

**REQUIREMENTS
FOR THE DESIGN AND
CONSTRUCTION OF
UNDERGROUND UTILITY
INSTALLATIONS
WITHIN THE STATE
HIGHWAY RIGHT-OF-WAY**



**NEW YORK STATE DEPARTMENT OF TRANSPORTATION
GEORGE E. PATAKI, GOVERNOR
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FEBRUARY 1997

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INTRODUCTION

This publication is to be used in conjunction with Parts 131 and 126 of New York State Department of Transportation Rules and Regulations, NYCRR Title 17. The controlling document when evaluating any issue of utilities in New York State Highway Right-of-Way is Part 131, Accommodation of Utilities Within State Highway Right-of-Way. It is a regulation which has the force and effect of law. Nothing in this "Blue Book" can be contrary to or appear to change any of the provisions of Part 131. The Blue Book's role is to provide greater detail of the Department's requirements, giving specifications, where applicable.

Soil, traffic, weather and other conditions may vary considerably across the eleven Regions of NYSDOT. What may be acceptable in one Region may be totally inappropriate in another. This Blue Book's requirements allow for this diversity, while preserving the flexibility for any Region to include specific requirements in its permits (consistent with Part 131) which suit that Region's unique needs.

**REQUIREMENTS FOR THE DESIGN
AND CONSTRUCTION OF UNDERGROUND UTILITY INSTALLATIONS
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1.00 JURISDICTION

These requirements are promulgated by the New York State Department of Transportation (hereinafter, NYSDOT) under authority of Title 17, New York Official Compilation of Codes, Rules and Regulations Part 131 (17 NYCRR Part 131), and apply to highway work permits authorizing work within the State highway right-of-way for water mains, gas mains, sewer lines, telephone, cable, other communication lines, electric and other utilities and structures. These requirements, and any specifications which are added to the work permit on the method of performing work, are enforceable by NYSDOT.

- 1.01 Work under the permit shall be commenced within thirty (30) days from date of permit issuance. Unless extension of this period is approved by the Region, the permit shall expire if no work is undertaken.

2.00 GENERAL REQUIREMENTS (UNDERGROUND)

- 2.01 All underground crossings shall be placed beneath the pavement and shoulder areas without disturbance to the pavements, unless otherwise approved. Such installation shall be by jacking, driving, boring, drilling, tunneling or other approved means, (hereinafter collectively referred to as, jacking, boring, etc.) in conformance with the requirements and specifications cited throughout this document. Water jetting will not be permitted. No open cuts will be allowed unless no other method is feasible. The increased cost of alternative methods shall not be considered as sufficient justification for open cut installations. (See Section 3.03.01)

NYSDOT shall require adherence by the permittee to NYSDOT Standard Specifications, Construction and Materials, as amended (hereinafter, NYSDOT Standard Specs), and all applicable Engineering Instructions. The Manual of Uniform Traffic Control Devices (MUTCD) shall be complied with in matters involving maintenance and protection of traffic, both vehicular and pedestrian. Temporary soil erosion and water pollution controls shall be used as required.

Additionally, the permittee shall comply with all current requirements of Title 29 CFR, Occupational Safety & Health Administration, Department of Labor, Part 1926, Safety & Health Regulations for Construction, New York State Department of Labor Industrial Code Rule 23, Protection of Persons Employed in Construction and Demolition Work, and

Industrial Code Rule 53, Construction Excavation and Demolition Operations At or Near Underground Facilities, and 17 NYCRR Part 131.

- 2.02 Plans for underground installations shall be submitted to, and meet the approval of, the Region prior to the permit issuance. A maintenance and protection of traffic (MPT) plan shall also be provided by permittee for all work which interrupts or otherwise affects vehicular or pedestrian traffic (see Section 5.00). Also, a site restoration plan, commensurate with the scale of work, shall accompany the permit application.
- 2.03 Plans shall be drawn to scale and show the following: (See Drawings 1-6). Sketches may be allowed, if approved by the Region.
 - 2.03.01 Plan view of proposed underground installation in relation to other highway facilities that may be affected including, but not limited to, underground traffic signal equipment, pavement, culverts, bridges, ditches, underdrain, anchors, footings, etc. The location of all excavations, jacking pits, etc., must be indicated on the plans.
 - 2.03.02 Location of underground installation from nearest highway mile point, reference marker, or survey baseline station.
 - 2.03.03 State highway number (SH #) of area for proposed occupancy.
 - 2.03.04 Profile of ground at centerline of pipe, conduit, cable, etc., showing relationship of pipe, etc., to ground level, pavement and other utilities (See Dwg.No. 2). For longitudinal occupancy, the profile of adjacent pavements shall be shown. (See Dwg.No.3).
 - 2.03.05 The limits of the highway right-of-way and property lines, where pertinent, clearly indicating dimensions from centerline.
 - 2.03.06 The angle of crossings in relation to centerline of pavement. (See Section 2.07).
 - 2.03.07 "Pipe Crossing Data Sheet" completed and put on plan. (See Dwg.No. 4).
 - 2.03.08 All appropriate specifications shall be included.
- 2.04 Method of installation.
 - 2.04.01 The plan shall describe in detail the size, length, depth, material, protection of the utility and pavement during and after construction, provisions for grouting, method of construction, etc.

- 2.04.02 The plan shall specify the type of equipment and construction procedures to be used. This is to include operations involving ground water control.
- 2.04.03 The plan shall specify size and material of carrier pipe, and casing pipe, if required.
- 2.05 Location and dimensions of jacking, boring, etc., pits shall be shown, with details of their sheeting, shoring and provisions for surface and ground water controls. (See Dwg.No. 5). Pits shall be located as far as practicable from the pavement, but in no event shall they be closer than 10 feet (3 m) from the edge of shoulder.
- 2.06 The Region may require that plans and specifications for work permits shall bear the seal of a New York State licensed professional engineer, depending on the complexity of the proposed project.
- 2.07 Installations which cross the highway shall preferably do so at or near right angles to the centerline of pavement.
- 2.08 Underground installations shall not be placed inside a culvert, or under or on a bridge, except where unavoidable, and as approved by the Region.
- 2.09 Any replacement or modification of a carrier pipe shall be considered a new installation, subject to the requirements of these specifications.
- 2.10 Where laws or orders of a regulating agency prescribe a higher degree of protection than specified herein, the higher degree so prescribed shall be deemed a part of these specifications.
- 2.11 Underground installations shall be suitably insulated from underground conduits carrying electric wires on State property.
- 2.12 When required by the Region, soil boring or other soil investigations shall be made to determine the nature of the underlying material for underground installations. If borings have been taken prior to application for a work permit, a copy of the boring logs shall be submitted with the permit application. Additional borings may be required.
- 2.12.01 Soil borings shall be progressed in accordance with Section 648, "Subsurface Explorations" of the NYSDOT Standard Specs.
- 2.12.02 Soil boring logs shall be accompanied by a plan drawn to scale showing location of borings in relation to the pavement and the proposed pipe location, the elevation of ground surface at each boring and ground water elevation. Material changes will also be noted, such as sand, gravel, rock and boulders. (See Dwg.No. 6).

- 2.13 The owner of an installation shall notify the Region in writing of the intention to abandon its facilities in place. Such abandoned underground installations within the State right-of-way shall remain the responsibility of the utility. NYSDOT may give reasonable notice to require the removal of abandoned utility facilities and restoration of the right-of-way, or the filling of any such facility by an approved method, when necessary to avoid interference with the operation, maintenance or reconstruction of the highway. If the utility shall fail to remove the abandoned facility within a reasonable time after such notice, NYSDOT may cause the removal of the facility. Any expenses incurred by NYSDOT arising from abandoned utility facilities shall be reimbursed by the owner or its successor.
- 2.14 Inspection and testing will be as determined and supervised by NYSDOT. NYSDOT may require the permittee to hire an acceptable engineering firm licensed in New York State to perform this work at permittee's expense. All costs incurred by the State necessary for these functions will be paid for by the permittee. Operations shall be subject to State inspection at all times.
- 2.15 All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of traffic, nor damage, destroy, or endanger the integrity of State facilities or adjacent properties. (See Section 5.00 Maintenance and Protection of Traffic for details.)
- 2.16 Blasting will not be permitted under or near highways and facilities or on NYSDOT right-of-way, unless approved by the Region. The permittee shall submit its proposed blasting patterns and procedures for review prior to blasting. The Region will require a meeting with the permittee, its New York State certified blaster, and representatives of all interested agencies prior to commencement of blasting operations.
- 2.17 NYSDOT will not undertake or accept financial responsibility for any remediation or similar activity with respect to the removal of hazardous wastes (6 NYCRR Part 373 and 374) and non-hazardous solid industrial wastes (6 NYCRR Part 360), which under law would not be required at the time but for the accommodation of utility facilities within the right-of-way. Such responsibility and costs shall be solely those of the utility.

3.00 ADDITIONAL REQUIREMENTS

- 3.01 Installations that cross and/or are under pavement and shoulder area.
 - 3.01.01 Pipelines and utilities under roadways shall be designed and protected as stipulated in Section 4.01.
 - 3.01.02 Carrier pipe (or casing, if used) under pavement and/or across highway pavements shall be not less than 60 inches (1520 mm) below the pavement surface. Installation

at lesser depths shall require approval based on a determination that such installation is consistent with safe highway use and operation.

3.02. Jacking, boring, etc.

3.02.01 Permittee shall monitor the worksite for indications of settlement or displacement of highway embankment, pavement, shoulders or other facilities. Elevations should be taken prior to and at the conclusion of the installation in an effort to monitor and/or detect any settlement. Repair or replacement shall be at permittee's expense.

3.02.02 Grouting operations may be required if loss of ground is a possibility or voids are caused during installation. All detrimental voids created during the installation of a crossover pipe, regardless of method, shall be filled. Appropriate backfill type and method of placement shall be addressed in the design of the crossing.

3.02.03 Chemical soil stabilization may be required by the Region as design or field conditions require.

3.02.04 If an obstruction encountered during installation stops the progress of the pipe, and it becomes evident that it is impossible to advance the pipe, then permittee shall cease operations and fill the pipe with approved material, plug it on both ends, if possible, and then abandon it in place, as noted in Section 2.13.

3.02.05 If dewatering is required, permittee shall submit its proposed method of dewatering to the Region for approval.

3.02.06 On all jacking, boring, etc., operations, permittee shall provide proof that the machine operator has experience and is competent in the operation of that machine.

3.03 Excavation of pavement, shoulder and sidewalk areas by open cut method.

3.03.01 Installation by open excavation will be permitted only upon demonstration of necessity or other conditions which warrant such a procedure. Subsurface rock formations, excessive presence of boulders, excessive and damaging skin friction during jacking operations, or insufficient right-of-way to allow jacking, boring, etc., may constitute a necessity. Where an ongoing or upcoming construction contract requires pavement removal and/or construction of new pavement, the Region may consider approving an open cut.

3.03.02 Pavement and shoulder removal shall be done in a manner that provides for proper restoration of the replacement sections. Generally, straight, vertical cuts of the pavement and shoulder will be required. Sheeting may be required (see 4.10 Sheeting). Permittee shall follow NYSDOT Standard Specs for materials and method

of repair. (See Dwgs.No. 7 and 8). Pavement that becomes undermined shall be cut back and removed. Alternative repair methods may be used if prior approval is granted by the Region.

- 3.03.03 Backfill shall be with granular material meeting the specification requirements for select granular fill in the NYSDOT Standard Specs, Section 206. Mortar, concrete, controlled backfill, or low-strength, material or other self-densifying materials may be substituted, as approved by the Region.
- 3.03.04 Granular backfill material shall be placed in 6 inch (150 mm) layers and compacted according to the requirements for backfilling as described in Section 203-3.15, NYSDOT Standard Specs.
- 3.03.05 The subbase course shall be replaced in-kind, unless otherwise approved. The material shall meet the requirements of Section 304-Subbase Course of the NYSDOT Standard Specs. Stockpiling, Section 304, however, may not be required.
- 3.03.06 The limit of pavement replacement shall be such that the replaced pavement is supported by thoroughly compacted subbase material and the pavement is restored to the proper grade, surface tolerance and surface texture.

Asphalt concrete pavement shall be replaced with adequately compacted base material, binder and top course material, consistent with Section 400 of the NYSDOT Standard Specs, which is at least equal in quality, mix type and thickness to the pavement which was removed. Existing pavement shall be saw cut to provide a clean butt joint between the old and new pavement. An emulsified asphalt tack coat shall be applied to all existing pavement edges prior to placing the new asphalt pavement courses.

Portland cement concrete mixtures shall normally be Class C or Class F (if required for early reception of traffic) and consistent with Section 500 of the NYSDOT Standard Specs. Undermined and broken slabs shall be completely replaced. Approved joint dowels and sealer, transverse ties and reinforcing steel shall be used as required.

Portland cement concrete mixtures shall be placed without segregation, then consolidated, finished to the proper elevation, and textured. Curing the concrete pavement shall be in accordance with one of the methods permitted in Section 502 of the NYSDOT Standard Specs.

- 3.03.07 Pavement shoulders, curbs, gutters, underdrain/edgedrain systems and other incidental features shall be replaced inkind, unless otherwise approved by the Region.

- 3.03.08 No pavement cuts are to be left unfilled overnight except with approval by the Region. In all cases, adequate precautions must be taken to protect vehicle and pedestrian traffic. Steel cover plates may be used, with prior approval. Recessing of these plates may be required.
- 3.03.09 Temporary pavements and shoulders shall be placed as soon as a cross-over installation is completed. If permanent pavement placement is to be delayed, temporary pavement restoration shall consist of a minimum compacted thickness of three inches (75 mm) of asphalt concrete, and approved base material of a depth to provide for permanent pavement. In situations where heavy traffic loads are anticipated or cases where the temporary pavement is required for a protracted period, more substantial pavement and backfill design may be required. The asphalt concrete shall be maintained flush with the existing pavement until the pavement is restored permanently.
- 3.03.10 Longitudinal carrier pipes, including utility service connections, shall be installed outside the area of live load influence of the travel lanes and shoulder, unless there is no reasonable alternative.
- 3.03.11 Sidewalks and shoulders shall be replaced either in-kind or as approved by the Region, in accordance with Sections 3.03.01 through 3.03.06. The permittee shall comply with the Americans with Disabilities Act (42 U.S.C. Ch. 126) with respect to work affecting sidewalks, and shall indemnify and hold harmless the State, NYSDOT, their officers and employees for damages resulting from the failure to comply.
- 3.04 Open excavation outside of pavement and shoulder areas.
- 3.04.01 Utilities laid within the highway right-of-way, but outside the pavement and shoulder shall be buried a minimum of 36 inches (910 mm) below the finished grade, unless the Region permits a shallower placement.
- 3.04.02 Backfilling shall be governed by Section 203-Excavation and Embankment of NYSDOT Standard Specs. The backfill for excavated areas shall be compacted to an approved density with suitable material and the upper surface maintained flush with the original surface. The surface shall be treated, in accordance with the site restoration plan, in order to restore the work area to essentially the same condition as prior to the excavation.

4.00 SPECIFICATIONS

4.01 Carrier pipe.

- 4.01.01 Pipelines carrying oil, liquified petroleum gas, natural or manufactured gas, and other flammable products shall conform to the requirements of all current industry standards, as well as all applicable State and Federal regulations, codes and rules, including but not limited to: National Electrical Safety Code; Title 16 NYCRR Chapters II and III; USASI Publications B31.1, B31.4, B31.8; 49 CFR of USDOT Rules and Regulations.
- 4.01.02 All applicable requirements for carrier pipe under pavements shall extend for a minimum of 50 feet (15.25 m) from the centerline of pavement, measured at right angles to the centerline, or to the right-of-way line, whichever is greater.
- 4.01.03 Pipelines carrying non-flammable substances shall be of acceptable material and construction as approved by the Region. Joints for carrier line pipe operating under pressure shall be of a mechanical or welded type.
- 4.01.04 Carrier pipes shall be laid with sufficient slack so that they are not in tension.
- 4.01.05 Crossover carrier pipes shall be designed to withstand all applied and/or superimposed loadings resulting from the roadway section, traffic, potential pipe settlements, and installation procedures. Certain soil and/or site conditions may require encasement. Where a cathodic system is designed to be installed for the crossover carrier pipe, the design of any casing shall be so as not to diminish the desired level of protection.
- 4.01.06 Crossover carrier pipe design shall be site-specific, based on field investigation. The design shall address all potential applied loads, installation methods, and loads induced during installation. If the installation is below the water table or in soft ground, the permittee shall employ an earth pressure balance or comparable system in order to prevent flowing soil or ground loss and pavement distress.
- 4.01.07 Design of a crossover carrier pipe section shall include consideration of, but not be limited to, the following:
- a) Increased pipe wall thickness for the distance within the pavement plus possible additional distance to allow for future highway widening;
 - b) Adequate wrapping, coating or other treatment to protect against corrosion;
 - c) Protective jacket adequate to ensure the integrity of the anti-corrosion material under installation and service conditions;
 - d) Any telltale to indicate loss of pipe material due to corrosion.

4.02 Casing pipe.

- 4.02.01 The carrier pipe shall be placed inside a casing pipe where foundation conditions (presence of boulders, rubble or bedrock) make the direct trenchless installation of the carrier pipe impractical. A casing pipe may also be used if the carrier pipe or conduit is not by itself suitable for trenchless installation.

NOTE: Modern methods of maintaining carrier pipe do not usually require the use of a casing pipe to facilitate removal of, or access to, the carrier pipe for repair.

- 4.02.02 The design criteria for casing pipe shall be the same as for carrier pipe. (See 4.01.)
- 4.02.03 Installation of casing pipe shall be subject to the requirements of Section 3.02.
- 4.02.04 Casing pipe shall meet the following specification requirements:
- a) Steel pipe: ASTM A-139, Grade B or equal, 35,000 psi minimum yield strength;
 - b) Reinforced concrete pipe: ASTM C-76, Class V, Wall C.
- 4.02.05 The carrier pipe shall be placed within the casing pipe, such that they are electrically insulated from each other. The inside diameter of the casing pipe shall be sufficient to permit the space between the carrier and the casing pipe to be filled with a non-conductive material that retains its insulating properties during long-term submergence in water.

4.03 Signs.

- 4.03.01 All pipelines (except in urban areas) shall be prominently marked at right-of-way lines (on both sides of the pavement for undercrossings) by durable, weather-proof signs located over the centerline of the pipe. Signs shall show the following:
- a) name & address of owner;
 - b) contents of pipe;
 - c) pressure in pipe;
 - d) depth below grade at point of sign;
 - e) emergency telephone in event of pipe rupture.

4.04 Shut-off valves.

- 4.04.01 Emergency shut-off valves shall be installed as required by New York State Public Service Commission Regulations, and Federal DOT Regulations (49 CFR).

4.05 Trenchless installation methods.

4.05.01 Installation may be by an approved method of jacking, boring, etc., or a combination of these. A detailed description of the equipment and the method to install the pipe, including appropriate plan, profile and cross-sectional views shall be submitted to the Region for approval. (See Dwg.No.4) General requirements that shall be met are as follows:

- a) The method shall include provisions for preventing the uncontrolled inflow of loose or saturated soils.
- b) Shields and pipe subject to jacking shall be designed to withstand jacking forces, as well as earth pressures.
- c) The use of water jetting to install pipe or remove spoil will not be permitted.
- d) The diameter of the excavation shall not exceed the outside diameter of the pipe (or casing, if one is used) by more than three inches (75 mm).
- e) The annular space between the excavation and the outer wall of the pipe shall be backfilled without delay.

4.06 Special requirements for tunneling.

4.06.01 Tunnels may be excavated manually or by the use of tunnel boring machines (TBM's or "moles"). The jacking of pipe sections, with no other lining, in conjunction with the use of a TBM is covered under 4.09, "Boring."

4.06.02 A tunnel may be lined with liner plate, precast or cast-in-place concrete lining, or pipe sections may be directly jacked in place behind a TBM.

4.06.03 Tunnels in earth shall be lined with tunnel liner plate or other type of lining approved by the Region. Excavation shall be advanced at any time only sufficient for the installation of one ring of liner plates.

4.06.04 Tunnels excavated manually in earth shall employ a shield or poling plates. When a shield is used, the lining shall be designed to withstand the thrust from jacking the shield.

4.06.05 Full tunnel shield.

The shield shall be of steel construction, designed to support the anticipated loading. The advancing face shall be provided with a hood extending not more than 20 inches (500 mm) beyond the face and extending around no less than the upper two-thirds of the circumference. It shall be of sufficient length to permit the installation of at least one complete ring of liner plates within the shield before it is advanced for the installation of the next ring of liner plates. It shall conform to and not exceed the outside dimensions of the pipe being installed by more than one inch (25 mm) at any point on the periphery, unless otherwise approved. It shall be adequately braced and provided with necessary appurtenances for completely bulkheading the face. Excavation shall not be advanced beyond the edge of the hood, except in rock, or with extreme care, to remove obstructions.

Detail plans sufficient to determine the adequacy of the shield, accompanied with design calculations, shall be submitted to the Region for approval and no work shall proceed until such approval is obtained.

4.06.06 Partial tunnel shield.

The shield shall be of steel construction, designed to support anticipated loading as specified in casing pipe. The advancing face shall be provided with a hood, extending not more than 20 inches (500 mm) beyond the face and extending around no less than the upper one-third of the circumference. It shall conform to and not exceed the outside dimensions of the pipe being installed by more than one inch (25 mm) at any point on the periphery unless otherwise approved. Excavation shall not be advanced beyond the hood, except in rock, or with extreme care, to remove obstructions.

Detail plans sufficient to determine the adequacy of the shield accompanied with design calculations, shall be submitted to the Region for approval, and no work shall proceed until such approval is obtained.

4.06.07 Poling plates.

Poling plates shall be of steel construction designed to support the ground outside the bounds of the tunnel through beam action. The beam action shall be capable of extending not less than 20 inches (500 mm) beyond the face and extending around no less than the upper one-third of the circumference. The poling plates shall conform to the configuration of the pipe being installed.

Detailed plans sufficient to determine the adequacy of the poling plates, accompanied with design calculations, shall be submitted to the Region for approval and no work shall proceed until such approval is obtained.

4.07 Jacking.

This method shall be in accordance with the current NYSDOT Standard Specs, Section 650.

4.08 Drilling.

This method shall employ the use of an oil field type rock roller bit or a plate bit. The bit shall be steerable and equipment shall be available to determine the depth and the orientation of the bit. A high density slurry (oil field drilling mud) may be injected through one or more small diameter jets to the head to act as a cutter lubricant and to aid in removing the spoil. The slurry shall be supplied to the head through the drill rods. The drilling unit shall run on a set of steel rails and shall be advanced by a set of hydraulic jacks. The hole may be back-reamed to accommodate the pipe. Methods of a similar nature shall be submitted to the Region for approval.

4.09 Boring.

4.09.01 This method shall consist of pushing the pipe with a boring auger rotating within or ahead of the pipe to remove the spoil. The excavation by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch (13 mm). The face of the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch (13 mm). The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or loose material.

4.09.02 The use of water jetting to install casing or remove spoil is prohibited.

The use of water to facilitate progression of the casing or spoil removal is subject to approval of the Region.

4.09.03 Plans and descriptions of the method and layout to be used shall be submitted to the Region for approval, and no work shall proceed until such approval is obtained.

4.10 Sheeting.

4.10.01 Sheeting shall be in accordance with NYSDOT Standard Specs, Section 552, except as noted. Design by a New York State licensed professional engineer may be required.

- 4.10.02 Plans submitted with the permit application shall, when necessary, specify one or more support systems from Section 552 of NYSDOT Standard Specs.
- 4.10.03 Trenching and/or digging boxes will not be permitted unless approved by the Region. Specifications shall be submitted for approval.

5.00 MAINTENANCE AND PROTECTION OF TRAFFIC

- 5.01 Traffic flow is to be maintained at all times during the progress of this work. Adequate signs, barricades, flagpersons, lights and other control devices shall be provided in accordance with the provisions of the NYSDOT Manual of Uniform Traffic Control Devices (MUTCD), in conjunction with NYSDOT Standard Specs, Section 619. A maintenance and protection of traffic (MPT) plan shall be required for all work affecting vehicular and pedestrian traffic. No lanes shall be closed without prior approval. Permittee shall designate an on-site representative responsible for implementing the MPT plan.
- 5.02 The permittee shall erect and maintain suitable barricades or barriers around all trenches while work is in progress, for the protection of the public, as provided in NYSDOT Standard Specs Section 107-05-E. The work shall be carried on in such manner that not more than 100 feet (30 m) of trench (parallel to the roadway) remains open at workday's end.
- 5.03 Pavement cuts shall not be left unfilled overnight, except with permission from the Region. When practicable, prior approval shall be obtained; otherwise the Region shall be notified immediately. In all cases, permittee shall take adequate precautions to protect traffic and pedestrians.
- 5.04 All work shall be performed in such a manner as to minimize hazards to the traveling public. Construction materials, equipment, etc., shall not be left on the shoulders or pavement after working hours, nor at any time be placed in a manner or location that will obstruct highway or railroad warning signs, highway safety, or the clear sight distance at intersections, including driveway entrances, without proper traffic control devices and measures.
- 5.05 Where work has rendered a shoulder unusable, either "no shoulder" or "low shoulder" signs in the manner specified by the MUTCD shall be erected as appropriate. Soft shoulder signs shall be erected and maintained on all backfilled trenches within the shoulder area, until shoulder restoration is completed.
- 5.06 During winter conditions, the permittee must perform its work so that the highway is free from obstructions which would interfere with snow removal and ice control.

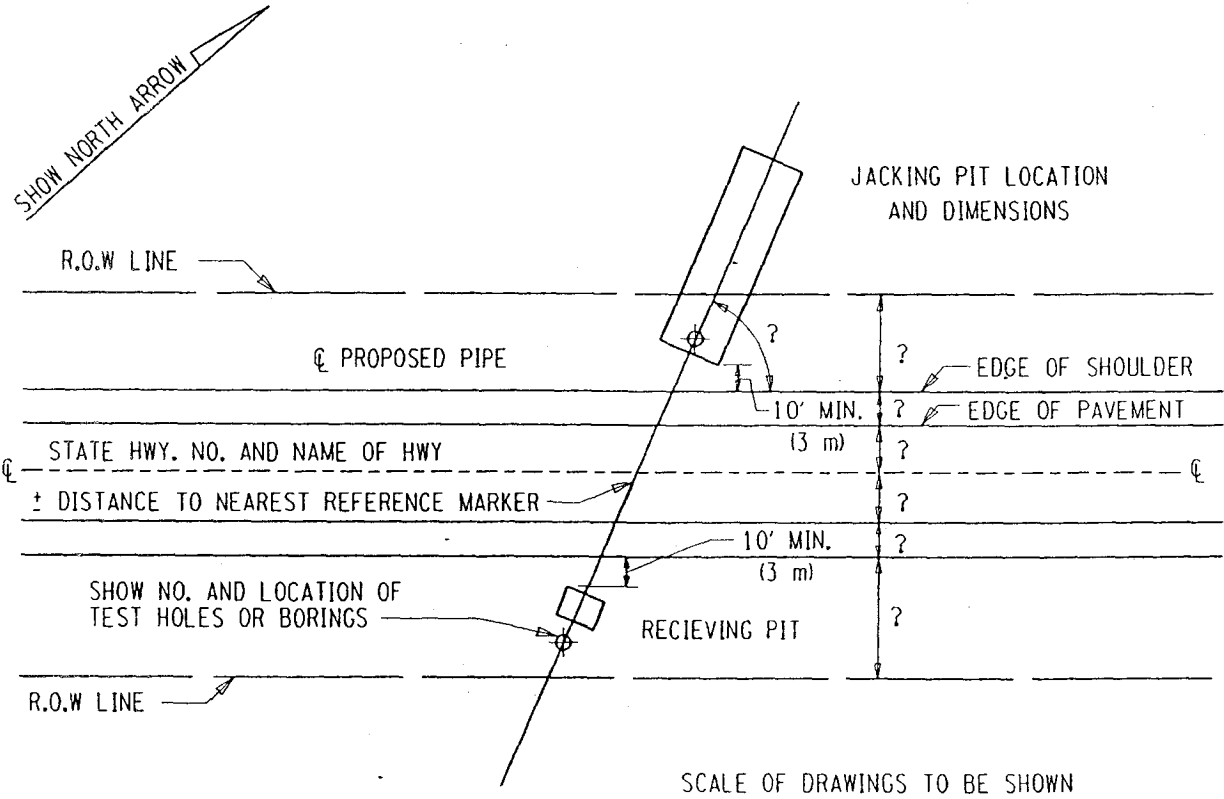
No drums, cones, barricades and other traffic control equipment shall remain in a location where they may interfere with or be disturbed by a snow plowing operation. The work must be scheduled to afford the safe removal of such devices when necessary.

Drainage frames, grates and covers shall not be adjusted in a travel lane unless the final pavement course is placed prior to the onset of snow and ice weather. Steel plates, etc., shall not protrude above adjacent pavement. If any of these protrusions exist in a non-travel lane prior to a snow and ice condition, then temporary asphalt ramps must be placed so that for every one inch (25 mm) of rise, there is a six foot (1.8 m) run of ramp.

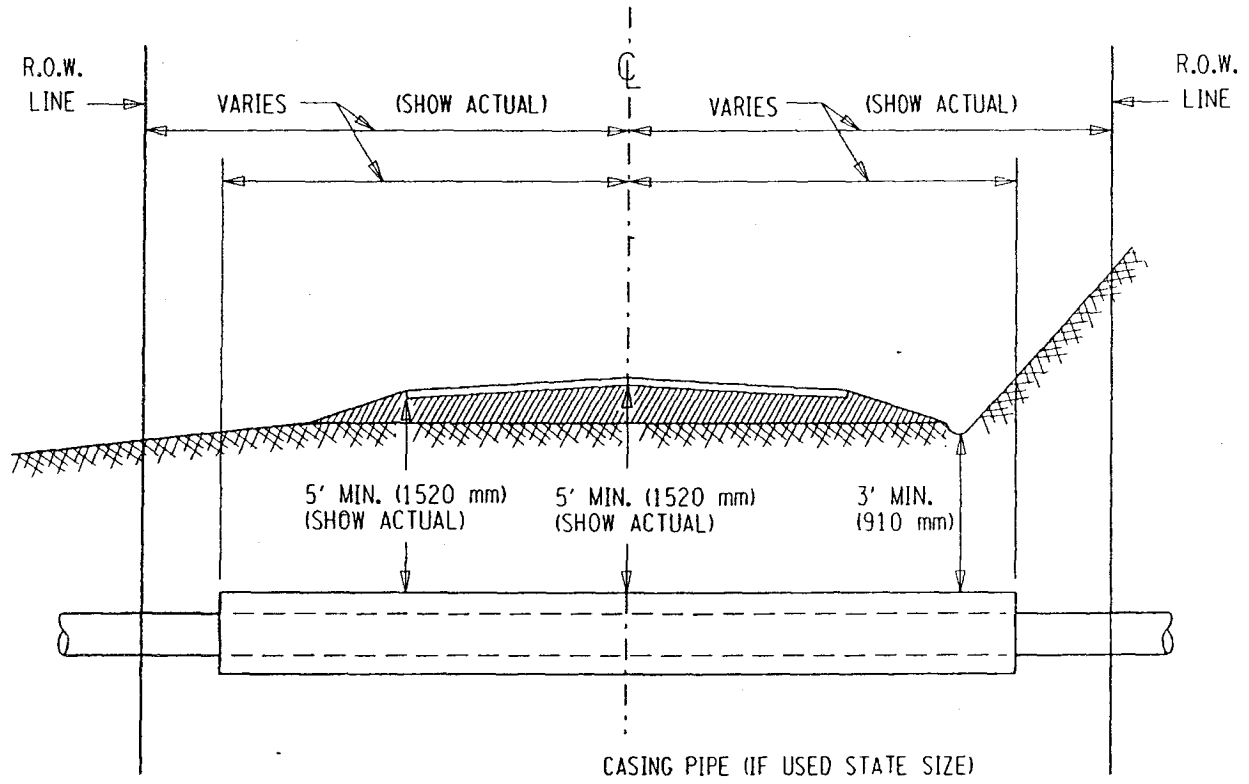
- 5.07 Backfilling operations requiring compaction in winter months must have prior approval by the Region. Frozen material shall not be used as backfill. The permittee will be required to return to make repair or replacement should pavement settlement result.
- 5.08 The permittee shall keep the traveled way free of foreign material that is deposited as a consequence of permittee's activities.
- 5.09 The permittee shall immediately change, move, cover or remove all traffic control devices that do not indicate actual conditions.

If work impacts an existing traffic signal system, permittee shall so indicate on its plans. Permittee shall repair any damage caused to existing signal installations.

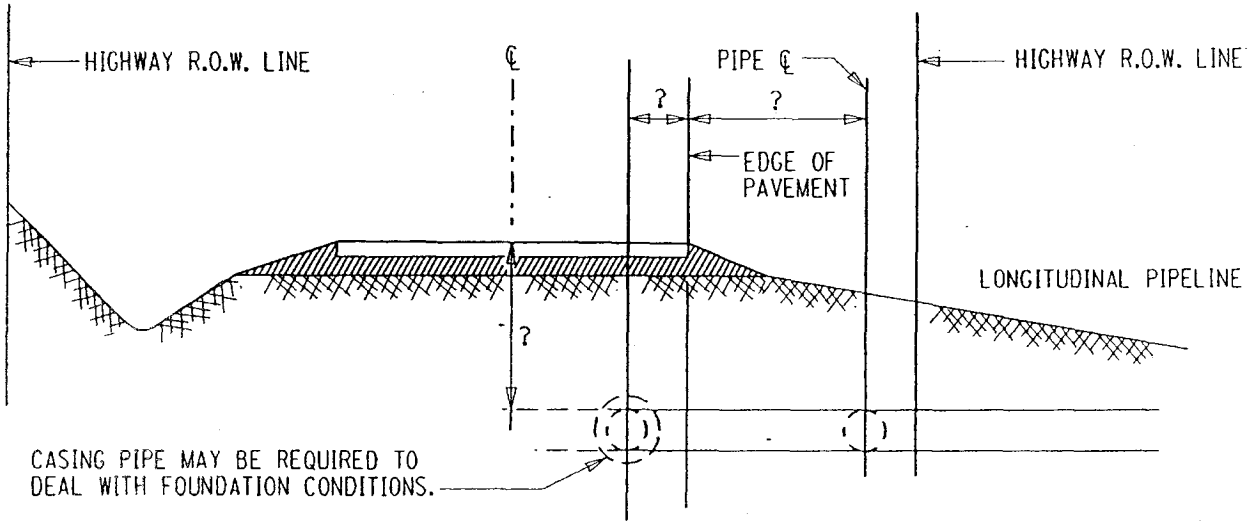
INFORMATION TO BE SHOWN ON PLAN SECTION



DWG. NO. 2

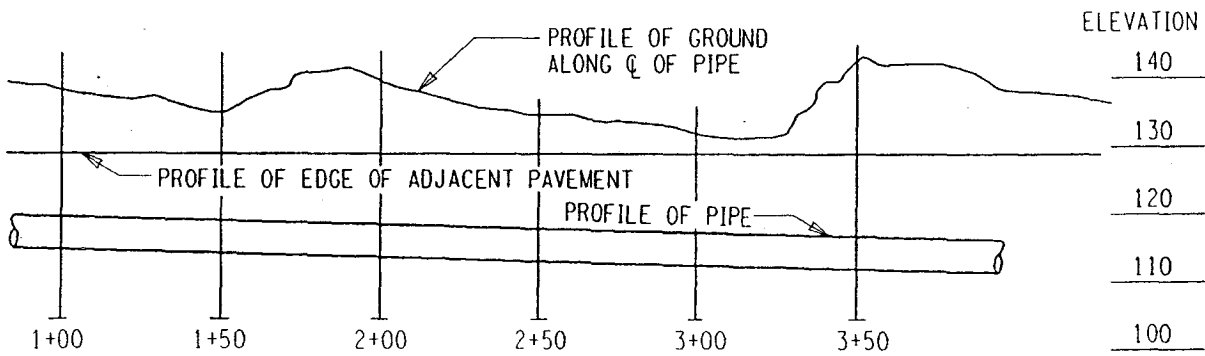


NOTE: CASING PIPE, WHERE USED, SHALL EXTEND FROM JACKING PIT TO RECIEVING PIT.



SECTION

SCALE: HORIZ.
VERT.



PROFILE

SCALE: HORIZ.
VERT.

PIPE CROSSING - DATA SHEET

INFORMATION TO BE SUBMITTED WITH HIGHWAY WORK PERMIT APPLICATION FOR TRENCHLESS (JACKING, BORING, ETC.) UNDERGROUND UTILITY INSTALLATIONS. THE REGION MAY ALTER OR ADD TO THIS LIST BASED ON PROJECT COMPLEXITY.

CHECKLIST

- Plan and profile - drawn to scale
- Highway ROW, C/L and stationing
- Edge of pavement and shoulders
- Drainage structures/ditches
- Toe of slopes
- Limits of work
- Limits of water bodies and wetlands
- Existing buildings, drives, sidewalks, walls, fences, etc.
- Pit location (jacking and receiving) and size
- Pipeline location, C/L and profile

- Pipe data - OD, ID, wall thickness, fittings
 - Yield strength, coating, jacketing

- Operating pressure, SMYS

- Subsurface explorations - samples at 5' or closer intervals
 - Locations
 - Casing blows (if driven casing is used)
 - Standard penetration test results
 - Visual descriptions of samples
 - Moisture contents of soil samples
 - Gradations of representative materials
 - Strength test results (as necessary)
 - Consolidation test results (as necessary)
 - Water table observations
 - Presence of boulders or obstructions

- Cathodic protection system (location and installation)
- Proposed erosion control measures

PIPE CROSSING - DATA SHEET
CHECKLIST CONTINUED

Jacking/receiving pits

- Locations
- Dimensions
- Side slopes
- Sheeting and bracing size, depth, type (as required)
- Backfill material/method

Installation method/equipment

- Equipment specifications
- Size, cutter, diameter and type
- Drive casing diameter
- Equipment bracing/anchorage details
- Maximum permitted tolerance from design line and grade

Grouting operation

- Grout tube size/type
- Grout hole location and method of placement/insertion
- Maximum pressure capability
- Maximum operating pressure (design)

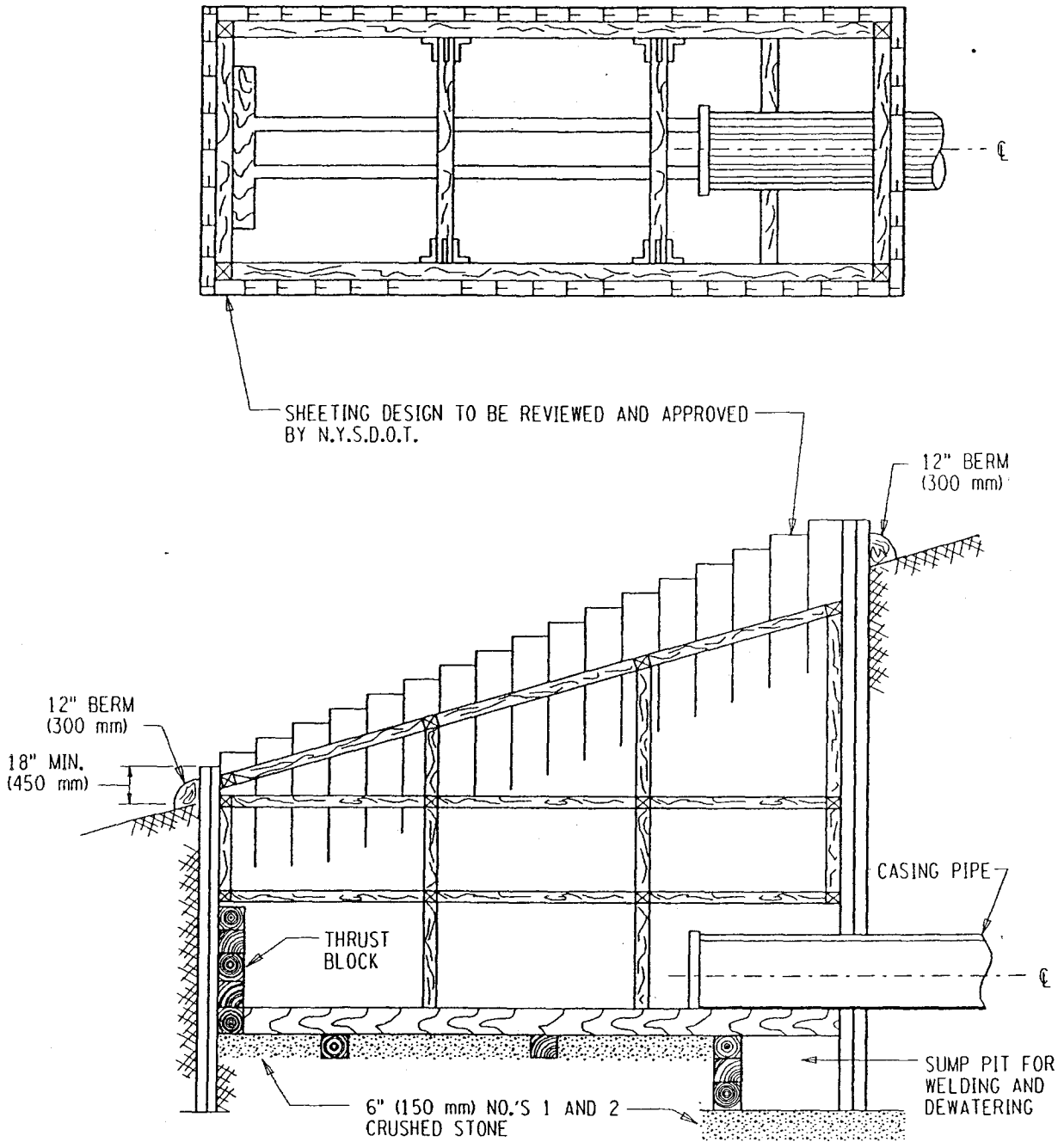
Construction sequence

- Installation method
- Removal of obstructions
- Method of verifying line and grade
- Method of correcting deviations from line and grade
- Grouting of annular space

Restoration specifications

TYPICAL BORING PIT DETAILS

DWG. NO. 5

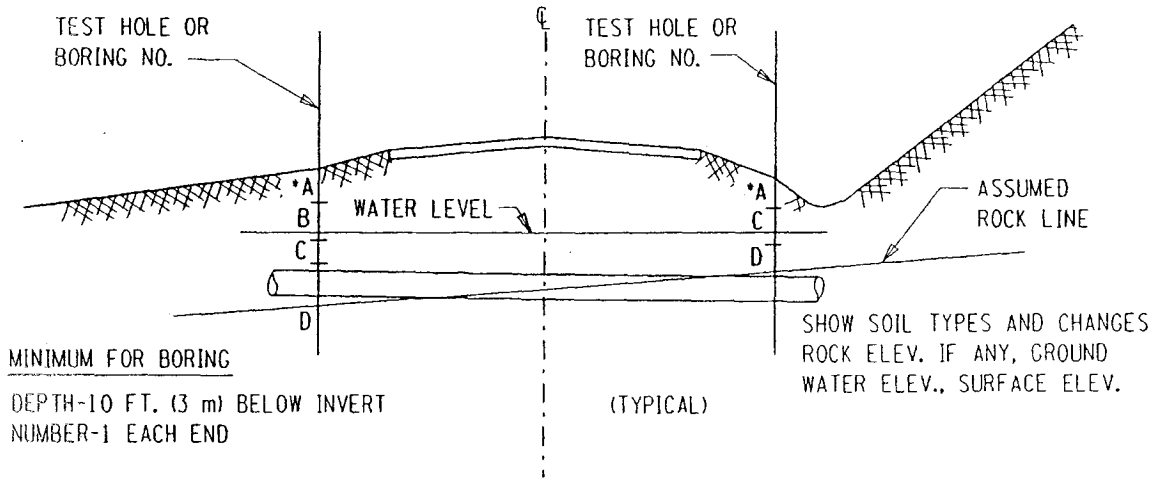


- NOTE: 1. ALL DIMENSIONS AND MATERIAL SIZES MUST BE SHOWN.
2. 12" (300 mm) EARTH BERM TO BE PLACED AROUND SHEETING.

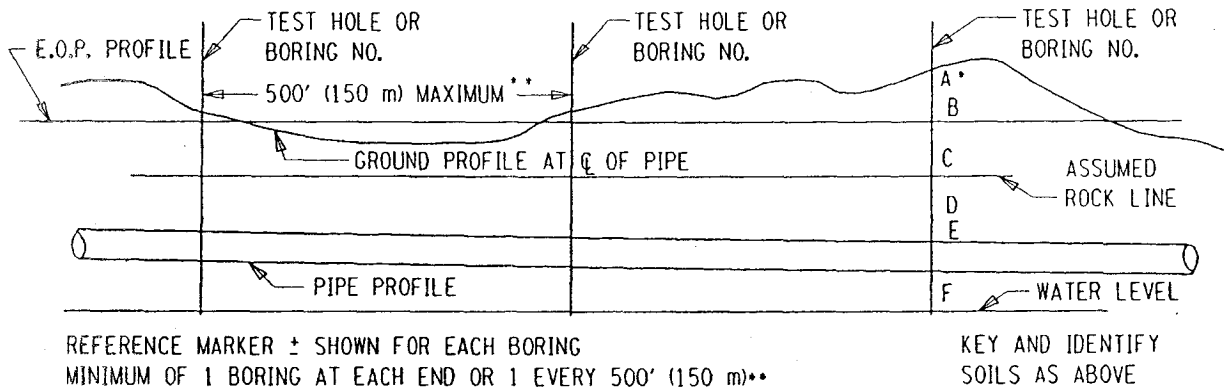
SOIL PROFILE

DWG. NO. 6

TRANSVERSE:

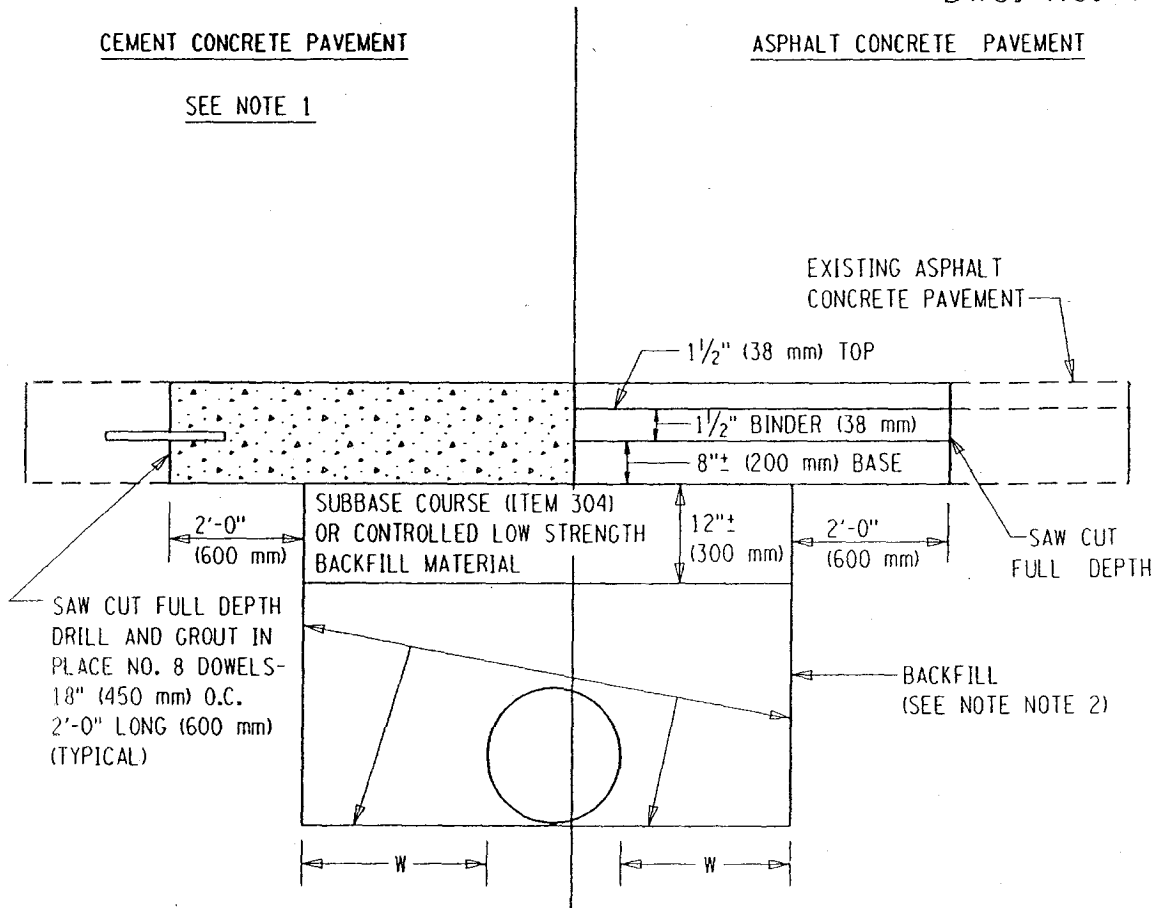


LONGITUDINAL:



• SOIL DESCRIPTIONS AS INDICATED BY A STANDARD SOIL CLASSIFICATION SYSTEM (I.E. U.S.D.A., F.A.A., A.A.S.H.T.O., N.Y.S. VISUAL, ETC.) SHOWN ON BORING LOG.

** ADDITIONAL BORINGS MAY BE REQUIRED.

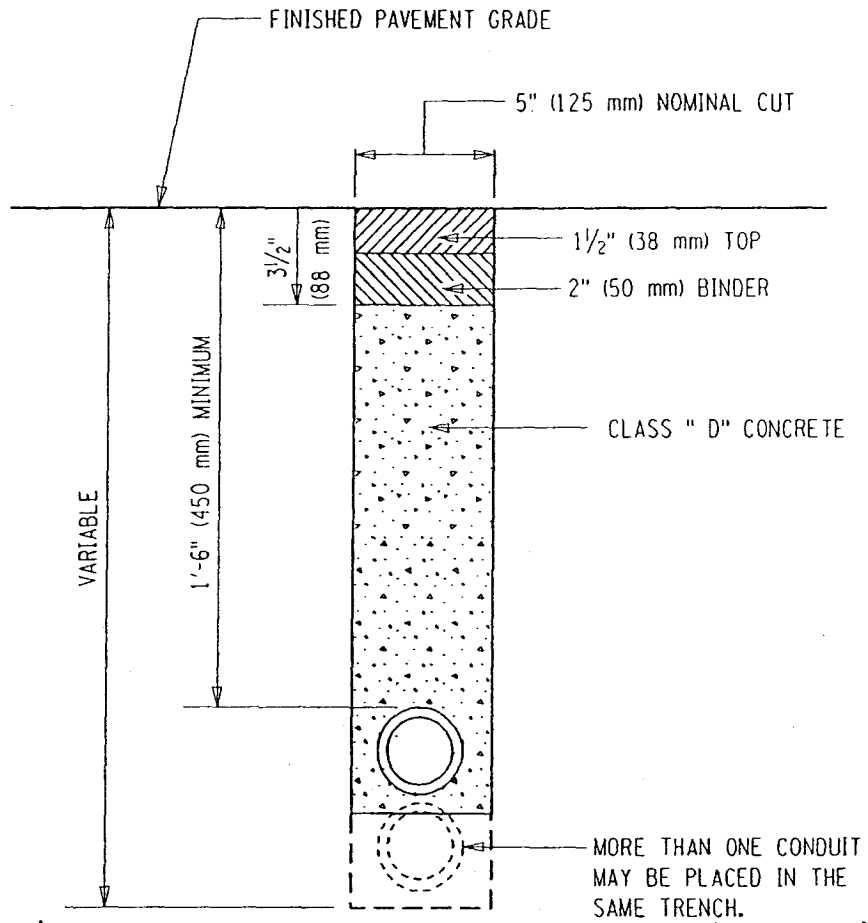


PAVEMENT REPLACEMENT DETAILS OF OPEN CUT CROSSING OF EXISTING PAVEMENT

NOTE 1: WHEN CONCRETE IS USED, IT SHALL BE REINFORCED PORTLAND CEMENT CONCRETE WITH DOWELS INSTALLED AT THE REQUIRED SPACING. WHEN ASPHALT CONCRETE IS USED, IT SHALL CONSIST OF BASE, BINDER, AND TOP COURSES. THE TOTAL PAVEMENT THICKNESS SHALL MATCH EXISTING, UNLESS OTHERWISE REQUIRED BY THE REGION.

NOTE 2: WHEN "W" IS LESS THAN 18" (450 mm), CONTROLLED LOW STRENGTH BACKFILL MATERIAL SHALL BE USED. WHEN "W" IS 18" (450 mm) OR MORE, BACKFILL SHALL BE WITH SELECT GRANULAR MATERIAL FROM THE BOTTOM OF THE TRENCH TO THE BOTTOM OF THE SUBBASE COURSE. PLACEMENT SHALL BE AS DESCRIBED IN SECTION 200, EARTHWORK OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION CURRENT SPECIFICATIONS AND ADDENDA.

ALTERNATE CONDUIT EXCAVATION,
BACKFILL AND PAVEMENT REPLACEMENT
(USING ROTARY PAVEMENT CUTTER)



DRAFT

Technical Information for Proposed Canal Directive: Requirements for the Installation of Underground Utilities Within Canal Corporation ROW

All installations shall comply with all applicable provisions of the New York State Department of Transportation REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF UNDERGROUND UTILITY INSTALLATIONS WITHIN THE STATE HIGHWAY RIGHT-OF-WAY, dated February 1997, with the modifications and additions as outlined below.

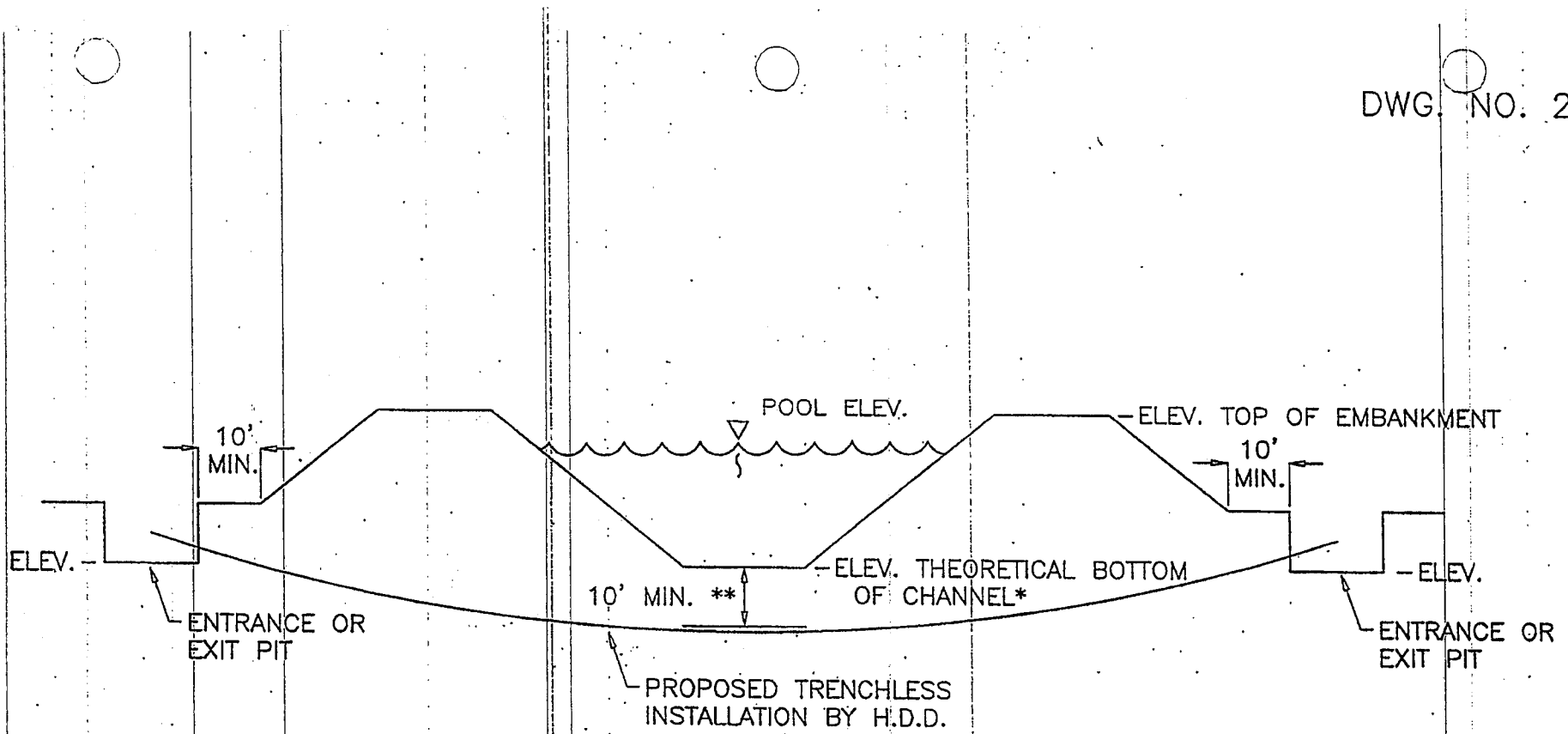
- All references to the "Region" should be changed to the "Division".
- Most references to "highway" and "pavement" should be changed to "canal", as appropriate.
- Most references to "NYSDOT" and "State" should be changed to "New York State Canal Corporation (NYSCC)", as appropriate.
- Subsection 2.02 – In addition to these requirements, the plan shall include the time of year when the work will be done (i.e. navigation season or non-navigation season).
- Replace Subsection 2.03.01 with the following: "Plan view of the proposed underground installation in relation to all Canal facilities that may be affected, including, but not limited to, canal embankments, canal channel, utilities, retaining walls, bridges, footings, culverts, cut-off walls, docks, etc. The locations and dimensions of all excavations, entrance pits, exit pits, etc. shall be indicated on the plan".
- Replace Subsection 2.03.04 with the following: "Profile of ground surface along centerline of proposed installation showing relationship of installation to ground level, canal embankments, canal channel bottom, canal structures and other utilities (See Dwg. No. 2a and 2b). The vertical datum used for the proposed installation shall be indicated on the profile. It should be noted that elevations of canal facilities taken from record plans are in Barge Canal Datum (BCD). The correction between BCD and NGVD 29 will be provided by the Division upon request."
- Replace Subsection 2.05 with the following: "Entrance and exit pits and other necessary excavations shall be located as far as practicable from the canal and canal structures. In no case shall a pit be located closer than 10 feet from the outboard toe of a canal embankment (for land cut sections) or the footing of a canal structure. For portions of the canal without a discernable embankment, the pit shall be located a minimum of 20 feet from the top of the inboard slope, and the bottom of the pit shall be located beyond the limits of a 1(V) on 1(H) slope extending downward from the top of the inboard slope. All pits

shall be backfilled in accordance with Subsection 3.04.02. Refer to Subsection 4.10 for additional requirements for entrance and exit pits.”

- Subsection 2.12 - Soil borings are required for all proposed underground installations.
- Replace Subsection 3.01.02 with the following: “Underground installations shall be placed at the following minimum depths below the theoretical bottom of channel elevation (as indicated on the Barge Canal Record Plans or as determined by the Division):
 - For Horizontal Directional Drilling (HDD) Installations, the minimum depth shall be ten feet (10) and, prior to drilling, the contractor shall submit calculations to the Division proving that their pressurized drill fluid will not fracture into the canal for the proposed depth.
 - For all other trenchless installation methods, the minimum depth shall be five feet (5).”
- Replace Subsection 4.02.03 with the following: “The installation of casing pipe shall be subject to the requirements of Sections 3.02 and 4.05.”
- Replace Subsection 4.02.04 with the following: “Casing pipe shall meet the following specification requirements:
 1. Steel pipe shall be bare steel casing pipe meeting the requirements of ASTM A53, Grade B, Types E or S, or approved equal. The ends shall be prepared for butt welding and beveled at 37 ½ degrees.
 2. Reinforced concrete pipe shall meet the requirements of NYSDOT Standard Specifications Subsection 706-02 Reinforced Concrete Pipe for Class V except that the exterior shall be smooth.
 3. High Density Polyethylene (HDPE) pipe shall be SDR-9 or SDR-11 and shall meet the requirements of AWWA C906, PPI PE 3408 and ASTM D3350-B-PE-345444C (for HDD installations, only).”
- Replace Subsection 4.05.01 through 4.09.03 with the following: “Acceptable methods of installation are as described in NYSDOT Standard Specifications Subsection 650-1 (Description). The method of installation selected shall be appropriate for the subsurface conditions, and shall include provisions to prevent the uncontrolled inflow of loose and/or saturated soils. Materials for installation shall conform to Subsection 4.02.04 of this document and NYSDOT Standard Specifications Subsection 650-2 (Materials). A detailed submittal of the actual installation method(s) shall be provided to the Division prior to construction. The submittal shall conform to the requirements of NYSDOT Standard Specifications Subsection 650-3.01 (Approval). The installations shall be progressed in accordance with Subsection 3.02 of this document and NYSDOT Standard Specifications Subsections 650-3.02 (Trenchless Installation Procedures) and 650-3.03 (Subsidence). A copy of NYSDOT Standard Specifications Section 650, as well as a copy of

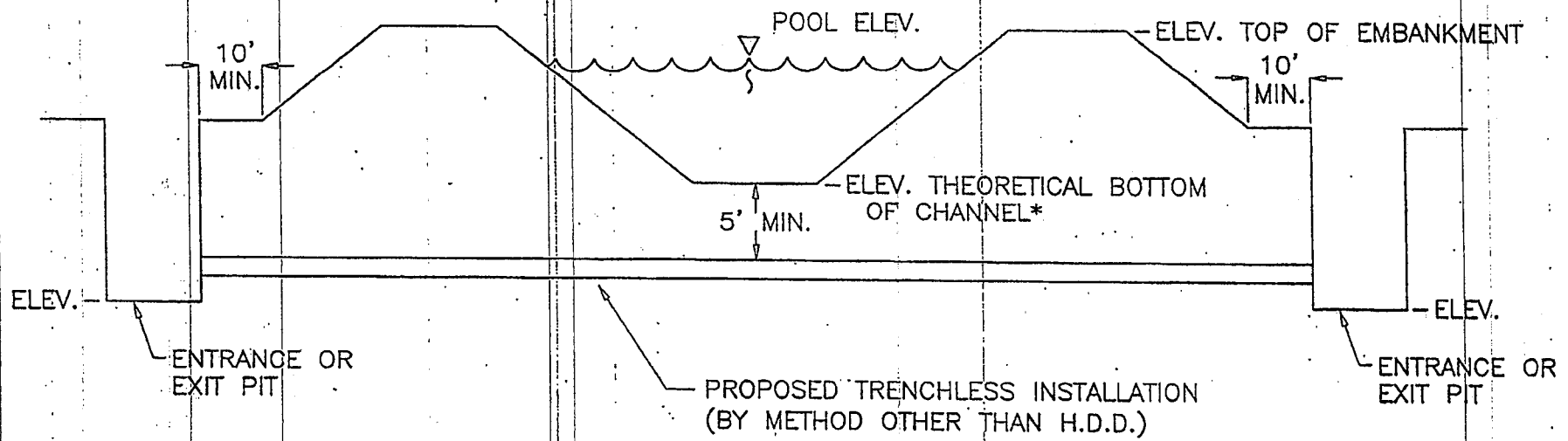
NYSDOT's DESIGN GUIDANCE FOR TRENCHLESS INSTALLATION
OF CASING, has been attached."

- Replace Subsections 4.10.01 through 4.10.03 with the following: "All entrance and exit pits shall be supported with a continuous sheeting system which does not allow adjacent earth movement. All sheeting shall be installed in accordance with NYSDOT Standard Specifications Section 552. The systems shall be designed to resist earth pressure, hydrostatic pressure, and surcharges from traffic, construction equipment and/or adjacent structures. The system shall also be designed to have an adequate factor of safety against heave or piping. The system shall be internally braced, if necessary and designed by a NYS licensed Professional Engineer. The design of the system, including details of surface and ground water controls, shall be provided to the Division for approval prior to final permit approval and construction of the pit. Trench boxes, or other methods of excavation support which allow adjacent earth movements, will not be permitted unless approved by the Division in consultation with the NYSTA Geotechnical Engineer. Specifications shall be submitted for approval."
- The example drawings shall be modified to show canal features, as appropriate.
- Drawing No. 2 shall be replaced with the attached Drawings No 2a and 2b.



MINIMUM INFORMATION TO BE SHOWN ON PROFILE FOR HORIZONTAL DIRECTIONAL DRILL (H.D.D.) INSTALLATIONS

* AS SHOWN ON BARGE CANAL RECORD PLANS OR AS DETERMINED BY DIVISION
** REFER TO SUBSECTION 3.01.02 FOR ADDITIONAL REQUIREMENTS



MINIMUM INFORMATION TO BE SHOWN ON PROFILE FOR TRENCHLESS INSTALLATIONS OTHER THAN H.D.D.

* AS SHOWN ON BARGE CANAL RECORD PLANS OR AS DETERMINED BY DIVISION