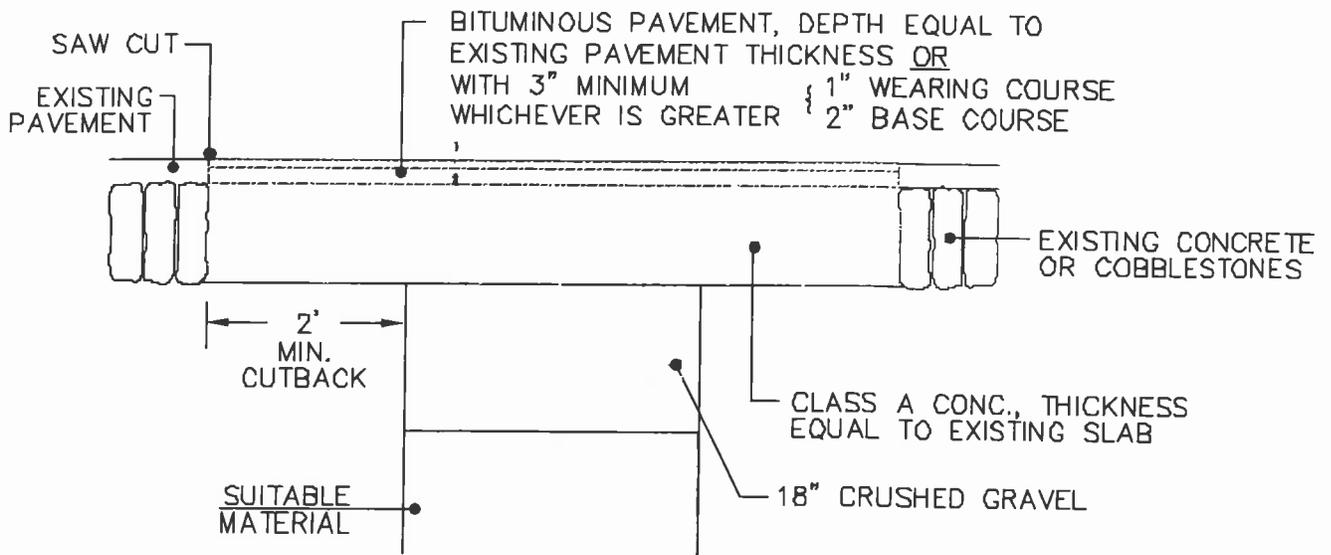
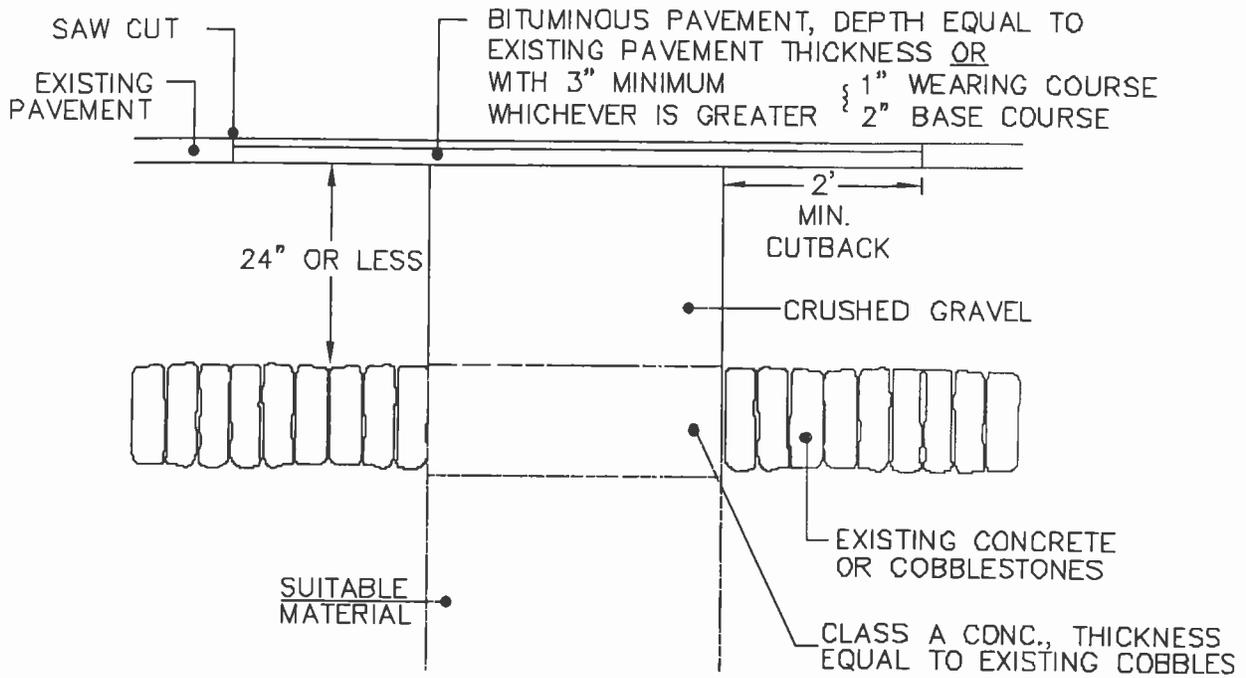
PAVEMENT RESTORATION

S:\DWG\DETAILS\5-2 5-3 PVT-REST.DWG

(NOT FOR WINTER CONSTRUCTION)

NOT TO SCALE

FIGURE II,5-2 AND FIGURE II,5-3



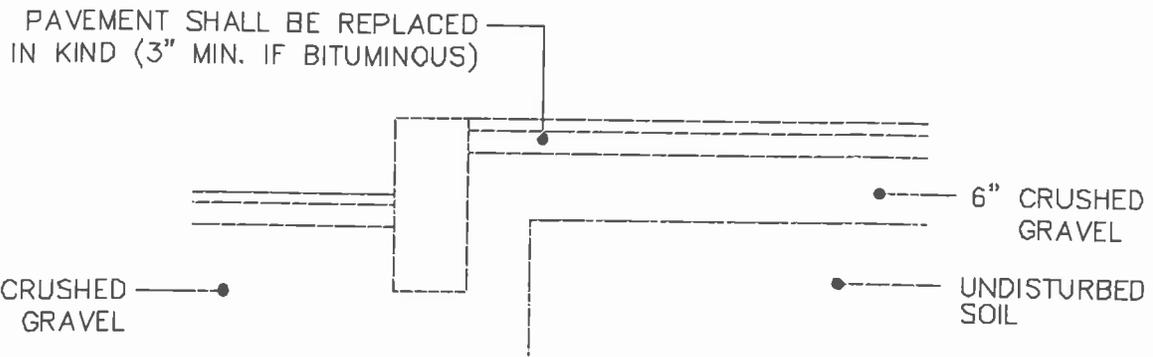
- 1) MATERIALS SHOULD BE REPLACED IN-KIND, WITH MINIMUM THICKNESS AS SHOWN.
- 2) PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REQUIREMENTS.
- 3) ROADWAY CONSTRUCTION SHALL CONFORM TO CITY OF MANCHESTER STANDARD SPECIFICATIONS.

PAVEMENT RESTORATION CONCRETE/COBBLESTONES

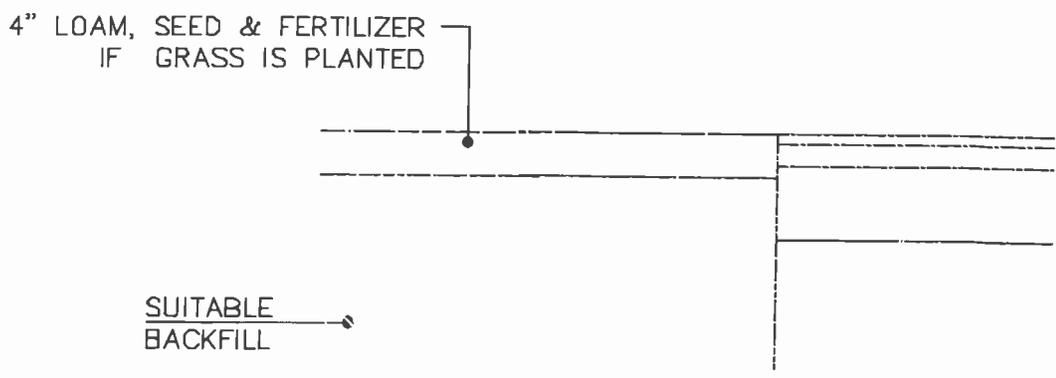
SS \DMG\DETAILS\5-4 PAVMT-REP.DWG

NOT TO SCALE

FIGURE II, 5-4



SIDEWALK REPAIR



SHOULDER REPAIR

- 1) MATERIALS SHOULD BE REPLACED IN-KIND, WITH MINIMUM THICKNESS AS SHOWN.
- 2) PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REQUIREMENTS.
- 3) ROADWAY CONSTRUCTION SHALL CONFORM TO CITY OF MANCHESTER STANDARD SPECIFICATIONS.

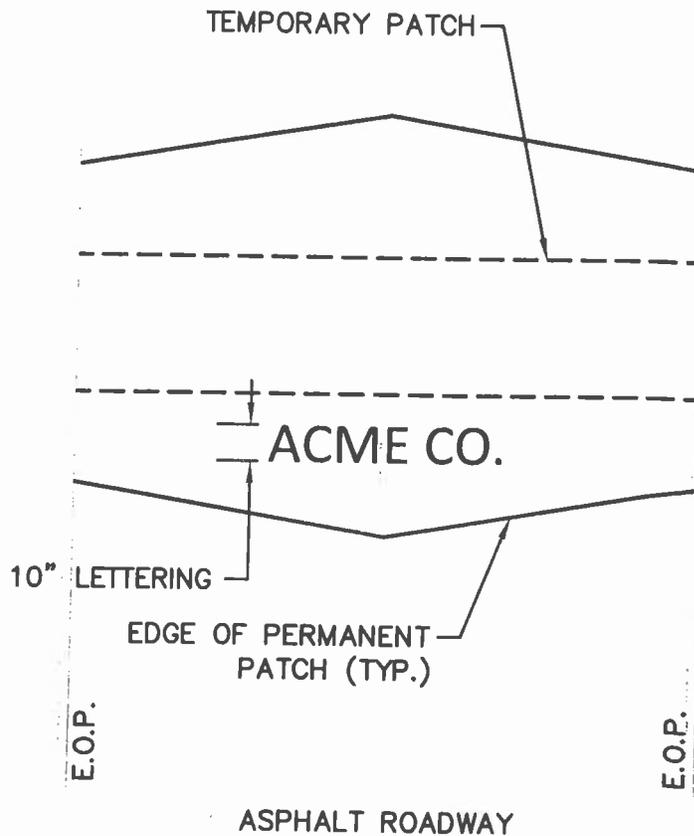
SIDEWALK/SHOULDER RESTORATION

NOT TO SCALE
 FIGURE II,5-5

S:\DMG\DETAILS\5-5 SWLK-SHLD-REP.DWG

PAVEMENT PATCH IDENTIFICATION MARKING

ALL TEMPORARY PAVEMENT PATCHES SHALL BE PAINTED WITH A 10" (MINIMUM) LETTERING TEMPLATE THAT LEGIBLY STATES THE NAME OF THE CONTRACTOR DOING THE WORK. THE COLOR OF THE TEMPLATE SHALL BE YELLOW FOR THE GAS, OIL AND STEAM UTILITIES, BLUE FOR WATER UTILITIES, RED FOR ELECTRIC UTILITIES, ORANGE FOR COMMUNICATION UTILITIES AND GREEN FOR SEWER OR DRAINAGE UTILITIES.



PAVEMENT PATCH IDENTIFICATION MARKING

NOT TO SCALE
FIGURE II 5-6

© 1994 by the American Road & Builders Builders Association

**SECTION 6 - GENERAL PROVISIONS FOR CONSTRUCTION
OF PUBLIC IMPROVEMENTS**

6.1 Scope of Work

6.1.1 It shall be the Contractor's responsibility to provide for the construction and completion in every detail of the work described on the plans and in the specifications. The Contractor shall arrange for all underground utility installations and insure that such work conforms with the requirements and specifications of the governing utility authority. All trenching and backfilling relative to these facilities shall conform to the Standard Specification of the City of Manchester, Department of Highways.

6.1.2 Minor alterations to the work presented on the approved plans may be made in the field during construction as specifically approved by the Engineer.

6.1.2.1 Where a major alteration to the proposed work may be necessary, either before or during construction, the Developer shall re-submit plans reflecting these changes to the City of Manchester Planning Board and/or the Department of Highways as described in the General Requirements.

6.1.3 Before acceptance of the work, the Contractor shall remove from within the limits of the right-of-way, all machinery, equipment, surplus materials, falsework, stumps, rubbish, temporary buildings, barricades and signs. All parts of the work shall be left in a neat and presentable condition.

6.2 Control of the Work

6.2.1 Authority of the Engineer. All work shall be done under the supervision of the Engineer and to his satisfaction. The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work; all questions which may arise as to the interpretation of the plans and specifications; and all questions as to the acceptable fulfillment of the work on the part of the Contractor. The Engineer will have the authority to suspend the work wholly or in part for such periods as he may deem necessary due to the failure of the Contractor to correct conditions unsafe for the general public, for failure to carry out provisions of the work, for failure to carry out orders, for conditions considered unsuitable for the prosecution of the work, such as extremes of wind, temperatures or precipitation, either existing or forecasted with reasonable certainty to occur and which could be harmful to the scheduled operation; in order to comply with directives of the Division of Air Resources, State of New Hampshire, Department of Environmental Services implementing the emergency episode procedure; or for any other condition or reason deemed to be in the public interest.

6.2.2 Plans and Working Drawings. The approved plans on file in the office of the Department of Highways will show the location, detail and dimensions of the work. These plans shall be supplemented by the Contractor with such additional working and

detail drawings as may be found necessary to adequately control the work and its prosecution. The Contractor's drawings shall be furnished well in advance of the work to allow the Engineer time to review the drawings. When requested, the Contractor shall furnish his basic calculations. Working drawings for steel structures shall consist of shop detail, erection and other working plans showing dimensions, sizes of materials, details and other information necessary for the complete fabrication and erection of the metal work. Working drawings for concrete structures shall consist of such detailed plans as may reasonably be required for the successful prosecution of the work and which are not included in the plans on file in the office of the Department of Highways. These may include plans for falsework, bracing, centering and form work; masonry layout diagrams and diagrams for bent reinforcement. Manufacturer's engineering data for prefabricated material including that for falsework and forms, shall be furnished with each set of drawings. The Contractor shall submit to the Engineer for approval 3 sets of any required preliminary detailed working drawings. Prior to the approval of the drawings, any work done or materials ordered for the structures involved shall be at the Contractor's risk. One set of the drawings will be returned to the Contractor approved or marked with corrections to be made. After approval has been given, the Contractor shall supply the Engineer with 3 sets of the revised detailed working drawings. The Contractor may propose detours not shown on the plans. Should he desire written approval of major detours, he shall submit plans in triplicate which shall show the proposed location, layout and signing.

The Engineer's approval of the Contractor's working drawings will not relieve the Contractor from responsibility for errors in dimensions or for incorrect fabrication processes or from responsibility to complete the work.

6.2.3 Conformity with Plans and Specifications. All work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions and material requirements shown on the plans or indicated in the specifications. If tolerances are specified, deviations beyond the specified limits will be unacceptable. When tolerance limits are not specified and only single dimensions are indicated, such dimensions are to be regarded as nominal dimensions. In the event the Engineer finds that the materials or the finished product in which the materials are used are not within reasonably close conformity with the plans and specifications but that reasonably acceptable work has been produced, he shall then make a determination if the work shall be accepted and remain in place. In this event, the Engineer will document the basis of acceptance as he deems necessary to conform to his determination based on engineering judgement. In the event the Engineer finds that the work performed or that the materials or the finished product in which the materials are used are not in reasonably close conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by the Contractor.

6.2.4 Coordination of Specifications, Supplemental Specifications, Plans and Special Provisions. The specifications, the supplemental specifications, the plans, special provisions and all supplementary documents are essential parts of the proposed

work and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions unless obviously incorrect, will govern over scaled dimensions; supplemental specifications will govern over standard specifications; plans will govern over supplemental specifications and standard specifications; and special provisions will govern over plans, supplemental specifications and standard specifications. The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

6.2.5 Cooperation by Contractor. The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer, his inspectors and other Contractors in every way possible. Except as permitted, the Contractor shall have on the work as his agent, a competent English-speaking Superintendent capable of reading and thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed. The Superintendent shall have full authority to receive and execute orders or directions of the engineer without delay and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. Such superintendence shall be furnished irrespective of the amount of work sublet.

6.2.6 Cooperation with Utilities. The Contractor shall notify all utility companies, all pipe line owners or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipe lines and other appurtenances within or adjacent to the limits of construction made as soon as practicable. Attention is directed to the possible existence of underground facilities not known to the City or in a location different from that which is shown on the plans or in the special provisions. The Contractor shall take steps to ascertain the exact location of all underground facilities prior to doing work that may damage such facilities or interfere with their service. "DIG SAFE" shall be notified at least 72 hours prior to the start of construction.

6.2.7 Construction Stakes, Lines and Grades. The layout of the work shall be done by a competent land surveyor licensed in the State of New Hampshire. The Contractor shall be responsible for furnishing and setting stakes and furnishing data necessary to establish the line and grade of the finished surface, the lines and grades of all waterways, drains, sewers and utilities, and such other points and benchmarks as are necessary to layout the work correctly. The Contractor shall also be held responsible for the preservation of all stakes and marks and establishing such other controls as may be required by the Engineer. All bounds as specified or shown on the plans, shall be set by a competent land surveyor licensed in the State of New Hampshire. All required bounds shall be properly set prior to final acceptance of the work.

6.2.8 Authority and Duties of Representatives of the Engineer. The Engineer may appoint such assistants and representatives as he desires and they shall be granted full

access to the work or to mills and plants in which work is being done for use by the Contractor. They have authority to give directions pertaining to the work or to the safety and convenience of the public, to approve or reject materials, to suspend any work that is being improperly performed, and otherwise represent the Engineer. The Contractor may however, appeal their decision to the Engineer himself, but any work done pending settlement is at the Contractor's own risk. The assistants and representatives are not authorized to act as superintendents or foremen for the Contractor, or to interfere with the management of the work by the Contractor. Any advice which the assistants or representatives of the Engineer may give the Contractor, shall not be construed as binding the Engineer or the Department in any way, nor releasing the Contractor from his responsibility for the work. All transactions between the Contractor and the representatives of the Engineer which are liable to protest, shall be made in writing.

INSPECTION SERVICES

6.2.9 Inspection Agreement. All work involving public improvements shall be inspected by the Department of Highways and the Contractor shall execute an inspection agreement to that effect. The Contractor will be assessed the current hourly rate for inspectors, including time and one-half for overtime. To guarantee payment of the cost involved, the Contractor agrees to provide a surety bond, letter of credit or certified check (payable to the City of Manchester, Department of Highways) in the sum of \$5,000. The Contractor shall inform the inspector assigned to the project of his proposed work schedule and shall notify the Engineer at least 2 working days in advance of all work requiring inspection. If an inspector has been requested and his services have been found not to be necessary, the Engineer shall be notified at least 1 full working day prior to the scheduled time of inspection. In those cases where inspection services have been requested and the Engineer has not been notified of a cancellation at least 1 day in advance, a minimum charge of 3 hours shall be assessed. Inspection services will be provided only after all necessary permits have been obtained. Approval of work inspected by the Department of Highways relative to site development and subdivision projects shall not be construed as partial or final acceptance of the projects. Final acceptance will be made by the City of Manchester Planning Board when all the work is satisfactorily completed per the approved plans and specifications.

6.2.10 Inspection of Work. All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection. No work shall be done at night contrary to local ordinances. No work shall be backfilled or covered without inspection by an authorized Department representative. Any work done or materials used without inspection by an authorized Department representative may be ordered removed and replaced at the Contractor's expense, unless the Department representative failed to inspect after having been given the required notice that the work was to be performed. When any unit of government or political subdivision or any railroad corporation has an interest in the work, its respective representatives shall have the right to inspect the work.

6.2.11 Removal of Unacceptable & Unauthorized Work. All work which does not conform to the requirements of the approved plans and specifications, will be considered unacceptable unless otherwise determined acceptable under the provisions in 5.2.3. Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner. Work done contrary to the instruction of the Engineer and work done beyond that shown on the approved plans or as given will be considered as unauthorized. Work so done may be ordered removed or replaced at the Contractor's expense.

6.2.12 Maintenance During Construction. The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day with adequate equipment and forces, to the end that the required work and work area is kept in satisfactory condition at all times. Debris shall not be permitted to accumulate. Dust shall be controlled at all times by wetting, the use of calcium chloride or by other means acceptable to the Engineer in order to prevent a nuisance to abutters. The Contractor shall take every reasonable precaution against spillage of construction materials on existing roadways and bridges. If spillage does occur, the Contractor shall remove such spillage immediately after its occurrence and continue such removal as long as such spillage takes place. Where damage would be caused, the Contractor shall not operate equipment of such weight or so loaded as to cause damage to structures, to the roadways or to any other work. The Contractor shall be responsible for all damage done by his hauling equipment. A special permit will not relieve the Contractor of liability for damage which may result from the moving of material or equipment. During the use of existing streets and roadways, the Contractor shall maintain them in a condition satisfactory to the Engineer and safe for the travelling public. After the hauling operations are completed, he shall repair to the satisfaction of the Engineer all damage incurred by his use of these streets and roadways.

6.2.13 Failure to Maintain the Work. If the Contractor at anytime, fails to comply with the provisions of 5.2.12, the Engineer may direct the Contractor to comply with the required maintenance provisions. If the Contractor fails to remedy unsatisfactory maintenance within the time specified in any order, the Engineer may immediately proceed to maintain the work and the entire cost of this maintenance will be charged to the Contractor.

6.2.14 Acceptance. Acceptance of work inspected by the Department of Highways involved in site development and subdivision projects, shall only be in regard to conformance with the specifications and shall not be construed as partial or final acceptance of the projects. It shall be understood that although the Department of Highways may accept the public improvement work as specified, the Contractor shall be responsible for maintaining such work until final acceptance of the entire project by the City of Manchester Planning Board. Upon due notice from the Contractor of presumptive completion of the work, the Engineer will make an inspection. If all construction provided for and contemplated is found complete to his satisfaction, this inspection shall

constitute the final inspection and the Engineer will make the final acceptance and notify the Contractor and the Planning Board in writing of this acceptance as of the date of the final inspection. If the inspection discloses any unsatisfactory work the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection provided the work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor and the Planning Board in writing of this acceptance as of the date of final inspection.

6.3 Control Of Material

6.3.1 Source of Supply and Quantity Requirements. The materials used on the work shall meet all quality requirements of the specifications. In order to expedite the inspection and testing of materials, the Contractor shall notify the Engineer of his proposed source of materials prior to delivery. At the option of the Engineer, materials may be approved at the source before delivery is started. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources. No material which, after approval, has any way become unfit for use, shall be used in the work.

6.3.2 Samples, Tests, Cited Specifications. All materials and products proposed to be used in the work shall be inspected, sampled and tested or accepted by a Certificate of Compliance letter from the Contractor as specified below. No material or product shall be incorporated in the work, unless it has been tested and approved or unless provisions have been made to accept the material by certification. Any work in which materials are used without approval, shall be performed at the Contractor's risk and may be considered unacceptable and unauthorized.

Unless otherwise specified, all tests will be made by and at the expense of the Contractor. All samples and all testing and laboratory methods shall be in accordance with the methods prescribed by the available pertinent publications of the AASHTO, ASTM or FSS, unless other standard methods are designated except that the Engineer reserves the right to make use of any information or method of testing, to determine the quality of material or of the work. With respect to all the above specifications, whenever specifications and serial numbers are stipulated, unless specific dates are indicated, the references shall be construed to be the standard, interim or tentative specifications and serial numbers of the pertinent body as amended to date of beginning the work. Samples for testing purposes shall be furnished, at no cost, by the Contractor. All materials being used are subject to inspection, test or rejection at any time.

Random samples of materials or completed work may be taken as checks on the control sampling and testing to determine reasonable compliance with the specifications at any time prior to final acceptance of the work, either while any phase of the work is in progress or after it has been completed. The extent and locations of such random

sampling will be as designated by the Engineer. Copies of all tests will be furnished to the Engineer at his request.

In all AASHTO or ASTM specifications, the section entitled: "Inspection" shall be amended to provide that tests of materials may be made in any recognized laboratory.

All sieves shall conform to the requirements of the AASHTO M 92, and shall be square hole wire cloth sieves.

6.3.3 Certificates of Compliance. Prior to, or at the time of field delivery, if materials are to be used in the work for which there is no prescribed schedule of testing, the Contractor shall submit 3 copies of a Certificate of Compliance for all such manufactured material. (See Fig. 6-1) The certificate shall show the following:

- a) Date of Certification
- b) Description of material supplied.
- c) Name of the Contractor to whom the material is supplied.
- d) Project name and numbers to which the material is consigned.
- e) Item number and item name.
- f) Name of manufacturer and/or supplier.
- g) The material meets the requirements of the pertinent specification required.
- h) That records will be maintained for the defined three-year period.
- i) Signature of a person having legal authority to bind the originator of the certificate.

Certificates of compliance submitted from either the manufacturer, the supplier or the Contractor in the format prescribed will be accepted. All documentation for said certificates must be maintained by the originator of the certificate for a period of not less than three years from the date the work is accepted.

Certificates of compliance covering more than one type of material or item will be acceptable if a listing is made of the item number, name of item, manufacturer and/or supplier for each material covered.

Materials listed in the above certificates may be subject to random sampling and testing by the Engineer. Certified materials which fail to meet the specification requirement will not be accepted.

Supplementing the above certificates upon request, the Engineer shall be furnished with a copy of the manufacturer's certificate of materials showing the physical properties, chemical composition, methods of testing and other relevant data.

6.3.4 Plant Inspection. The Engineer may undertake inspection of materials at the source.

In the event plant inspection is undertaken, the following conditions shall be met:

- a) The Engineer shall have cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.
- b) The Engineer shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.
- c) If specified, the Contractor shall arrange for an approved building for the use of the Inspector; such building to be located conveniently near the plant, independent of any building being used by the material producer, in which to house and use the equipment necessary to carry on the required tests.
- d) Adequate safety measures shall be provided and maintained.

6.3.5 Storage of Materials. Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. Approved portions of the right-of-way may be used for storage purposes and for the placing of the Contractor's plant and equipment, but any additional space required therefore, must be provided by the Contractor at his expense. Private property shall not be used for storage purposes without written permission of the owner or lessee, and if requested, copies of such written permission shall be furnished to the Engineer. All storage sites shall be restored to their original condition by the Contractor at his expense. This shall not apply to the stripping and storing of topsoil, nor to other materials salvaged from the work.

6.3.6 Handling Materials. All materials shall be handled in such a manner as to preserve their quality and fitness for the work.

6.3.7 Unacceptable Materials. All materials not conforming to the requirements of the specifications shall be considered as unacceptable and all such materials will be rejected. They shall be removed immediately from the site of the work as ordered by the Engineer in writing. No rejected material, the defects of which have been allowed to be corrected, shall be used until approval has been given. Should the Contractor fail to remove defective materials within the time indicated in writing, the Engineer shall have authority to cause the materials to be removed at the Contractor's expense.

6.3.8 Disposal of Surplus and Waste Materials. Surplus and waste material shall be disposed of as directed or permitted. It shall be the Contractor's responsibility to secure disposal areas for surplus and waste materials.

6.4 Legal Relations and Responsibility to Public

6.4.1 Laws to be Observed. The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances and regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work or which in any way affect the conduct of the work. He shall, at all times, observe and comply with all such laws, ordinances, regulations, orders and decrees and shall protect and indemnify the City and its representatives against any

claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself or his employees.

6.4.2 Permits, Licenses and Taxes. The Contractor shall procure all permits and licenses, pay all charges, fees and taxes and give all notices necessary and incidental to the due and lawful prosecution of the work.

6.4.3 Restoration of Surfaces Opened by Permit. Any individual, firm or corporation wishing to make an opening in any street or roadway, must secure a permit from the Department of Highways. The Contractor shall allow parties bearing such permits and only those parties, to make openings in streets and roadways. The Contractor shall make in an acceptable manner all necessary repairs due such openings as directed by the Engineer.

Excavation in existing streets and roadways shall conform to the requirements of the City of Manchester, New Hampshire Street Excavation Regulations. The Contractor shall obtain street opening and/or encumbrance permits as necessary prior to excavating in City streets, rights-of-way or on City property.

6.4.4 Sanitary, Health and Safety Provision. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of its employees and Department representatives as may be necessary to comply with the requirements of the State and local Boards of health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, State and local laws, rules and regulations concerning safety and health standards. The Contractor's attention is directed to the following safety and health standards which apply to all contracts:

"It is a condition of this contract and shall be made a condition of each subcontract entered into pursuant to this contract, that the Contractor and any Subcontractor shall not require any laborers or mechanics employed in performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to their health or safety, as determine by the occupational safety and health standards, of the Occupational Safety and Health Administration, United States Department of Labor, which standards include by reference the established Federal Safety and Health Regulations for construction.

"The standards and regulations comprise Part 1910 and Part 1926 respectively of Title 24 of the Code of Federal Regulations and are set forth in the Federal Register. Subsequent to the date of this specification, in case any revisions in the Code of Federal Regulations are published, such revisions will be deemed to supersede the appropriate Part 1910 and Part 1926 and be effective as of the date set forth in the revised regulation."

6.4.5 Public Convenience and Safety. The Contractor shall, at all times, conduct his work as to assure the least possible obstruction to traffic. A minimum of one lane of traffic shall be provided for at all times, except as may be approved by the Engineer. Uniformed officers shall be employed for traffic control as necessary or as directed by the Engineer.

The safety and convenience of the general public and the protection of persons and property shall be provided for by the Contractor. The Contractor shall be responsible for proper and timely notification to local residents prior to any interruptions of their access or services.

Fire hydrants and waterholes for fire protection on or adjacent to the project, shall be kept accessible to the fire apparatus at all times and no obstructions shall be placed within 10 feet of any such facility. No footways, gutters, sewer inlets or portions of roadways adjoining the project under construction shall be obstructed more than is necessary. Existing road surfaces shall be maintained satisfactorily with suitable patching material when ordered.

An encumbrance permit must be obtained prior to closing all or part of a roadway to traffic. In the event that all or part of a roadway is officially closed to traffic during construction, the Contractor shall provide and maintain safe and adequate traffic accommodations for residences and businesses along and adjacent to the roadway so closed.

The Contractor shall provide all safeguards, safety devices and protective equipment and take any other actions necessary to insure the protection of the life and health of the public.

Outside the limits of the project on City streets and State highways, no vehicle used in the construction of the work shall be driven or moved unless such vehicle, when loaded with sand, gravel, rock, borrow, or other particulate substance, is so covered and secured by a close fitting tarpaulin as to prevent any of its load from dropping, sifting, leaking or otherwise escaping. The covering shall be substantial enough and fastened securely enough so that it will not become loose, detached, or in any way, a hazard to other users of the highway.

6.4.6 Railway-Highway Provisions. All work to be performed by the Contractor in construction on the railroad right-of-way shall be performed at such times and in such manner as not to unnecessarily interfere with the movement of trains or traffic upon the track of the railway company. The Contractor shall use all care and precaution in order to avoid accidents, damage or unnecessary delay or interference with the railway company's trains or other property.

The Contractor shall secure from the Railroad, flagging service for the protection of railroad traffic during the progress of work by the Contractor on, over, under or adjacent

to the tracks of the Railroad. The Contractor shall reimburse the Railroad for the expense of such service.

If the Railroad grants the Contractor's request for any temporary crossing or any temporary crossing is ordered by the New Hampshire Public Utilities Commission, the Contractor shall assume the cost of installing, maintaining, removing and protecting such temporary crossing. The type and method of protection of the crossing and the insurance required shall be as determined by the Railroad.

6.4.7 Construction Over or Adjacent to Navigable Waters. All work over, on or adjacent to navigable waters shall be so conducted that free navigation of the waterways will not be interfered with and that the existing navigable depths will not be impaired except as allowed by the Federal agency having jurisdiction.

6.4.8 Barricades and Warning Signs. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices and shall take all necessary precautions for the protection of the work and safety of the public. Roadways closed to traffic, shall be protected by effective barricades. Obstructions shall be illuminated during hours of darkness. Suitable warning signs shall be provided to control and direct traffic in a proper manner.

The Contractor shall erect warning signs in advance of any place on the project where his operation may interfere with traffic and at all intermediate points where the new work crosses or coincides with an existing road.

The Contractor will be held responsible for all damage to the work from traffic, pedestrians, animals or any other cause due to lack of adequate signs or barricades. All barricades, warning signs, lights, temporary signals and other protective devices shall conform with the Manual on Uniform Control Devices.

6.4.9 Protection and Restoration of Property and Landscape. The Contractor shall use every precaution to prevent injury or damage to wires, poles or other property of public utilities; trees, shrubbery, crops and fences along and adjacent to the right-of-way, all underground structures such as pipes and conduits within or without the right-of-way; all pavement markings which may be placed upon the new pavement constructed by him; and all signs authorized or erected by the City or State; and he shall protect and carefully preserve all property marks until an authorized agent has witnessed or otherwise referenced their location.

The Contractor shall be responsible for all damage or injury to property of any nature during the prosecution of the work resulting from any act, omission, neglect or misconduct in his manner or method of executing the work or at any time due to defective work or materials and said responsibility will not be released until the project shall have been completed and accepted.

PART II, Section 6 – General Provisions

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work or in consequence of the nonexecution thereof by the Contractor, he shall restore at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

The Contractor shall utilize proper tree pruning techniques to repair, all scars made on fruit or ornamental trees by equipment, construction operations or the removal of limbs larger than 1 inch in diameter. The work shall be performed as outlined in the current edition of the American National Standard for Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices: ANSI.

If the Contractor fails to repair, rebuild or otherwise restore such property as may be deemed necessary, the Engineer, after 48 hours notice, may proceed to do so and the cost thereof will be charged to the Contractor.

When the Contractor's operations encounter remains of prehistoric man's dwelling sites, artifacts or other archaeological resources, such operations shall be discontinued until a proper investigation can be made.

6.4.10 Contractor's Responsibility for Work. Until final written acceptance of the work by the Engineer, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof.

Where practicable, spray applications of materials containing fertilizer, asphalt and other injurious substances which cause pitting or which impair the reflective and brightness values of metal, shall precede the installation of susceptible roadside structures such as signs, sign supports and guard rail; otherwise coverings shall be used to protect such structures installed prior to the spray applications.

In case of suspension of the work, the Contractor shall be responsible for the work and shall take such precautions as may be necessary to prevent damage to the work, provide for normal drainage and shall erect any necessary temporary structures, signs or other facilities at his expense. During such period of suspension of work, the Contractor shall properly and continuously maintain, in an acceptable growing condition, all living material in newly established plantings, seedings and soddings and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

6.4.11 Contractor's Responsibility for Utility Property and Services. It shall be the Contractor's responsibility to ascertain the existence of any underground

improvements or facilities which may be subject to damage by reason of his operations. The fact that any underground facility is not shown upon the plans, shall not relieve the Contractor of his responsibility under this section.

At points where the Contractor's operations are adjacent to properties of railway, telegraph, telephone and power companies or adjacent to other property, damage to which might result in considerable expense, loss or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

Prior to doing work that might damage underground facilities or interfere with their service, the Contractor shall take steps to have the owners verify the locations shown on the plans and identify such facilities in the field.

He shall cooperate with the owners to arrange that stakes or other markings set by the owners will be set so that maintenance of such points may be possible as long as necessary. The Contractor shall maintain such references and will be responsible for damage to any underground facility, if the owner has properly located it. The Contractor shall maintain access to the installation in order to permit maintenance of services or permit repairs in case of interruptions of service.

The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

Should the Contractor desire to have any rearrangement made in any utility facility or other improvement for his convenience in order to facilitate his construction operations, which rearrangement is in addition to or different from the rearrangements indicated on the plans or in the special provisions, he shall make whatever arrangements are necessary with the owners of such utility or other facility for such rearrangement and bear all expenses in connection therewith.

6.4.12 Personal Liability of Public Officials. In carrying out any of the provisions of these specifications or in exercising any power or authority granted to them by or within the scope of the inspection agreement, there shall be no liability upon the Director, Engineer or their authorized representatives, either personally or as officials of the City, it being understood that in all such matters, they act solely as agents and representatives of the City.

6.4.13 Environmental Protection. The Contractor shall comply with all Federal, State and local laws and regulations, controlling pollution of the environment. He shall take necessary precautions to prevent pollution of streams, lakes, ponds and reservoirs with fuels, oils, bitumens, chemicals or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

6.5 Prosecution and Progress

6.5.1 Subletting of Work. No subcontracts shall, in any case, release the Contractor of his liability under the provisions of the inspection agreement.

6.5.2 Prosecution and Progress. Prior to initiating operations on the project, the Contractor shall furnish the Engineer with a "Schedule of Operations" for his approval. The progress schedule may be used to establish major construction operations and to check on the progress of the work. A schedule of Erosion Control Methods may also be required for approval. The Contractor shall provide sufficient materials, equipment and labor to guarantee the completion of the project in accordance with the plans and specifications.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall submit an amended schedule for approval before resuming operations.

6.5.3 Limitation of Operations. The Contractor shall conduct the work at all times in such a manner and in such sequence as will assume the least interference with traffic. He shall have due regard to the location of detours and to the provisions for handling traffic. The Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

No work shall be performed at night and on Sundays or legal holidays except in cases of emergency and upon permission of the Engineer. Whenever a holiday is observed on a Friday or a Monday, the Contractor may be required to suspend work for 3 calendar days. Prior to the close of work, the project shall be placed in the best condition possible for the comfort and safety of the travelling public and sound arrangements shall be made for responsible personnel to maintain the project in the above condition throughout the period of suspension.

6.5.4 Character of Workmen. All the Contractor's personnel shall have sufficient skill and experience to perform properly the work assigned to them. Workmen engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any Subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is disorderly, shall be removed forthwith by the Contractor or Subcontractor employing such person and shall not be employed again in any portion of the work without approval.

Should the Contractor fail to remove such person or persons as required above or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until such orders are complied with.

6.5.5 Methods and Equipment. All equipment which is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be such as to cause no injury to adjacent property, other roadways or to any stage of the partially completed work.

If any equipment is not maintained in full working order or, as used by Contractor, proves inadequate to obtain results prescribed, the Engineer may order said equipment to be improved or other equipment substituted or added.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the specifications.

When the specifications call for the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized. If the Contractor desires to use a method or type of equipment other than those specified, he may request authorization from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and the reasons for making the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with the plans and specifications. If after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet the requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove the deficient work and replace it with work of specified quality or take such corrective action as directed.

Failure on the part of the Contractor to observe the necessary precautions to prevent damage to property or injury to persons shall be sufficient grounds for suspension of the work.

Sample Certificate of Compliance

ORGANIZATION LETTERHEAD

Date _____

WE HEREBY CERTIFY THAT _____

Description, Kind of material or Trade Name

Furnished to _____

Contractor (Prime or Subcontractor)

For Use on _____

Project Name

Project Number

Used for Item Number* _____

Name of Item

Manufactured by _____

Supplied by _____

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SPECIAL PROVISIONS, AND SPECIFICATIONS OF THE MANCHESTER, NH DEPARTMENT OF HIGHWAYS IN ALL RESPECTS. PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATION, DRAWINGS AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than three years from the date of acceptance of the project.

(Manufactured, Supplier or Contractor)

Signed by _____

(Officer of Organization)

Title _____

* For more than one item, list each Item Number, name of Item, Manufacture and/or Supplier.

FIGURE II, 6-1