STATE OF VERMONT
AGENCY OF ENVIRONMENTAL CONSERVATION

TECHNICAL SPECIFICATIONS
FOR
RECONSTRUCTION OF
SILVER LAKE DAM
BARNARD, VERMONT

AUGUST, 1982

DuBois & King Inc.

ENGINEERING • PLANNING • DEVELOPMENT • MANAGEMENT

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6.2 Environmental Damage. The CONTRACTOR is required to inform himself of all applicable State and Federal rules and regulations concerning the maintenance of environmental quality and to conduct his operations in conformance with the intent of such rules and regulations at all times.

In the event that a question of conformance arises, the ENGINEER shall have the authority to order discontinuance of the WORK or activity in contention until resolution satisfactory to State and/or Federal agencies is achieved. The CONTRACTOR shall bear all costs associated with making his work conform, including, but not limited to, cost of corrective repairs or changes in construction procedures.

6.3 Engineer's Office Not Required. The CONTRACTOR will not be required to furnish an office for the ENGINEER.

6.4 Permits.

6.5 Liaison With Utilities. The CONTRACTOR will be required to perform WORK in areas where existing utilities are presently provided. The CONTRACTOR shall plan and confine his operations to that which will provide only the minimum essential interruption of such services. Prior to interrupting services, the CONTRACTOR shall notify the ENGINEER and the utility sufficiently in advance of any planned interruption of such services. The CONTRACTOR is responsible for making all necessary arrangements for coordination with and assistance by utility companies during the execution of this PROJECT. Any costs associated with such coordination or assistance shall be the responsibility of the CONTRACTOR. Any interrupted services shall be done with the approval of the utility involved.

6.6 Interruption of Existing Sewage Flows. The CONTRACTOR is advised that interruption of an existing sewage flow will not be permitted. The CONTRACTOR shall use temporary piping and/or pumping facilities to insure a continuous flow. Ditches will not be permitted as a means of continuing such flow. All expenses incurred by providing temporary means to convey the existing sewage flow shall be borne by the CONTRACTOR.

6.7 Interruption of Driveways. The CONTRACTOR will be crossing driveways in which the accesses are essential to the operation of many businesses or private homes along the construction route. The CONTRACTOR shall coordinate his excavations with the activities of the particular business or private homes in order to minimize the interruption of the use of the driveways.

6.8 Work Within State Highway Rights-of-Way.

Title

1. General
2. Approval
3. Excavation, Backfill, and Surface Restoration

1. GENERAL

The CONTRACTOR shall apply for and obtain Highway Permits prior to the commencement of any construction within a public highway right-of-way. Permits for work within a State Highway right-of-way shall be obtained from the Utilities Engineer, Vermont Department of Highways, Montpelier, Vermont.

A preconstruction meeting will be held prior to the CONTRACTOR beginning WORK. The State Highway District Engineer and/or Utilities Engineer, the CONTRACTOR'S superintendent, a representative from the Town, and the ENGINEER assigned to the PROJECT will be present at this meeting.

Upon completion of the WORK, a final inspection will be held, with the same parties present as at the preconstruction meeting. The CONTRACTOR will be required to restore the highway right-of-way to as good condition as it was prior to his doing the WORK, and to the satisfaction of the District Highway Engineer.

Ten days' WRITTEN NOTICE shall be given to the District Highway Engineer before any WORK is done within a State Highway right-of-way. A copy of such notice shall be furnished to the ENGINEER. Inspection by the Highway Department shall be permitted as construction progresses.

The CONTRACTOR'S WORK shall be performed in such a manner that the roadway, appurtenances, and highway traffic will be safe-guarded.

No blasting will be permitted under or adjacent to the highway unless special permission has been received from, and arrangements made with, the District Highway Engineer.

The CONTRACTOR shall suspend all WORK within the State Highway right-of-way during the period from November 15th to April 15th. Prior to suspension of WORK, the CONTRACTOR shall hold a conference with the ENGINEER, District Highway Engineer, and the OWNER. Any WORK required as a result of this conference shall be accomplished prior to November 15th. All bituminous paved travel ways and parking areas disturbed under this CONTRACT shall be restored to a condition equal to that which existed prior to start of construction. All bituminous paved and gravel surfaced travel ways and parking areas shall be maintained by the CONTRACTOR throughout the suspension of WORK period.

Traffic shall be protected at all times by suitable barricades, warning and advance warning signs, as required to protect the public during the construction period. All construction operations will be conducted so as to cause a minimum of interference with traffic. At least one-way traffic shall be maintained at all times. Two-way traffic shall be maintained at all times when construction operations are not in progress. Uniformed officers shall be provided for the control of traffic when two-way traffic cannot be maintained and at such other times as may be required by the District Highway Engineer for the protection of the public.

2. APPROVAL

Before any construction operations are started, the CONTRACTOR shall submit to the ENGINEER in triplicate a detailed written description of the equipment and methods he proposes to use and acceptable sketches showing details of the proposed operations. If a SUBCONTRACTOR is to be used for the WORK, the name and address of the SUBCONTRACTOR shall be indicated in the written description. No WORK shall proceed until the CONTRACTOR'S plans and schedules have been approved in writing by the OWNER, the ENGINEER, and the District Highway Engineer.

3. EXCAVATION, BACKFILL, AND SURFACE RESTORATION

Maximum dimensions of excavation within the highway right-of-way shall conform in general to details shown on Vermont Department of Highways Standard Drawing D-20. When excavating through portland cement concrete pavements, existing reinforcing shall be cut in the center of the trench, and carefully bent out of the way of excavation operations.

Immediately following installation of the casing and/or pipe, the trench shall be backfilled with approved material in 6-inch layers to the subgrade line. Each layer shall be compacted to not less than 95% of the maximum dry density as it is placed. Subbase of gravel or crushed rock shall be placed on the properly compacted subgrade in 6-inch compacted layers and shall be a minimum depth of 18 inches or as directed by the ENGINEER. Each layer shall be thoroughly and solidly compacted.

At least a temporary pavement shall be provided within 36 hours of the completion of backfilling where an open cut has been made through a roadway subject to vehicular traffic. The temporary pavement shall consist of at least one-inch of thoroughly compacted bituminous concrete. Temporary pavements shall be properly maintained and shall be replaced with permanent pavement prior to completion of the PROJECT or suspension of WORK for the winter season.

Cement concrete pavements shall be replaced with concrete having a minimum thickness of 8 inches, with the top surface shaped to match adjoining pavement. Existing reinforcing is to be bent back and spliced adequately with new cross reinforcement tied to the longitudinal bars. Reinforcing shall be placed with a minimum concrete cover of 2 inches. Concrete shall be thoroughly compacted, struck off to the desired grade and cured for 7 days with moistened sand or burlap covering before being subjected to traffic.

Bituminous pavements shall be replaced with 3 inches of bituminous plant-mixed concrete or the thickness of the existing bituminous pavement, whichever is less, in accordance with Vermont Department of Highways Standard Drawing D-20.

Sidewalk and curbs shall be replaced in kind or in accordance with details shown on the plans.

Existing granite curb may be salvaged and reset.

In areas presently grass covered, turf shall be reestablished in accordance with Section 651, Vermont Department of Highways Standard Specifications for Highway and Bridge Construction, to the satisfaction of the District Highway Engineer. The CONTRACTOR shall be responsible for the turf and grade of the ground surface for one year following the completion of the WORK, or as specified by the District Highway Engineer.

6.9 Stream Crossing(s). As indicated on the DRAWINGS, this CONTRACT includes stream crossing(s). The CONTRACTOR shall comply with the require- ments of the SPECIAL CONDITION entitled, "PERMITS".

In addition, the CONTRACTOR shall submit to the ENGINEER, in triplicate, a detailed, written description, with DRAWINGS if applicable, of equipment and methods he proposes. The CONTRACT DRAWINGS represent the intention of the completed WORK, but do not intend to restrict the CONTRACTOR as to method. If a SUBCONTRACTOR is to be used, his name and address shall be included in the description. In preparing the description, the CONTRACTOR should consider items such as season, method of excavation, minimal disturbance to shoreline, minimal rising and siltation of stream, protection of aquatic life, contingency plans for flash floods, methods of pipe and concrete encasement, testing, erosion control, maintenance of grades, etc.

All areas of disturbed streambanks shall receive riprap bank protection with suitable subbase.

No WORK shall proceed until the CONTRACTOR'S plans and schedules have been approved in writing by the ENGINEER/OWNER.

6.10 Lowering Silver Lake. The CONTRACTOR may lower the water level in Silver Lake to the bottom of the existing 22-inch steel drainage pipe at all times during the construction period.

The rate of lowering Silver Lake shall be approved by the Water Resources Department, such approval and direction shall not be cause for additional compensation to the CONTRACTOR other than that stated in the Proposal, nor shall the CONTRACTOR be relieved of any responsibility of liability in this Contract Agreement because of such approved methods or direction.

Lowering operations shall start after September 1st .

GENERAL SPECIFICATIONS

SECTION 7

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7.1 General. The CONTRACTOR shall furnish all materials, labor, tools, and equipment necessary to do all work required for the completion of each item of this CONTRACT as herein specified.

7.2 Definitions. Wherever the words defined in this section or pronouns used in their stead occur in the SPECIFICATIONS, they shall have the meanings herein given.

As Directed, As Required, Etc.

Wherever in the SPECIFICATIONS, or on the DRAWINGS, the words "as directed", "as required", "as permitted", or words of like import are used, it shall be understood that the direction, requirement, or permission of the ENGINEER is intended. Similarly, the wrds "approved", "acceptable", "satisfactory", and words of like import shall mean approved by, acceptable to, or satisfactory to the ENGINEER.

Elevation

The figures given in the CONTRACT DOCUMENTS or on the DRAWINGS after the word "elevation: or abbreviation of ity shall mean the distance i feet above the datum adopted by the ENGINEER.

Rock

The word "rock", wherever used as the name of an excavated material or material to be excavated, shall mean boulders and pieces of concrete or masonry exceeding one cubic yard in volume; or solid ledge rock which, in the opinion of the ENGINEER, requires, for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated tool. No soft or disintegrated rock which can be removed with a hand pick or power operated excavator or shovel; no loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere; and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed.

Earth

The word "earth", wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material except rock as above defined.

7.3 Abbreviations. Where any of the following abbreviations are used in the SPECIFICATIONS, they shall have the meaning set forth opposite each.

AASHO	- American Association of State Highway Officials
ANSI	- American National Standards Institute
ACI	- American Concrete Institute

AGMA	- American Gear Manufacturers Association
IEEE	- Institute of Electrical and Electronic Engineers
ASME	- American Socity of Mechanical Engineers
ASTM	- American Society for Testing Materials
AWWA	- American Water Works Association
IBR	- Institute of Boiler and Radiator Manufacturers
MCB	- Master Car Builders
NBS	- National Bureau of Standards
NEC	- National Electrical Code, latest edition
NEMA	- National Electrical Manufacturers Assoc.
NFPA	- National Fire Protection Agency
NEWWA	- New England Water Works Association
Federal Specification	- Federal Specification issued by the Federal Supply Service of the General Service Administration, Washington, D.C.
125-lb. American Standard	- American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125 (ASA B16.1-1960)
A.W.G.	- American or Brown and Sharp Wire Gage
E.D.R.	- Equivalent direct radiation
O.S. & Y.	- Outside screw and yoke
Stl. W.G.	- U.S. Steel Wire, Washburn and Moen, American Steel and Wire Cos., or Roebling Gage
W.S.P.	- Working Steam Pressure
NPT	- National Pipe Thread
UL	- Underwriters Laboratories, Inc.

7.4 Materials - Samples - Inspection - Approval. Unless otherwise indicated on the DRAWINGS or specified, only new materials and equipment shall be incorporated in the WORK. All materials and equipment furnished by the CONTRACTOR to be incorporated in the WORK shall be subject to the inspection and approval of the ENGINEER. No material shall be processed for, fabricated for, or delivered to the WORK without prior approval of the ENGINEER.

As soon as possible after the formal execution of the contract, the CONTRACTOR shall submit to the ENGINEER, the names and addresses of the manufacturers and SUPPLIERS of all materials and equipment he proposed to incorporate into the WORK. When SHOP DRAWINGS are required as specified below, such information shall be submitted prior to the submission of the DRAWINGS so that the ENGINEER may consider and approve or disapprove the manufacturer and/or the SUPPLIER as to his or their ability to furnish a product meeting the SPECIFICATIONS, subject to the final approval of the particular material or equipment. As requested, the CONTRACTOR shall also submit data relating to the materials and equipment he proposes to incorporate into the WORK, in sufficient detail to enable the ENGINEER to identify the particular product in question and to form an opinion as to its conformity to the contract requirements. Such data shall be submitted in a manner similar to that specified for SHOP DRAWINGS with the application clearly noted and drawing sheet or specification page reference where it applies.

Facilities and labor for the handling and inspection of all materials and equipment shall be furnished by the CONTRACTOR. Defective materials and equipment shall be removed immediately from the site of the work.

If the ENGINEER so requires, either prior to beginning or during the progress of the WORK, the CONTRACTOR shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the SPECIFICATIONS. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed, and shipped as directed, at the expense of the CONTRACTOR. The CONTRACTOR shall, at his own expense, furnish approved molds for making concrete test cylinders. Except as otherwise specified, the OWNER shall make arrangements for, and pay for, the tests.

All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, and the name of the building or work and location for which the material is intended, and the name of the CONTRACTOR submitting the sample. To ensure consideration of samples, the CONTRACTOR shall notify the ENGINEER by letter that the samples have been shipped and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.

The CONTRACTOR shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing and approval before the materials and equipment are needed for incorporation in the WORK. Delay resulting from his failure to do so shall not be used as the basis of the claim against the OWNER or the ENGINEER.

In order to demonstrate the proficiency of workmen, or to facilitate the choice among several textures, types, finishes, surfaces, etc., the CONTRACTOR shall, at his own expense, provide such samples of workmanship of wall, floor, finish, etc., as may be required.

When required, the CONTRACTOR shall furnish to the ENGINEER triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relatiave to materials, equipment performance ratings, and concrete data.

After approval of the samples, data, etc., the materials and equipment used on the WORK shall correspond therewith.

7.5 CONTRACTOR'S Shop Drawings. SHOP DRAWINGS are drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data prepared by the CONTRACTOR or any SUBCONTRACTOR, manufacturer, SUPPLIER, or distributor which illustrate how specific portions of the WORK shall be fabricated and/or installed. The CONTRACTOR shall submit SHOP DRAWINGS of concrete reinforcement, structural details, piping layouts, wiring, materials fabricated especially for this CONTRACT, and materials and equipment for which such drawings are specifically requested.

Prior to the submission of the first request for payment, the CONTRACTOR shall submit to the ENGINEER a schedule of major SHOP DRAWING submissions. The CONTRACTOR shall be responsible for the prompt submittal of all SHOP DRAWINGS in accordance with the accepted schedule. Failure of the CONTRACTOR to comply with the schedule shall not constitute a justification for a CONTRACT TIME extension.

The CONTRACTOR shall submit to the ENGINEER one (1) reproducible transparency (sepia) of all SHOP DRAWINGS, prepared on approximately 22 in. x 34 in. sheets, except those which are made by revision of existing standard SHOP DRAWINGS. If considered by the ENGINEER to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted in place of drawings. When submitted in this manner, the CONTRACTOR shall furnish six (6) copies of the SHOP DRAWINGS. All submittals shall be clearly referenced with the DRAWING or SPECIFICATION to which they apply, and shall be marked with the names of the OWNER, CONTRACTOR, building, equipment, or structure.

The CONTRACTOR shall utilize a SHOP DRAWING approval stamp or otherwise indicate on each shop drawing a statement containing the following wording to stipulate to the OWNER and ENGINEER that:

> "The Contractor represents that he has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data, and has reviewed and coordinated the information in the shop drawings with the requirements of the work and the contract documents."

It shall also indicate if the SHOP DRAWING submitted is an initial or corrected submission, and shall be dated and signed by an authorized CONTRACTOR'S representative. SHOP DRAWING submittals that do not conform to this requirement will be rejected and returned.

Upon receipt of the SHOP DRAWINGS submittal, the ENGINEER shall review and return a marked-up reproducible transparency (sepia) or three copies of the manufacturer's catalog or specification sheets, noted with one of the following:

Accepted
No revision will be required and fabrication of the items covered by the submittal may proceed in accordance therewith.

Accepted As Corrected
Formal revision of the submittal will not be required. The CONTRACTOR, after making the corrections noted on his copy, may proceed with fabrication of the items covered by the submittal and in accordance therewith.

Rejected, Revise and Resubmit
The CONTRACTOR shall revise the submittal and shall resubmit one (1) revised reproducible transparency (sepia) or six (6) revised copies, as appropriate.

Rejected - Unacceptable

The CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by the ENGINEER on RESUBMITTED SHOP DRAWINGS.

The CONTRACTOR shall neither purchase nor fabricate any materials and equipment, as shown on the SHOP DRAWINGS, nor shall he proceed with any portion of the WORK which is dependent on SHOP DRAWINGS, until such drawings are accepted by the ENGINEER.

The ENGINEER'S acceptance of SHOP DRAWINGS shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the CONTRACT DOCUMENTS unless the CONTRACTOR has, in writing, called the ENGINEER'S attention to such deviation at the time of submission and the ENGINEER has given written acceptance of the specific deviation, nor shall any acceptance by the ENGINEER relieve the CONTRACTOR from responsibility for errors or omissions in the SHOP DRAWINGS.

It shall be understood that Shop Drawing Submittals processed by the Engineer are not Change Orders; that the purpose of Shop Drawing Submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

If deviations, discrepancies or conflicts between Shop Drawings and Specifications are discovered either prior to or after Shop Drawing Submittals are processed by the Engineer, the design Drawings and Specifications shall control and shall be followed.

7.6 Inspection of Work Away from the Site. If work to be done away from the construction site is to be inspected on behalf of the OWNER during its fabrication, manufacture, or testing, or before shipment, the CONTRACTOR shall give notice to the ENGINEER of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the ENGINEER in ample time so that the necessary arrangements for the inspection can be made.

7.7 Handling and Distribution. The CONTRACTOR shall, at his own expense, handle, haul and distribute all materials and surplus materials on the different portions of the WORK, as necessary. He shall provide suitable and adequate storage room for materials and equipment during the progress of the WORK and be responsible for loss of, or damage to, materials and equipment furnished by him, until the final acceptance of the WORK.

Storage charges and demurrage charges by transportation companies and vendors, which result from delays in handling, shall be borne by the CONTRACTOR.

7.8 Storage of Materials and Equipment. All excavated materials, construction equipment, and materials and equipment shall be placed so as not to injure the WORK and so that free access can be had at all times to all parts of the WORK and to all public utility installations in the vicinity of the WORK. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining tenants.

7.9 Planning and Progress Schedules. Before starting the WORK and from time to time during its progress, as the ENGINEER may request, the CONTRACTOR shall submit to the ENGINEER a written description of the methods he plans to use in doing the work and the various steps he intends to take.

The CONTRACTOR shall prepare and submit to the ENGINEER, within 15 days after the date of starting WORK, a planning and progress schedule that conforms to the Sample Schedule, Standard Detail 800-1. The schedule shall be subject to review and change from time to time during the progress of the WORK.

7.10 Standard Drawings. Standard Drawings which apply to this CONTRACT are bound in the back of the SPECIFICATIONS.

7.11 Safety Precautions. The CONTRACTOR shall bear primary responsibility for the adherence of adequate safety precautions during the execution of all WORK under this CONTRACT. If at any time, in the opinion of the ENGINEER, the WORK is not properly lighted, barricaded, and in all respects safe in regard to public travel, persons on or about the WORK, or public or private property, the ENGINEER shall have the right to order such safeguards to be erected and such precautions to be taken as he deems advisable, and the CONTRACTOR shall comply promptly with such orders. If, under such circumstances, the CONTRACTOR does not or cannot immediately put the WORK in the safeguards into proper and approved condition or if the CONTRACTOR or his representative is not upon the site of the WORK so that he can be notified immediately of the insufficiency of safety precautions, the ENGINEER may put the WORK into such a

condition that it shall be, in his opinion, in all respects safe. The CONTRACTOR shall pay all expenses for such labor and mateials as may have been used for this purpose by him or by the ENGINEER. Such action of the ENGINEER, or his failure to take such action, shall in no way relieve the CONTRACTOR of the entire responsibility for any cost, loss, or damage sustained on account of the insufficiency of the safety precautions taken by him or by the ENGINEER acting under authority of this action.

7.12 Sanitary Regulations. The CONTRACTOR shall provide adequate sanitary conveniences for the use of those employed on the WORK. Such conveniences shall be made available when the first employees arrive on the WORK, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points, and in such manner as may be required or approved.

The CONTRACTOR shall maintain the sanitary facilities in satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the WORK, on the lands of the OWNER, or on adjacent property.

The OWNER and the ENGINEER shall have the right to inspect any building or other facility erected, maintained, or used by the CONTRACTOR to determine whether or not the sanitary regulations have been complied with.

7.13 Intoxicating Liquors. The CONTRACTOR shall not permit the introduction or use of intoxicating liquors upon or about the WORK under this contract.

7.14 Closing Up Trenches. The CONTRACTOR shall provide adequate warning signs and other measures to protect the public at no additional expense to the OWNER for all trench excavations that are open. The CONTRACTOR shall not permit such excavations to remain open on weekends, legal holidays or other periods when work is not being performed.

7.15 Traffic Control. The CONTRACTOR shall utilize adequate warning signs, lights, and barricades in accordance with the Federal Highway Manual and the Vermont Highway Department to safely control traffic at all times. The CONTRACTOR should make reference to Standard Detail E-8 bound in the back of these SPECIFICATIONS. At the close of WORK each day, the CONTRACTOR willinspect the WORK and see that no unreasonable hazards exist and that all obstructions and/or hazards to traffic left overnight are adequately warned and marked.

The CONTRACTOR shall leave the roadway clear of obstruction or hazard on weekends, legal holidays, or other periods during which work is not being performed.

For control of moderate traffic, the CONTRACTOR shall provide an adequate number of flagmen employed at his expense.

The CONTRACTOR shall 24 hours in advance, notify the Police and Fire Departments in writing, with a copy to the ENGINEER, if the closure of a street is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and, at his expense, shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.

Whenever and wherever, in the opinion of the ENGINEER, traffic is sufficiently congested or public safety is endangered, the CONTRACTOR, as required, shall furnish uniformed special officers to direct traffic and to keep traffic off the highway area affected by his construction operations. Such officers shall be in addition to the flagmen required under other provisions of the CONTRACT.

In the event the OWNER elects to furnish traffic officers on regular duty with the Police Department, the CONTRACTOR shall not be required to pay for such officers.

The employment or presence of traffic flagmen, special officers, or police shall in no way relieve the CONTRACTOR of any responsibility or liability which is his under the terms of the CONTRACT.

7.16 Obstruction of Vehicular and Pedestrian Traffic. The CONTRACTOR shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefor from the proper authorities. If any street or private way shall be rendered unsafe by the CONTRACTOR'S operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the ENGINEER.

Streets, roads, private ways, and walks not closed shall be maintained passable by the CONTRACTOR at his expense, and the CONTRACTOR shall assume full responsibility for the adequacy and safety of provisions made.

Reference is made to Section 7.15 entitled "Traffic Control."

7.17 Dimensions of Existing Structures. Where the dimensions and locations of existing structures are of critical importance in the installation or connection of new WORK, the CONTRACTOR shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

7.18 Work to Conform. During its progress and on its completion, all WORK shall conform truly to the lines, levels, and grades indicated on the DRAWINGS or given by the ENGINEER and shall be built in a thoroughly substantial and workmanlike manner, in accordance with the DRAWINGS and SPECIFICATIONS and the directions given from time to time by the ENGINEER. In no case shall any WORK in excess of the requirements of the DRAWINGS and SPECIFICATIONS be paid for unless ordered in writing by the ENGINEER.

7.19 Pipe Location and Elevation. Pipe will be located substantially as indicated on the DRAWINGS, but the right is reserved to the OWNER, acting through the ENGINEER, to make such modifications in locations and/or elevations as may be found desirable to avoid interference with existing structures or for other reasons.

7.20 Limits of Normal Excavation. In determining the quantities of excavation to which unit prices shall apply, the limits of normal width and depth of excavation shall be indicated on DRAWINGS.

7.21 Computation of Quantities. For estimating quantities in which the computation of areas by geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

It is further stipulated and agreed that the computation of the volume of prismoids shall be by the method of average end areas.

7.22 Precautions During Adverse Weather. During adverse weather and against the possibility thereof, the CONTRACTOR shall take all necessary precautions so that the WORK may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building paper shelters, or other approved means.

During cold weather, materials shall be preheated, if required, and the materials and adjacent structure into which they are to be incorporated shall be made and kept sufficiently warm so that a proper bond will take place and a proper curing, aging, or drying will result. Protected spaces shall be artificially heated by approved means which will result in a moist or a dry atmosphere according to the particular requirements of the WORK being protected. Ingredients for concrete and mortar shall be sufficiently heated so that the mixture will be warm throughout when used.

The ENGINEER may suspend construction operations at any time when, in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be, in any season.

7.24 Electrical Energy. The CONTRACTOR shall make all necessary applications and arrangements and pay all fees and charges for electrical energy for power and light necessary for the proper completion of this CONTRACT during its entire progress. The CONTRACTOR shall provide and pay for all temporary poles, wiring, switches, connections, and meters.

There shall be sufficient electrical lighting so that all WORK may be done in a workmanlike manner when there is not sufficient daylight.

7.25 Water Supply. The CONTRACTOR shall, at his own expense, provide all water for construction purposes.

7.26 Cutting and Patching. The CONTRACTOR shall leave all chases or openings for the installation of his own or any other CONTRACTOR'S or SUBCONTRACTOR'S work, or shall cut the same in existing WORK, and shall see that all sleeves or forms are at the WORK and properly set in ample time to prevent delays. He shall see that all such chases, openings, and sleeves are located accurately and are of proper size and shape and shall consult with the ENGINEER and the CONTRACTORS and SUBCONTRACTORS concerned in reference to this WORK.

In case of his failure to leave or cut all such openings or have all such sleeves provided and set in proper time, he shall cut them or set them afterwards at his own expense, but in so doing he shall confine the cutting to the smallest extent possible consistent with the WORK to be done. In no case shall piers or structural members be cut without the consent and approval of the ENGINEER.

The CONTRACTOR shall carefully fit around, close up, repair, patch, and point around the WORK specified herein to the entire satisfaction of the ENGINEER.

All of this WORK shall be done by careful workmen competent to do such WORK and with the proper small hand tools. Power tools shall not be used except where, in the opinion of the ENGINEER, the type of tool proposed can be used without damage to the structure beyond the limits of the WORK and without inconvenience or interference with the operation of the facilities.

The CONTRACTOR shall not himself, and shall not permit any SUBCONTRACTORS, to cut or alter the WORK of any other SUBCONTRACTOR except with the consent of the SUBCONTRACTOR involved, given in writing or in the presence of the ENGINEER.

All cutting and patching or repairing made necessary by the negligence, carelessness, or incompetence of the CONTRACTOR or any SUBCONTRACTOR shall be done by the CONTRACTOR or SUBCONTRACTOR who constructed the WORK, but such cutting and repairing shall be done at the expense of the CONTRACTOR.

7.27 Replacing Damaged Pipes. The CONTRACTOR may be required to perform excavation or new trenching in close proximity to existing sewers, water mains, gas lines, conduits, and structures. The DRAWINGS and subsurface exploration data depict existing conditions within the accuracy of construction documents. The CONTRACTOR shall repair or replace any utilities damaged as a result of his construction methods, at his own expense. This WORK may include testing and inspecting as required.

The CONTRACTOR should consider no existing underground utilities to be abandoned unless so informed by the ENGINEER.

7.29 Dust Control. The CONTRACTOR shall employ measures to prevent and control dust within the area affected by the PROJECT, suitable for the conditions present. No additional compensation will be paid to the CONTRACTOR for general dust control measures unless there are specific items in the BID which apply.

7.30 Cleaning Up. The CONTRACTOR is expected to conduct his activities in a neat and workmanlike manner and to keep the job site in acceptably presentable condition throughout the life of this CONTRACT. Basic clean-up must closely follow construction disturbance. In the event of his failure to do so, the OWNER may initiate clean-up work at the expense of the CONTRACTOR.

7.31 Occupying Private Land. The CONTRACTOR shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment, any land outside the rights-of-way or property of the OWNER. A copy of the written consent shall be given to the ENGINEER.

7.32 Lines, Grades, and Measurements. The CONTRACTOR shall establish all lines, elevations, reference marks, batter boards, etc. needed by the CONTRACTOR during the progress of the WORK; and from time to time, he shall verify such marks by instrument or other appropriate means.

The ENGINEER shall be permitted at any time to check the lines, elevations, reference marks, batter boards, etc. set by the surveyor employed by the CONTRACTOR; and the CONTRACTOR shall correct any errors in lines, elevations, reference marks, batter boards, etc. disclosed by such check. Such a check shall not be construed to be an approval of the CONTRACTOR'S WORK and shall not relieve the CONTRACTOR of the responsibility for the accurate construction of the entire WORK.

The CONTRACTOR shall make all measurements and check all dimensions necessary for the proper construction of the WORK called for by the DRAWINGS and SPECIFICATIONS. During the prosecution of the WORK, he shall make all necessary measurements to prevent misfitting in said WORK, and he shall be responsible for the accurate construction of the entire WORK.

CLEARING, GRUBBING, AND STRIPPING

SECTION S100

	Title	Page
S100.1	General.	S100-1
S100.2	Clearing	S100-1
S100.3	Grubbing	S100-1
S100.4	Stripping.	S100-1

S100.1 General. The Contractor shall do all clearing, grubbing, and stripping, necessary to permit construction of the work within the limits of the property or easement lines or as directed by the Engineer. No clearing, grubbing, or stripping shall be done outside the indicated limits.

S100.2 Clearing. The Contractor shall take extreme care not to damage or cut trees outside property or easement lines and shall be responsible for all damage done outside these lines. Removal of any trees inside or outside these lines shall be done only after receiving written permission from the Engineer.

Where the work is in easements, the property owners shall have the right to cut and remove any wood in advance of the Contractor's operations. All other wood shall become the property of the Contractor.

S100.3 Grubbing. Grubbing shall consist of removing all stumps and all roots to a sufficient depth below the surface of the ground as directed by the Engineer.

S100.4 Stripping. The unsuitable materials to be removed by stripping shall include all surface boulders and loose rock; debris; topsoil; vegetable matter, including stumps and roots; and all other perishable and objectionable materials that are unsuitable for use in the permanent construction required under these specifications or that might interfere with the proper bonding of the embankment with the foundation, or the proper compaction of the materials in the embankment, or that may be otherwise objectionable as determined by the Engineer.

All suitable materials, as determined by the Engineer, stripped away from the ground surface shall be stockpiled and later utilized in construction.

EMBANKMENT EXCAVATION AND BACKFILL/FILL

SECTION S101

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S101.2	Separation of Surface Materials	S101-2
S101.2a	Excavated Materials	S101-2
S101.3	Drainage	S101-2
S101.4	Excavation Near Existing Structures	S101-3
S101.5	Protection of Existing Structures	S101-3
S101.6	Care and Restoration of Surfaces	S101-3
S101.7	Unauthorized Excavation	S101-3
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S101.1 General. All excavation required for the dam and appurtenant works shall be made to the lines, grades, and dimensions shown on the drawings or where directed, shall be to a firm formation or to an otherwise suitable foundation as determined by the Engineer/Owner.

During the progress of the work, it may be found necessary or desirable to vary the slopes, grades, or the dimensions of the excavations from those specified herein. Any increase or decrease of quantities excavated as a result of such variations will be included in the estimates. However, if the Engineer/Owner determines that the contractor's costs of performing the work will be increased by reason of such variations, an equitable adjustment will be made to cover such increased costs. Otherwise, the work will be paid for at the unit price bid therefore in the schedule regardless of such variations.

All necessary precautions, including control of blasting, shall be taken to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. Whenever, in the opinion of the Engineer/Owner, further blasting might injure the material upon or against which concrete is to be placed, the use of explosives shall be limited to light loads, and the excavation shall be completed by light blasting, wedging, barring, channeling, line drilling and broaching, or other suitable methods approved by the Engineer/Owner. Any damage to the work due to the contractor's operations, including shattering of the material beyond the required excavation lines, shall be repaired at the expense of and by the contractor. Slopes shattered or loosened by blasting shall be taken down at the expense of and by the contractor.

All excavation for embankment and structure foundations shall be performed in the dry. No excavation shall be made in frozen materials without written approval. No additional allowance above the unit prices per cubic yard bid in the schedule for excavation will be made on account of any of the materials being wet or frozen.

S101.2 Separation of Surface Materials. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated without additional compensation.

S101.2a Excavated Materials. So far as practicable, as determined by the Engineer/Owner, all suitable materials from excavations shall be used in the permanent construction required under these specifications.

Excavated materials which are unsuitable for or are in excess of dam embankment or other earthwork requirements, as determined by the Engineer/Owner, shall be wasted as provided in section S101.9.

The contractor's blasting and other operations in excavation shall be such that the excavations will yield as much suitable material for such construction as practicable, and shall be subject to the approval of the Engineer/Owner. Where practicable, as determined by the Engineer/Owner, suitable materials shall be excavated separately from the materials to be wasted and the suitable materials shall be segregated by loads during the excavation operations. The suitable materials shall be placed in the designated final locations directly from the excavation, or shall be placed in temporary stockpiles and later placed in the designated locations as directed by the Engineer/Owner.

Excavated materials which, have a moisture content greater than that required for placement and compaction in the dam embankment, the material shall be placed temporarily in stockpiles and allowed to drain or dry until the moisture content is reduced sufficiently to permit it to be placed in the embankment.

Should cobbles, boulders, or rock fragments having maximum dimensions of more than 10 inches be found in otherwise approved excavated materials, they shall be removed by the contractor either at the site of the excavation or after being transported to the temporarily stockpile areas but before the materials are rolled and compacted. Such rock materials shall be placed in other portions of the dam embankment or wasted, as directed.

S101.3 Drainage. At all times during construction, the Contractor shall provide and maintain ample means and devices with which to remove promptly and dispose properly of all water entering trenches and other excavations and keep said excavations dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work or damage to pavements, other surfaces, or property. Suitable temporary channels shall be provided for water that may flow along or across the site of the work. It shall be solely the Contractors responsibility to ascertain whether a discharge permit is required, and to obtain said permit, when working in or around waters of the State of Vermont.

S101.4 Excavation near Existing Structures. The program of excavation and dewatering shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing any existing structure or any work previously completed under this contract.

As the excavation approaches pipes or other underground structures, digging by machinery shall be discontinued and the excavation shall be done manually, as directed. Such manual excavation, when incidental to normal excavation, shall be done without additional compensation.

The borings indicate that the upstream wall may be founded about 2 ft above the top of the glacial till. If the wall is founded above the glacial till, the excavation does not have to be carried down to the till immediately behind the wall. A small bench of the existing material above the till should be left in place adjacent to the downstream side of the wall to avoid undermining the wall. This bench should be 2 ft wide and sloped downward at 1-1/2H:1V.

S101.5 Protection of Existing Structures. All existing pipes, poles, wires, fences, curbings, property line markers, and other structures which, in the opinion of the Engineer, must be preserved, shall be carefully supported and protected from injury by the Contractor; and in case of injury, they shall be restored by him, without compensation therefore, to at least as good condition as that in which they were found immediately prior to the start of the work.

The restoration of structures shall be done as promptly as practicable and shall not be left until the end of the construction period.

S101.6 Care and Restoration of Surfaces. On paved surfaces, the Contractor shall not use or operate tractors, bulldozers, or other power operated equipment, the treads or wheels of which are so shaped as to cut or otherwise damage such surfaces.

All surfaces which have been damaged by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations. Suitable materials and methods shall be used for such restoration.

The restoration of all surfaces shall be done as promptly as practicable and shall not be left until of the construction period.

S101.7 Unauthorized Excavation. Any and all excess excavation taken out beyond the limits indicated on the drawings for the convenience of the contractor for any purpose or reason, except as may be ordered in writing by the Engineer/Owner, and whether or not due to the fault of the contractor, shall be at the expense of the contractor. Where required to complete the work, all such excess excavation and overexcavation shall be refilled with materials furnished and placed at the expense of and by the contractor as directed by the Engineer/Owner: Provided, that payment will be made for cement used in concrete placed to refill such excess excavation or over-excavation unless such excavation or overexcavation is caused by careless excavation or is intentionally performed for the convenience of the contractor to facilitate his operations, as determined by the Engineer/Owner.

S101.8 Preparation of Foundation. If, in the opinion of the Engineer/Owner, the material at or below the lines, grades and dimensions of the excavation shown on the drawings is unsuitable for foundation, it shall be removed to such widths and depths as directed or shall be removed and replaced with a suitable material as directed by the Engineer/ Owner.

The bottom and side slopes of excavation in common material upon or against which concrete is to be placed shall be prepared by moistening and tamping or rolling with suitable tools and equipment to form a firm foundation for the concrete structure. If, at any point in common material, the natural foundation material is disturbed or loosened, for any purpose or reason, it shall be consolidated by tamping or rolling, or where directed, it shall be removed and replaced with selected earthfill material moistened and thoroughly compacted in 6-inch layers by tamping or rolling.

The foundation for the earthfill, shall be prepared by leveling, moistening, and rolling so that the surface materials of the foundation will be as compact and will provide as satisfactory a bonding surface with the first layer of the earthfill as specified for the subsequent layers of the earthfill.

Immediately prior to placing the first layer of earthfill, all surfaces upon or against which the earthfill portions of the dam embankment are to be placed shall be cleaned of all loose and objectionable materials in an approved manner by handwork, barring, picking, brooming, sluicing, or by other effective means. Such surfaces shall have all water removed from depressions and shall be properly moistened and sufficiently clean to obtain a suitable bond with the earthfill.

The finished foundation surfaces shall be a firm formation or to an otherwise suitable foundation as determined by the Engineer/Owner.

The cost of all work required in removing unsuitable foundation material, below the lines, grades and dimensions shown on the drawing's shall be included in the applicable unit price bid in the schedule for excavation.

S101.9 Disposal of Excavated Material. So far as practicable, as determined by the Engineer/Owner, all suitable materials from excavation required under these specifications shall be used in the permanent construction. Excavated materials that are unsuitable for or are in excess of permanent construction requirements shall be wasted.

If the materials are not needed on other work, the surplus excavation materials shall become the property of the Contractor and shall be disposed of away from the site of the work.

All unsuitable excavated materials shall be disposed of off site unless otherwise approved by the Engineer.

S101.10 Preparation of Subgrade. Areas upon which backfill is to be placed the Contractor shall remove loam and topsoil, loose vegetable matter, stumps, large roots, etc. The subgrade shall be suitably shaped as indicated on the drawings or as directed and shall be so prepared by forking, furrowing, or plowing so that the new material placed shall be firmly bonded to it.

S101.11 Embankment Construction - General. For the purpose of these specifications, the term "dam embankment" includes all portions of the material downstream of the concrete cutoff wall to the toe of the dam. The suitability of each part of the foundation for placing embankment materials thereon, and of all materials for use in embankment construction, will be determined by the Engineer/Owner. No embankment material shall be placed in the embankment when either the material or the foundation or embankment on which it would be placed is frozen.

No brush, roots, sod, or other perishable or unsuitable materials shall be placed in the embankment.

Each load of the material placed in the embankment, whether from excavation for other parts of the work, from borrow pits or stockpile areas, shall be placed in the location designated by the Engineer/Owner, and the contractor shall be entitled to no additional allowance above the unit prices bid in the schedule on account of this requirement.

In any separate portion of dam embankment being constructed, each layer of each material shall be constructed continuously and approximately horizontal for the width and length of such portion at the elevation of the layer.

The contractor shall maintain the embankment in an approved manner, including maintaining surfaces free of excess water, weeds or other vegetation, until final completion and acceptance of all the work under the contract.

Materials having maximum dimensions of more than 10 inches shall not be placed in the earthfill. Should materials of such size be found in otherwise approved earthfill materials, they shall be removed by the contractor either at the site of excavation, stockpile area, or after being transported to the earthfill but before the materials in the earthfill are rolled and compacted. Such materials shall be placed in the other portions of the dam embankment or wasted as approved by the Engineer/Owner.

The distribution and gradation of the materials throughout the earthfill shall be such that the fills will be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or moisture from the surrounding material. The combined excavation, separation, and operations shall be such that the materials when compacted in the earthfill will be blended sufficiently to secure the best practicable degree of compaction and stability. Successive loads of material shall be dumped on the earthfill so as to produce the best practicable distribution of the material, subject to the approval of the Engineer/Owner and for this purpose the Engineer/Owner may designate the locations in the earthfill where the individual loads shall be deposited, to the end that the most impervious materials shall be placed on the downstream side of the existing concrete cutoff wall and the more pervious materials shall be placed so that the permeability of the fill will be gradually increased from the existing concrete cutoff wall to the downstream slope of the earthfill.

The material shall be placed in the earthfill in continuous, approximately horizontal layers gradually scoping away from existing concrete cutoff wall, not more than 12 inches or as listed in section S101.14, in thickness after being compacted. If, in the opinion of the Engineer/Owner, the surface of the prepared foundation on the compacted surface of any layer of earthfill is too dry or smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or worked with harrow, scarifier, or other suitable equipment, in an approved manner to a sufficient depth to provide a satisfactory bonding surface before the next succeeding layer of earthfill material is placed. If, in the opinion of the Engineer/Owner, the compacted surface of any layer of the earthfill in place is too wet for proper compaction of the layer of earthfill material to be placed thereon, it shall be removed; allowed to dry; or be worked with harrow, scarifier, or other suitable equipment to reduce the moisture content to the required amount; and then it shall be recompacted before the next succeeding layer of earthfill material is placed.

The earthfill on each side of the concrete cutoff walls, conduits, foundations, gate structure and at the abutments shall be kept at approximately the same level as the placing of the earthfill progresses, and the walls, conduits, foundations, gate structure and abutment shall be protected against displacement or other damage.

Earthfill shall not be placed against any concrete cutoff walls, conduits, foundations, gate structure or abutment until the structure has been approved by the Engineer/Owner.

If the Contractor desires to utilize an alternate backfill/fill method other than that specified above, the Contractor shall be required prior to approval, to conduct density tests at the Contractor's own expense to demonstrate that the alternate method of compaction of the soil used for backfill/fill will achieve the density specified in Section 101.14. All approvals of alternate backfill/fill methods will be in writing.

S101.14 Compaction Control and Testing. Density control of compacted earthfill shall be such that the dry density of the compacted material, as determined by tests performed by the Engineer/Owner, shall conform to the following limits:

Material	Minimum Acceptable Compaction	Maximum Thickness of Compacted Lift
Re-used embankment soil	90%	12 inches
Bank-run sand and gravel filter layer	90%	12 inches
Pipe bedding	95%	8 inches
Roadway subbase	95%	8 inches
Rip-rap bedding	not compacted	---
Rip-rap	not compacted	---

Material represented by samples having a dry density less than the listed percent of its Proctor maximum dry density will be rejected. Such rejected material shall be recompacted until a dry density equal to or greater than the listed percent of its Proctor maximum dry density is obtained. Material shall be tested by the Modified Proctor maximum density method (ASTM D1557-78, Method C).

Compaction shall be limited immediately behind the new (1968) portion of the upstream wall where it extends above the old masonry portion that has been cut off. Heavy compaction equipment shall not be permitted within 4 ft of the new wall. This zone shall be compacted by hand-operated compaction equipment to 90% of the Modified Proctor maximum density.

The Contractory shall submit samples of borrow materials (100 lb min.) at least two weeks prior to use to allow time for grain-size analyses and laboratory compaction tests.

ROCK EXCAVATION AND DISPOSAL

SECTION S102

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S102.6	Preparation of Rock Surfaces	S102-2
S102.7	Removal of Boulders	S102-2
S102.8	Disposal of Excavated Rock	S102-2

S102.1 General. The Contractor shall excavate rock (as defined in the General Specifications and/or the Special Conditions), if encountered, to the lines and grades indicated on the drawings or as directed. All excavated materials shall be dealt with in accordance to Section S101.21.

The Contractor's attention is directed to the General Specifications, Section 7, and/or the Special Conditions for additional requirements regarding rock. In particular, the Contractor's work shall conform to the sections entitled "Definitions" and "Limits of Normal Excavation."

S102.2 Explosives. The Contractor shall keep explosives on the site only in such quantity as may be needed for the work under way and only during such time as they are being used. He shall notify the Engineer/Owner, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distant from the explosives. When the need for the explosives has ended, all such material remaining on the work shall be promptly removed from the premises.

In addition to observing all municipal ordinances and State and Federal laws relating to the transportation, storage, handling, and use of explosives, the Contractor shall conform to any further regulations which the Engineer/Owner may think necessary in this respect. In the event that any of the above-mentioned laws, ordinances, or regulations require a licensed blaster to perform or supervise the work of blasting, said licensed blaster shall, at all times, have his license on the work and shall permit examination thereof by the Engineer/Owner or other officials having jurisdiction.

S102.3 Blasting Precautions. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing

pipes or other structures and property above or below ground. Rock shall be well covered with logs, mats, or both, when required. Sufficient warning shall be given to all persons in the vicinity of the work before a charge is exploded.

All blasting shall be completed within a distance of 50 feet before any portion of a masonry structure is placed or any pipe is laid.

S102.4 Excessive Rock Excavation. If rock is excavated beyond the limits of payment indicated on the drawings, specified, or authorized in writing by the Engineer/Owner, the excessive excavation, whether resulting from overbreakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below in this section.

If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor, and the Engineer/Owner considers such shattered rock to be unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as directed by the Engineer/Owner. All such removal and backfilling shall be done by and at the expense of the Contractor.

S102.5 Blasting Records. The Contractor shall keep an accurate record of each blast. The record shall show the general location of the blast, the depth and number of drillholes, the kind and quantity of explosive used, the time and date of the blast, and other data required for a complete record. All records shall be legible. A copy of all such records shall be kept at the site for inspection by the Engineer/Owner. Upon request, the Contractor shall furnish a copy of any or all blasting records to the Engineer/Owner.

S102.6 Preparation of Rock Surfaces. Whenever so directed during the progress of the work, the Contractor shall remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Water in depressions shall then be removed as required so that the whole surfacae of the designated area can be inspected to determine whether seams or other defects exists.

The surfaces of rock foundations shall be left sufficiently rough to bond well with the masonry and embankments to be built thereon and, if required, shall be cut to rough benches or steps.

Before any masonry or embankments are built on or against the rock, the rock shall be scrupulously freed from all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means may be used to clean the rock surface.

S102.7 Removal of Boulders. Piles of boulders or loose rock encountered within the limits of earth embankments shall be dealt with in accordance to Section S101.21.

S102.8 Disposal of Excavated Rock. Excavated rock shall be disposed of in accordance with Section S101.9

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GRANULAR MATERIALS

SECTION S103

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S103.3	Pipe Bedding	103-1
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S103.5	Installation	103-2

S103.1 General. Unless otherwise specified or indicated on the drawings, granular backfill around structures and pipes and granular fill shall conform as herein specified. Percentages are by dry weight.

S103.2 Bank-Run Sand and Gravel Filter Layer. Bank run sand and gravel layer shall be uniformly graded and shall consist of hard, durable sand and gravel, free of organic matter, plastic fines (clay) and debris.

Gradation:		
	Percent passing 10-inch size	= 100
	Percent passing 3-inch size	= 85 - 100
	Percent passing 3/4 inch size	= 65 - 100
	Percent passing No. 4 sieve	= 40 - 90
	Percent passing No. 10 sieve	= 20 - 75
	Percent passing No. 40 sieve	= 0 - 35
	Percent passing No. 200 sieve	= 0 - 8

Bank-run sand and gravel filter shall be obtained from an approved source.

S103.3 Pipe Bedding. Pipe bedding shall be uniformly graded and shall consist of hard, durable sand and gravel, free of organic matter, plastic fines (clay) and debris.

Gradation:		
	Percent passing 3 inch size	= 100
	Percent passing 3/4 inch size	= 65 - 100
	Percent passing No. 4 sieve	= 40 - 90
	Percent passing No. 10 sieve	= 20 - 75
	Percent passing No. 40 sieve	= 0 - 35
	Percent passing No. 200 sieve	= 0 - 8

Pipe bedding shall be obtained from an approved source.

S103.4 Crushed Stone Bedding for Rip-Rap. Crushed stone bedding for rip-rap shall be uniformly graded and shall consist of hard, durable, angular crushed stone, free of organic material, plastic fines (clay) and debris.

Gradation:	Percent passing 10 inch size	= 100
	Percent passing 6 inch size	= 75 - 100
	Percent passing 3 inch size	= 50 - 100
	Percent passing 1-1/2 inch size	= 30 - 75
	Percent passing 3/4 inch size	= 10 - 45
	Percent passing 3/8 inch size	= 0 - 25
	Percent passing No. 4 sieve	= 0 - 10

Crushed stone bedding for rip-rap shall be obtained from an approved source.

103.5 Installation. All granular materials shall be placed and compacted per Section 101, Embankment Excavation and Backfill/Fill.

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DUMPED RIPRAP
SECTION S105

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S105.1 Materials. Rock used for dumped riprap shall be hard, durable, angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale, and organic material; and shall meet the gradation requirements specified in this Section. Neither breadth nor thickness of an individual rock fragment should be less than one-third its length. Rounded stone or boulders will not be accepted. Shale and rock with shale seams are not acceptable. The minimum unit weight of the rock shall be 155 pounds per cubic foot (bulk-saturated-surface-dry basis, AASHO Test T 85).

The sources from which the rock will be obtained shall be selected well in advance of the time when the rock will be required in the work.

If in the opinion of the Engineer/Owner it appears that the durability of the rock may not meet the project requirements, the resistance to disintegration shall be determined by the following tests:

1. Abrasion test in the Los Angeles machine (AASHO Test T 96) - the rock shall have a percentage loss of not more than 40 after 500 revolutions.

2. Freezing and thawing test (AASHO Test 103 for ledge rock procedure A) - the rock shall have a loss not exceeding 10 percent after 12 cycles of freezing and thawing.

If testing is required, suitable samples of rock shall be taken in the presence of the engineer at least 25 days in advance of the time when the placing of riprap is expected to begin. The tests shall be performed by a qualified testing laboratory approved by the Owner/Engineer and shall be provided by the contractor at no additional cost to the Owner. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

Each load of riprap shall be reasonably graded within the following limits:

Percentage	Size of Rock Fragments	
	Weight (lbs)	Equivalent Spherical Diameter (ft)
Maximum size	5500	4
50 percent larger than	2300	3
Less than 10 percent smaller than	100	1

Control of gradation will be by visual inspection. Any difference of opinion between the engineer and the contractor shall be resolved by dumping and checking the gradation of two random truck loads of riprap. Mechanical equipment, a sorting site, and labor needed to assist in checking gradation shall be provided by the contractor at no additional cost to the Owner.

Existing riprap and other rock materials at the site that meet the requirements of this section may be stockpiled and reused as dumped riprap. At the discretion of the Engineer/Owner, existing riprap and rock materials that do not meet the requirements of this section may be reused as dumped riprap in noncritical areas. Noncritical areas are defined as areas that are not subjected to flow from the spillway pipes, low-level outlet pipe, or drainage culverts.

S105.2 Placement. Crushed Stone Bedding for Riprap shall be placed on the slope below the riprap as shown on the drawings.

Dumped riprap shall be placed on the prepared slope in a manner which will produce a reasonably graded mass of stone with the minimum practicable percentage of voids. The entire mass of stone shall conform with the lines, grades, and thicknesses shown on the plans. Riprap shall be placed to its full thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation will not be permitted.

The larger stones shall be well distributed and the entire mass of stone shall conform to the gradation specified in Section S105.1. All material going into the riprap layer shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of stone.

It is the intent of these specifications to produce a fairly compact riprap layer in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stone by mechanical equipment may be required.

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MISCELLANEOUS EARTH EXCAVATION

SECTION S108

	Title	Page
S108.1	General.	S108-1

S108.1 General. The Contractor shall dig and backfill test pits and test holes ahead of the work as directed for the purpose of locating underground structures and shall make all other miscellaneous excavations in earth which shall be ordered by the Engineer/Owner. If required, miscellaneous excavations shall be backfilled immediately after their purpose has been accomplished, and the Contractor shall thereafter maintain the ground surface in a safe and satisfactory condition for travel until the earth excavation reaches the pit or until the surface has been repaired as specified elsewhere.

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HANDLING FLOWS DURING CONSTRUCTION

SECTION S115

	Title	Page
S115.1	General	S115.1
S115.2	Diversion of Stream and Care of Water	S115.1
S115.3	Removal of Water From Foundations	S115.2
S115.4	Responsibility of Contractor	S115.2

S115.1 General. The Contractor shall construct and maintain all necessary cofferdams, channels, flumes, drains, sumps and/or other temporary diversion and protective works; shall furnish all materials required therefore; and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work, for protecting the works from damage by the elements, and for maintaining the foundations and other parts of the work free from water. After having served their purpose, all cofferdams or other protective works downstream from the dam shall be removed from the stream bed or leveled to give a sightly appearance, so as not to interfere in any way with the operation or usefulness of Silver Lake Dam and in a manner approved by the Engineer/Owner. All cofferdams or other protective works constructed upstream from the dam and not a part of the permanent dam embankment shall be removed or leveled and graded to restore the lake bed to its original configuration. The Contractor shall be responsible for and shall repair at his expense any damage to the foundations, structures, or any other part of the work caused by floods, water, or failure of any part of the diversion or protective works.

S115.2 Diversion of Stream and Care of Water. The contractor shall not interrupt nor interfere with the natural flow of the stream through the damsite for any purpose without the written approval of the Engineer/Owner.

The contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, and other objectionable pollutants and wastes into streams, watercourses, lakes, and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sewage effluent, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution. Sanitary wastes shall be disposed of on land by burial at approved sites or by other approved methods.

Unwatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels or conduits, barriers, settling ponds, or by other approved means.

When necessary to perform required construction work in the stream channel the contractor shall perform the required work in the shortest practicable time period. This required construction work may include such work as diversion of a stream, construction or removal of cofferdams, specified earthwork in or adjacent to a stream channel, and construction of turbidity control structures. Mechanized equipment shall not be operated in flowing water except as necessary to construct crossings or to perform the required construction.

All construction activities shall be conducted in a manner to prevent muddy water and eroded materials from entering the stream or watercourses by construction of intercepting ditches, bypass channels or conduits, barriers, settling ponds, or by other approved areas.

S115.3 Removal of Water from Foundations. The Contractor's method of removal of water from foundation excavations shall be subject to the approval of the Engineer/Owner.

The Contractor shall take care of all other surface water and groundwater so as to render the foundation dry and suitable for placing concrete or backfill.

S115.4 Responsibility of Contractor. At a reasonable time in advance of the construction work, the Contractor shall submit, for the approval by the Engineer/Owner, the general methods and details he proposes to use for the control of water at, onto, or through the construction site.

Whatever method is adopted, the construction of diversion or protective works, the maintenance and operation of the same, and all other operations connected therewith, shall be carried out in a satisfactory manner; and the Engineer/Owner may at any time require the Contractor to increase the precautions taken or to take additional steps to make the diversion or protective works adequate, substantial and secure. Such directions or instructions given from time to time by the Engineer/Owner, shall in no way relieve the Contractor from the whole responsibility for the efficiency and safety of these works. The Contractor shall form his own estimates of the probable flood flows and of the necessary size and strength of the stream control works, and shall assume all expenses and losses which may result from their inadequacy or from failure due to any cause whatsoever; and if destroyed or damaged he shall replace the damaged portion of the work or structure in a satisfactory manner.

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CONNECTION TO EXISTING STRUCTURES

SECTION S120

	Title	Page
S120.1	General.	.S120-1
S120.2	Cutting and Patching	.S120-1
S120.3	Construction Methods	.S120-1

S120.1 General. The Contractor shall cut suitable openings into existing structures to accommodate the pipe or structure, shall make the necessary connections to existing pipe lines or structures and do all miscellaneous work for each complete connection, as indicated on the drawings, as herein specified, or as directed.

S120.2 Cutting and Patching. Wherever necessary to connect to existing structures or lines, the Contractor shall remove the minimum amount of existing work for the installation of the necessary piping or new work. All cutting shall be confined to the smallest amount possible consistent with the work to be done, but so as to provide an acceptable connection with first class workmanship.

After new pipes or works are installed, the Contractor shall carefully fit around, close up, and repair the pipes and miscellaneous work in such a manner as is satisfactory to the Engineer/Owner. All such work shall be done by careful workmen competent to do such work with the proper tools.

All new work to be incorporated into the connections to existing structures or pipelines shall be made with new materials. No old or used materials will be permitted in making the connection unless approved by the Engineer/Owner.

S120.3 Construction Methods. The Contractor shall submit for approval details of the methods and materials he proposes to use for making all connections to existing structures, pipelines, etc.

No work shall be started on connections until the Contractor has assembled all tools, material and equipment necessary to complete the work in the shortest possible time. Once the connection work is started the Contractor shall work continuously on the connection so that the work is completed. No unfinished work shall be left for completion at a later time or date unless approved by the Engineer/Owner.

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MISCELLANEOUS APPURTENANT WORK

SECTION S122

	Title	Page
S122.1	General	S122-1
S122.2	Removal and Replacement of Portions of the Existing Structure and Appurtenances.	S122-1
S122.3	Foundation for the Concrete Cutoff Wall	S122-1
S122.4	Steel Beam Guard Rails.	S122-2
S122.5	Observation Wells	S122-2

S122.1 General. The Contractor shall furnish all materials, labor, tools and equipment necessary to do all miscellaneous appurtenant work required for the completion of each item of this Contract as herein specified and as indicated on the drawings.

S122.2 Removal and Replacement of Portions of Existing Structure and Appurtenances. The existing low-level outlet, 22-inch diameter steel pipe shall be removed and replaced by 30-inch diameter prestressed concrete cylinder pipe as indicated on the drawings and as directed. Due to the unknown condition of the original masonry at the entrance to the low-level outlet, additional reinforced concrete work may be necessary, as determined by the Engineer/Owner. The cost of the additional reinforced concrete work for connecting the new work to the existing structure shall be included in the applicable unit price bid.

The four existing 36-inch CGMP emergency spillway pipes shall be removed and replaced by four new 36" CGMP, as indicated on the drawings and as directed.

The existing dry hydrant and water line shall be removed as indicated on the drawings and as directed. The existing dry hydrant shall be properly stored and then re-installed at the same location with new 10-inch ductile iron water main, thickness class 50. Attach anti-seep collars as indicated on the drawings.

All removed portions of the structure that are not specified for reuse including concrete work and pipes shall become property of the Contractor who shall dispose of these materials off the site of the work at a location of his own choice and responsibility.

S122.3 Foundation for the Concrete Cutoff Wall. During the excavation phase of the construction the Owner/Engineer shall be given a reasonable amount of time to examine the foundation conditions of the concrete cutoff wall. Upon completion of the examination, as determined and directed by the Owner/Engineer, additional work may be required to insure the performance and stability of the structure. If the Engineer/Owner determines that the contractor's costs of performing the work will be increased due to the additional work to insure the performance and stability of the structure, an equitable adjustment will be made to cover such increased costs. Otherwise the work will be paid for at the unit price bid.

Any openings in the downstream side of the original masonry upstream wall should be sealed by mortaring or slush grouting to prevent intrusion of fines from the earthen embankment.

S122.4 Steel Beam Guard Rails. The existing steel beam guard rail on the south side of the North Road, shall be carefully removed and temporarily stored until time to reinstall at original location, as indicated on the drawings or as directed. Materials damaged or lost shall be replaced with new materials by the Contractor without additional compensation. The new materials shall be equal to or better than the material of the existing guard rail.

A new standard steel beam guard rail shall be furnished and installed on the north side of the North Road as indicated on the drawings or as directed by the Engineer/Owner. The steel beam guard rail shall conform to all the requirements of the "Standard Steel Beam Guard Rails with Steel Posts" as described in the Vermont Specifications for Highway and Bridge Construction dated March 1976, or latest revision, under Section 621.

S122.5 Observation Wells. A total of two (2) groundwater observation wells shall be installed to a depth of 25 ft at the locations shown on the drawings, or as directed by the Engineer/Owner. The wells shall be installed in cased boreholes advanced by conventional wash boring drilling techniques.

The following materials will be required for installation of an observation well:

a. Clean, uniform, MEDIUM SAND - 3% passing 200 mesh sieve, coefficient of uniformity = 2.5, grain size approximately 0.4 to 2 mm or Standard Ottawa Sand (ASTM Designation C190).

b. Clean, well graded, COARSE to FINE SAND - 3% passing 200 mesh sieve.

c. BENTONITE BALLS - Volclay KWK No. 33 or equal.

d. SLOTTED PIPE - 1-1/2 in., Schedule 80, flush joint PVC pipe, with slot width of 0.020 in., as manufactured by Hydrophilic Industries Inc. or equal.

e. RISER PIPE - 1-1/2 in., Schedule 80, flush joint PVC pipe.

f. SURFACE ROAD BOX - cast iron gate-box with bolted cover of the type used for roadway installation of water valves.

Materials to be used must be approved by the Engineer/Owner.

The observations wells shall be installed in cased boreholes using casing with a 3-in. minimum I.D. The cased boreholes shall be advanced by driving the casing to the required depth and washing out the casing with approved drilling bits. Drilling bits for cleaning out the casing may be chopping bits, tricone

(roller) bits, or auger bits, all with side discharge. The hole shall be flushed with water until the drill water return is clear and void of any cuttings. Downward jetting, drill water return outside the casing, and use of drilling mud shall not be permitted. (See Figure 1)

The installation of the observation well shall proceed as follows:

a. Pour enough MEDIUM SAND or Standard Ottawa Sand into the casing to equal one foot of thickness and wait until it settles to the bottom of the borehole. Bump out the casing an amount equal to the thickness of sand placed.

b. Lower the slotted pipe (10-ft length, plugged at the bottom) and riser pipe into the borehole and allow it to rest on the sand cushion described in a. above. The riser pipe should extend 18 in. above the ground surface. It must be noted that special care should be taken to ensure that all connections are watertight.

c. Pour MEDIUM SAND or Standard Ottawa Sand into the borehole between the casing and the riser pipe in increments of 6 to 12 in. bumping back the casing after each increment. Continue this procedure to a height of 12 to 18 in. above the slots in the PVC pipe; agitate and allow the sand to settle.

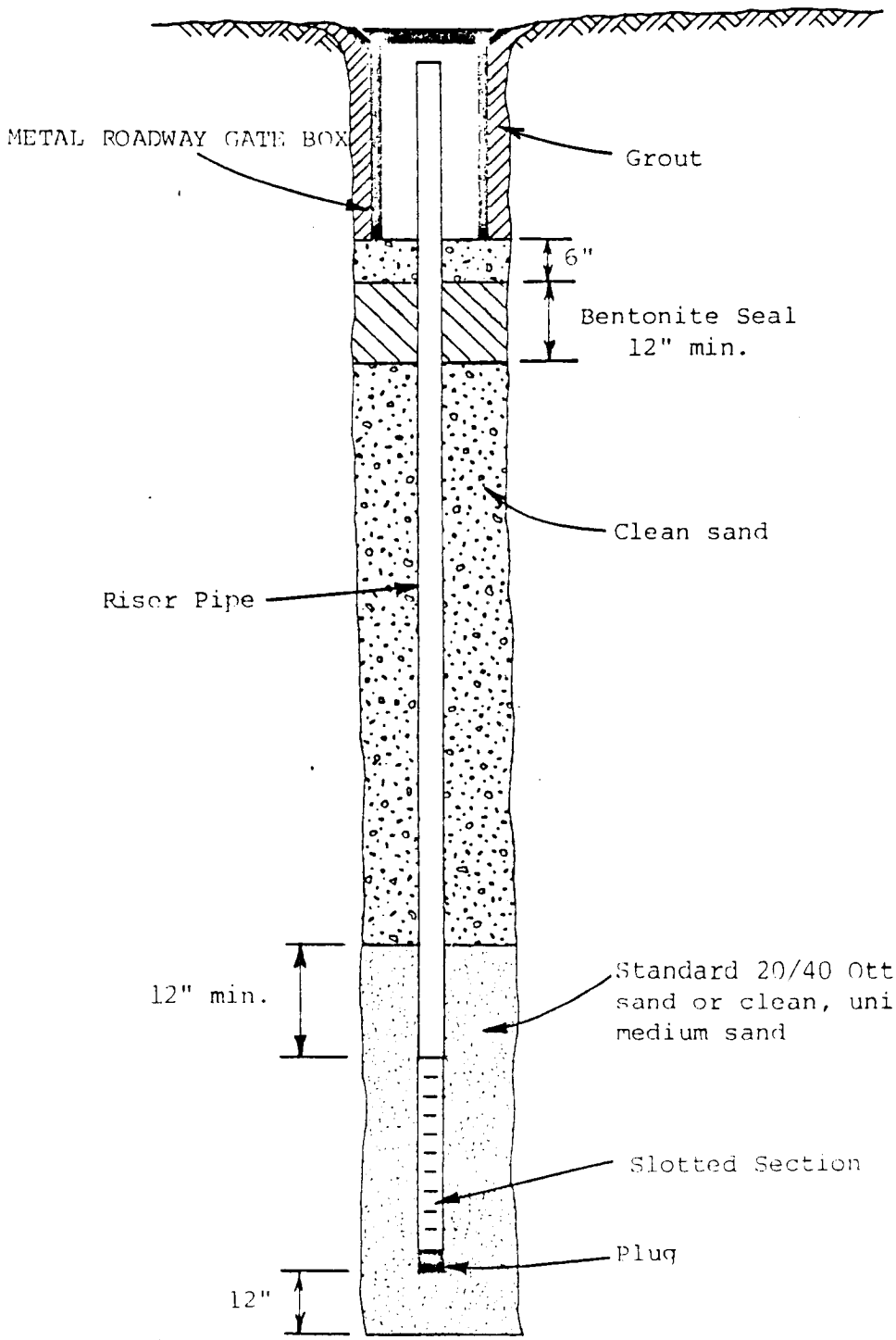
d. Backfill the remainder of the borehole with the same material as in c. above or with COARSE to FINE SAND. Simultaneous "bumping" back of casing shall take place in no greater than 12-in. increments unless otherwise approved by the Engineer. Tamp the sand in 3-ft intervals with a drilling rod or approved equivalent to increase compaction.

e. A seal consisting of a layer of BENTONITE BALLS shall be placed as shown in the drawing to prevent surface water from entering the observaton well.

f. The remaining casing shall then be removed and the SURFACE ROAD BOX grouted into place. (Note: Special care should be taken to prevent any material entering the riser pipe.)

g. The operation of each observation well shall be tested by filling the well with water and taking readings with time until the equilibrium water level is reached. Testing shall be performed in the presence of the Engineer/Owner and a record of the test (water level readings and time of reading) shall be submitted to the Engineer/Owner.

* * * *



NOT TO SCALE

DuBois & King, Inc. Randolph, Vermont	Silver Lake Dam Barnard, Vermont	GROUNDWATER OBSERVATION WELL
GEOTECHNICAL ENGINEERS INC MANCHESTER • MASSACHUSETTS	Project 81985	April 21, 1989 Fig. 1

CONCRETE AND REINFORCING

SECTION 201

	Title	Page
201.1	General	201-1
201.2	Codes	201-1
201.3	Concrete	201-1
201.4	Reinforcement	201-2
201.5	Forms	201-2
201.6	Placement	201-2
201.7	Curing	201-2
201.8	Finish	201-2
201.9	Mix Design	201-2
201.10	Field Testing	201-3

201.1 General. The Contractor shall furnish all labor and materials to complete the installation of the cast in place concrete as indicated on the drawings and as herein specified.

201.2 Codes. All concrete work shall comply with the appropriate American Concrete Institute (ACI) Codes and Portland Cement Association (PCA) recommendations.

201.3 Concrete. All concrete shall be produced in a ready-mix plant conforming to ASTM C94. All concrete shall be made using Type II, (Max. C_3A content of the Portland Cement in Concrete in contact with sewage or effluent shall be 8 percent). Portland Cement conforming to American Society of Testing Materials (ASTM) C150. All water shall be potable and all aggregates conforming to ASTM C260 shall be used in all concrete to obtain a 5 + 1% air content (as determined by ASTM C173). No other chemical admixture shall be used without the Engineer's written approval. The water content of the mix shall be adjusted to maintain a minimum slump of 3 inches and a maximum slump of 5 inches (as determined by ASTM C143). The following classes of concrete shall be required as indicated on the drawings (Class A concrete shall be used if not otherwise indicated on the drawings):

Class A Concrete shall have a minimum ultimate compressive stress of 3,750 psi at 28 days; minimum cement content 6 sacks/cy.

Class B Concrete shall have a minimum ultimate compressive stress 3,000 psi at 28 days.

Class C Concrete shall have a minimum ultimate compressive stress 1,500 psi at 28 days.

201.4 Reinforcement. All reinforcing bars shall be new billet steel conforming to ASTM A615 with a minimum yield of 60,000 psi. All welded wire fabric shall conform to ASTM A82 and ASTM A185 with a minimum yield of 70,000 psi. All reinforcing shall be placed and securely tied in accordance with accepted standard practice. The Contractor shall submit for approval, cutting and bending drawings and schedules for all reinforcement furnished by him. This requirement may be waived on small projects with the Engineer's written permission.

201.5 Forms. Forms shall be substantially built, tied, properly aligned and clean in accordance with the appropriate ACI Code. Form surfaces in contactwith concrete must be treated with an effective bond-breaking form coating in accordance with ACI 347. The use of 4-foot wide forms are recommended in order to reduce the amount of required finishing work.

Shores shall not be removed until concrete has attained at least 67% of the specified design strength and also sufficient strength to support safely its own weight and the construction live loads. Beams and girders shall be reshored as directed by the Engineer.

201.6 Placement. To prevent segregation, concrete should not be allowed to drop more than 5-feet vertically or through a cage of reinforcing steel. Placing should be carried on in such a manner that the concrete in the form is still plastic and can be integrated with the fresh concrete. As soon as possible after depositing, concrete should be consolidated in an approved manner.

201.7 Curing. All curing methods require the Engineer's approval. The curing method shall retain the moisture in the concrete (plus additional water as directed by the Engineer) for a period of 48 hours with high-early strength cement and 7 days for regular cement. Curing shall commence immediately following initial set or completion of surface finishing. The temperature of the concrete shall be maintained between 50 and 90 degrees F during the curing period. Concrete shall not be placed on frozen ground.

201.8 Finish. Finishing of formed and unformed surfaces shall be as specified by ACI 301, sections 10.4 and 11.8, titled Unspecitied Finish, unless otherwise noted on the drawings or as indicated below.

Exposed formed surfaces shall be finished as specified by ACI 301, section 10.3.1, titled Smooth Rubbed Finish.

201.9 Mixing Design. A testing laboratory acceptable to the Owner and Engineer shall be retained by the Contractor for the purpose of design and testing of trial concrete mixes for each class of concrete required. The testing shallbe in accordance with ACI 318-71, Part 3, Chapter 4 - Concrete Quality.

The Contractor shall submit a detailed report in duplicate prepared by the testing laboratory of the results of each test series. No concrete shall be placed unti the concrete mix has been approved by the Engineer. The Contractor shall pay all expenses affiliated with the process of obtaining an approved design mix.

201.10 Field Testing. A testing laboratory shall be retained and paid for by the owner to perform the following services:

1. Taking and testing of specimen cylinders taken from concrete actually placed in the work. Four test cylinders shall be taken during the progress of the work for every 50 cubic yards of concrete placed or any smaller amount placed in any one day. Test cylinders shall be made, stored and tested in accordance with ASTM C31. Two of the cylinders shall be tested after 7 days and two after 28 days.

2. Inspecting operations at the ready-mix plant and pouring operations in the field. The inspector shall regularly determine and maintain a log of the slump, air content, unit weight and temperature of the concrete being placed each day. The Contractor shall notify the laboratory in advance of all contemplated pours.

3. Submit reports promptly in duplicate to the Engineer and a single copy to the Contractor. The report shall include the source of concrete, design strength, date of pour, where concrete was placed (i.e., footings for south wall) unit weight, slump, air content, temperature, age at break, compressive strength, and any other pertinent remarks.

In the concrete fails to meet the specified standards, the Engineer may order tests on the hardened concrete in accordance with ACI 301. If after additional testing the concrete does not meet the specified standards, the contractor shall make all corrections, including replacement, as recommended by the Engineer. All correctional work and additional testing shall be paid for by the Contractor.

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CONSTRUCTION AND EXPANSION JOINTS

SECTION 203

	Title	Page
203.1	General.	203-1
203.2	Waterstop.	203-1
203.3	Premolded Joint Filler	203-1
203.4	Liquid Joint Sealant	203-2
203.5	Bearing Pad.	203-2

203.1 General. Construction and expansion joints shall be of the type and size indicated on the drawings. Joints shall be constructed only in such places as are indicated on the drawings or otherwise directed or approved. It is the Contractor's responsibility to insure that the joint is constructed in such a manner as to function as designed.

203.2 Waterstop. Waterstop shall be polyvinyl chloride (PVC) and shall conform to the Corps of Engineers Specification CRD-C-572.

Waterstop for construction joints shall be as manufactured by the W.R. Grace & Co., Servicised/Durajoint Type No. 14 or W.R. Meadows, Inc. Sealtight PVC Waterstop No. 9380, or approved equal.

Waterstop for expansion joints shall be as manufactured by W.R. Grace & Co., Servicised/Durajoint Type No. 62 or W.R. Meadows, Inc. Sealtight DUO-PVC No. 9532-D or Nail-On DUO-PVC No. 9532-ND, or approved equal.

Waterstop shall be installed in the longest practicable lengths. All waterstop joints, both horizontal and vertical, shall be butt-fused with equipment specifically designed for that operation.

Waterstop placement shall be planned to insure that wherever possible, joints in the waterstop do not coincide with construction or expansion joints.

The Contractor shall insure that each butt-fused joint is sound and watertight prior to inclusion in the work.

Waterstop shall be held securely in place by split forms or any proper method that will insure correct positioning and permit proper embedment of the waterstop while the concrete is being placed. Concrete shall be thoroughly vibrated around waterstop to avoid honeycombs or voids and to insure complete bonding of the concrete to the waterstop ribs.

For the second pour, the waterstop shall be secured with copperclad steel anchors and No. 16 gauge tie wire to the form or reinforcing steel.

203.3 Premolded Joint Filler. Premolded joint filler shall be self-expanding cork conforming to Federal Specification HH-F-341e. Joint filler shall be as manufactured by W.R. Grace & Co., Servicised Self-Expanding Cork, Code No. 4324 or W.R. Meadows, Inc., Sealtight Self-Expanding Cork Expansion Joint Filler, or approved equal.

Self-expanding cork shall be ordered in the required width, length, and thickness indicated on the drawings. Cutting or fabricating from a slab shall not be attempted at the job site. Care shall be taken to avoid removal of the factory wrapping more than 24 hours prior to installation in the joint. If conditions are such that excessive moisture is present and in contact with the cork, the self-expanding cork shall not be unwrapped more than 4 hours prior to placing the joint.

203.4 Liquid Joint Sealant. Joint sealing compound for expansion joints shall be a two-component polysulfide liquid sealant conforming to Federal Specification TT-S-227e.

Joint sealant shall be as manufactured by W.R. Grace & Co., Vertiseal, Thiokol Two-Component Polysulfide Sealant, Code 2382-Grey with Code 2379 Primer, or W.R. Meadows, Inc., CM-60 Two Park Polysulfide Sealant with C17-60 Underwater Primer or approved equivalent.

Services of a manufacturer's representative are required.

Prior to installation of the joint sealant compound, the joint faces shall be cleaned by sandblasting or power driven wire brush.

A bond breaker such as a PVC strio shall be placed between the self-expanding cork joint filler and the joint sealant.

203.5 Bearing Pad. Bearing pad shall be of neoprene with a 60 Durometer hardness conforming to AASHO requirements. The bearing pad shall be as manufactured by W.R. Grace & Co., Servicised Neoprene Bearing Pads, Code 3340, or ACME Highway Products Corp., Johnson Rubber Co., Middlefield, Ohio or approved equivalent. Size and shape shall be as indicated on the drawings.

Bearing pad shall be fixed in place as indicated on the drawings with adhesive as recommended by the bearing pad manufacturer.

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EMERGENCY SPILLWAY PIPE

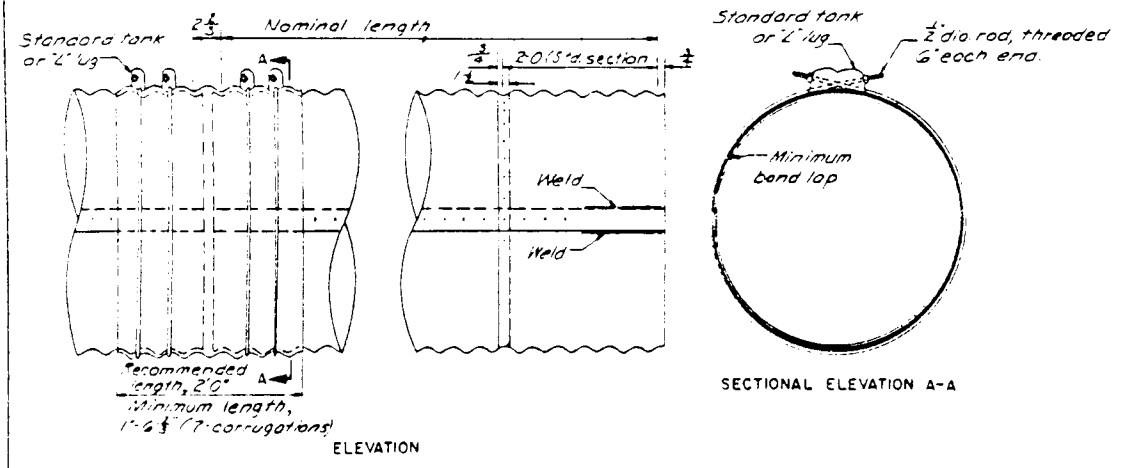
SECTION S400A

	Title	Page
S400A.1	General	S400A-1
S400A.2	Corrugated Metal Pipe	S400A-1

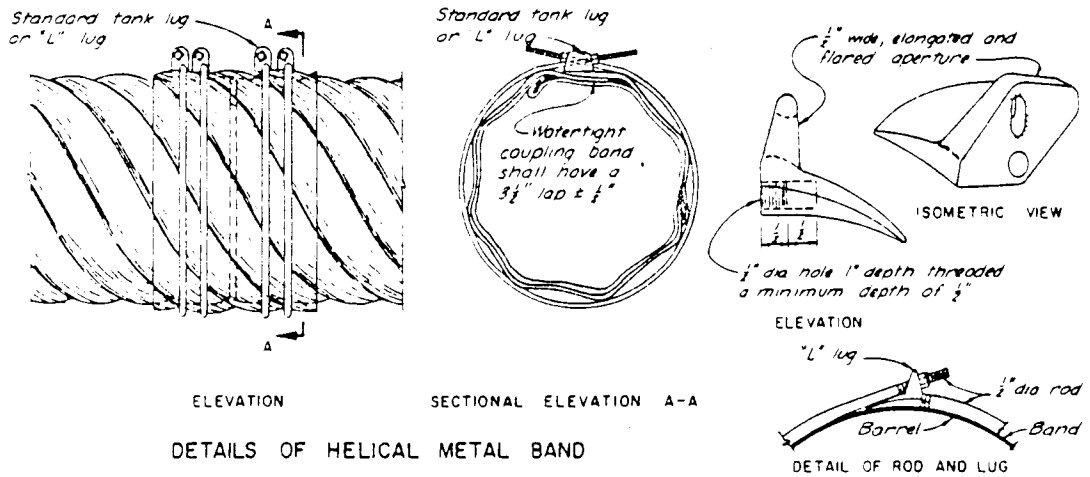
S400A.1 General. The Contractor shall furnish and install the emergency spillway pipes of the type and size indicated on the drawings. Included shall be the furnishing and/or constructing of such joints and special pipe and fittings and such connections to existing pipes and structures as may be required to complete the work.

S400A.2 Corrugated Galvanized Metal Pipe. Corrugated galvanized metal pipe, asphalt coated corrugated metal pipe, and fittings shall be of the sizes indicated on the drawings and shall conform to the requirements of the American Association of State Highway Officials (AASHO) Designation M-136. Asphalt coated corrugated metal pipe shall be fully asphalt coated both inside and outside to a minimum thickness of 0.05 inches in accordance with AASHO Designation M-190. Corrugated metal pipe shall be joined by butting the ends together and joining the sections with a band made of the same material as the pipe. Watertight couplings shall be made as shown on the attached figure.

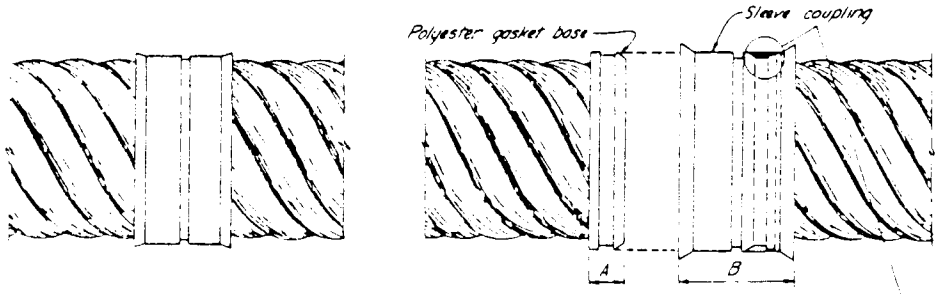
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DETAILS OF WATERTIGHT COUPLING BAND FOR C.M. PIPE



DETAILS OF HELICAL METAL BAND



DIMENSIONAL TABLE

PIPE DIAMETER (INCHES)	DIMENSION OF COMPONENTS IN VARIOUS PIPE DIAMETERS (INCHES)		
	A	B	C
6	2 1/2	9	1
8	2 1/2	10	1
10 & OVER	2 1/2	12	1

DETAILS OF SLEEVE JOINT FOR HELICAL PIPE

DETAILS OF WATERTIGHT COUPLING BANDS FOR HELICAL METAL PIPE

PRESTRESSED CONCRETE CYLINDER PIPE

SECTION S400B

	Title	Page
S400B.1	General	S400B-1
S400B.2	Pipe and Fitting	S400B-1
S400B.3	Shop Drawings	S400B-2
S400B.4	Jointing Pipe and Fittings	S400B-3
S400B.5	Installing Pipe and Fittings	S400B-3
S400B.6	Anti-Seep Collar	S400B-4

S400B.1 General. The Contractor shall furnish all labor, material, tools, and equipment and shall construct the prestressed concrete cylinder pipe outlet as indicated on the drawings and as herein specified.

S400B.2 Pipe and Fittings. Pipe manufactured in sizes 16-inches through 48-inches shall be prestressed concrete lined cylinder pipe and pipe 54-inches and larger shall be prestressed concrete embedded cylinder pipe. All pipe shall be manufactured in accordance with the latest revision of AWWA C301, and be as manufactured by Interpace Corporation spec. SP-5 and SP-12, or the equivalent by Price Bros. Co., or approved equal. The pipe shall have the following principal features: a watertight welded steel cylinder with steel joint rings welded to its ends; a core consisting of a lining of concrete within the steel cylinder; or the cylinder embedded in an envelope of concrete, whichever is appropriate; reinforcement consisting of high tensile wire wound around the outside of the core at a predetermined stress and securely fastened at its ends; a coating of dense mortar covering the core and wire except for the necessarily exposed surface of the joint rings; a self centering joint with a preformed rubber gasket, so designed that the joint will be watertight under all conditions of service. The pipe shall be designed for the maximum trench loading with class "C Modified Bedding" which shall be applied after the backfill is in place, plus an allowance of 20 psi. surge pressure. In no case will the design earth load be less than that due to six feet of cover with Class "C Modified Bedding". Where the pipe is to be laid under a roadway, it shall be designed to withstand a live load equal to American Association of State Highway Officials H-20 loading.

Pipe diameters 126-inches and larger will be furnished in maximum lengths of 12-feet. Pipe diameters 120-inches and smaller may be furnished in maximum standard lengths of 20-feet.

The size of the high-tensile wire and the spacing and tension under which it is wound shall be such that the conditions required by the design methods in Appendix A of AWWA C301 are met. The design shall fully recognize all losses due to elastic and inelastic deformation, such as relaxation of the wire and plastic strains in the concrete.

The average gross wrapping stress in the high tensile wire shall not exceed 75 per cent of the minimum ultimate tensile strength of the wire. The wire shall not be smaller than 8 gage. The minimum centerline spacing of the wire shall be that which produces a clear distance of 3/16-inch between wires on the barrel of the pipe. The centerline spacing of the wire shall not exceed 1-1/2 inches. The contractor shall submit design calculations, which must be approved by the engineer prior to the manufacture of any pipe for this project. Upon delivery the contractor shall submit a certificate of compliance for all pipe and fittings.

Prestressed concrete cylinder pipe shall be used where shown on the drawings or as directed by the engineer.

Cement shall be type II.

All surfaces of the steel joint rings exposed in finished pipe shall be protected from corrosion by means of a coating of factory applied metallic zinc not less than 0.002-inch thick.

In addition to straight pipe, the contractor shall furnish all bends, tees, closure pieces, wall fittings, test plugs, eccentric reducers and other fittings which are shown on the plans or required to complete the work. Except as modified herein, the design and mnaufacture of fittings shall be governed by the same requirement as the connecting piping. Fittings shall conform to the requirements of AWWA C301 type B latest revision.

Each pipe or fitting shall have plainly and permanently marked thereon the pipe class, date of manufacture, manufacturer's name or trademark, and on bends the angle turned thereby.

Identification of specials shall be made to show proper location in the line, and on beveled pipe, the amount of bevel and point of maximum bevel.

The prestressed concrete cylinder pipe and fittings for the 30-inch outlet shall be manufactured for a minimum design working pressure of 10 psi.

Joints shall be of the flexible restrained type consisting of bolts factory installed in the bell end of the pipe. Joints shall be designed to remain watertight with an extension of 1/2 inch at each joint.

External loading on the pipe shall be the maximum depth of cover or a combination of shallow depth of cover and an ASSHO H-20 truck loading, or the rip-rap loading, whichever is critical.

S400B.3 Shop Drawings. The Contractor shall submit to the Engineer for approval, shop drawings prior to the fabrication of the pipe, showing pipe lengths, joint and special fittings details, flexible restrained joints if required, and other pertinent data. All pipe furnished under the contract shall be fabricated in accordance with the approved details.

The manufacturers shall submit to the engineer prior to the shipment of pipe to the site in affidavit of compliance certifying that the pipe has been manufactured in accordance with the requirements of AWWA C301 (Latest revision).

S400B.4 Jointing Pipe and Fittings. Pipe and fittings shall be jointed in accordance with the latest detailed instructions of the manufacturer. The ends of the pipe and the rubber gasket shall be satisfactorily cleaned just before the laying of the pipe and shall be thoroughly lubricated as recommended by the manufacturer.

Where recommended by the manufacturer, the Contractor shall furnish coupling pullers for jointing the pipe. Gasket feeler gauges shall be available for use by the pipe layer and the Engineer for checking the position of the rubber gaskets in the completed joint, if so directed by the Engineer.

Rubber and steel joints shall be externally mortared after jointing.

The gasket sealing the joint shall be made of rubber or special composition having a texture to assure a watertight and permanent seal. The gasket shall be a continuous ring of circular cross-section and of such size as to completely fill the groove on the spigot joint ring when the pipes are laid. The gasket shall be the sole element depended upon to make the joint watertight and shall have smooth surfaces free of pitting, blisters, porosity, and other imperfections.

Rubber for the gasket shall meet the following physical requirements when tested in accordance with appropriate sections of "methods of physical tests and chemical analysis for rubber goods" (Federal Specifications ZZ-R-601A). Rubber shall contain not less than 65 percent by volume of first-grade natural crude rubber: the remainder shall consist of suitably pulverized fillers. The tensile strength shall be at least 3,000 psi. The elongation at rupture shall be such that 2-inch gage marks shall stretch to not less than 10-inch. The specific gravity shall be between 1.16 and 1.22. The percent of cold flow, computed as 100 times the change in thickness divided by the original thickness, shall not exceed 10 percent when tested by subjecting a disc of the material 1/4-inch thick by 3/4-inch in diameter to a pressure of 600 psi. Using a spring pressure device placed in an air oven at a temperature of 158°F for 24 hours. The tensile strength of the compound after being subjected to an accelerated aging test for 96 hours in air at 158°F shall not be less than 80 percent of the tensile strength before aging.

S400B.5 Installing Pipe and Fittings. No defective pipe or fitting shall be installed. Any piece discovered to be defective after having been laid shall be removed and replaced with a sound piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being installed and shall be kept clean until accepted in the completed work.

Each pipe shall be handled into its position in the trench only in such manner, and by such means, as the Engineer approves as satisfactory. The Contractor will be required to furnish slings, straps, and other approved devices to permit satisfactory support of all parts of the pipe when it is lifted. The use of lifting holes will not be permitted.

The pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.

Each length of pipe shall be shoved home against the pipe previously laid and held securely in position. Joints shall not be "pulled" or "cramped" without approval of the Engineer.

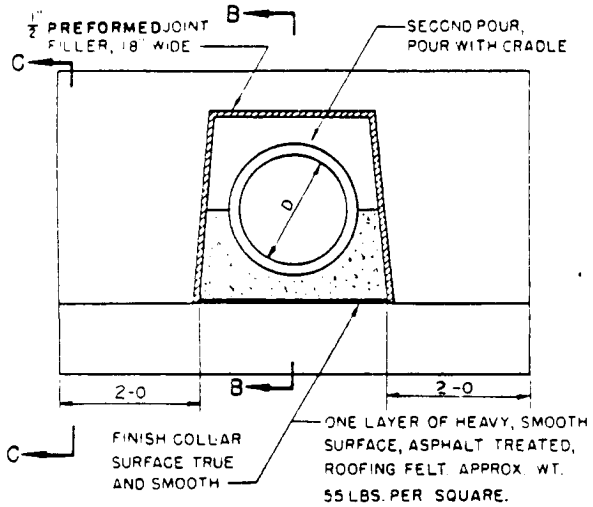
Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

Pipe or fittings shall not be left permanently supported on saddles or blocking, but shall be supported by an envelope of select material.

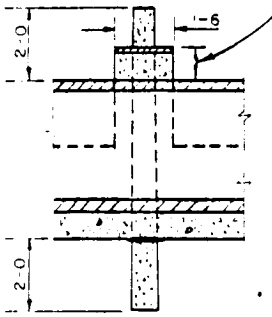
Each pipe shall be firmly bedded in an envelope of select material. The bedding material shall be thoroughly compacted under the pipe to obtain a substantially unyielding bed. After each pipe has been properly bedded, enough select material shall be placed between the pipe and the side of the trench, and thoroughly compacted to hold the pipe in correct alignment. Holes provided for jointing shall be filled and compacted and then select material shall be placed and compacted to complete the envelope and bedding.

The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench.

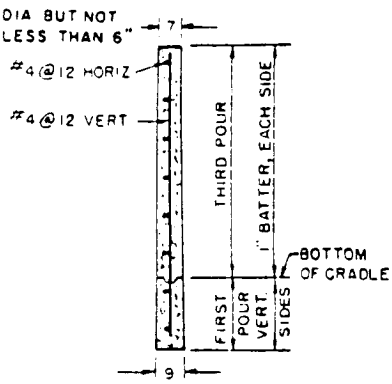
S400B.6 Anti-Seep Collar. Anti-seep collars shall be placed around the low level outlet at the locations shown on the drawings and in accordance with the attached detail.



DETAIL SHOWN FOR EARTH FOUNDATION. FOR ROCK FOUNDATION, FOUND BOTTOM OF CRADLE ON ROCK LINE AND KEY COLLAR 6" INTO ROCK.



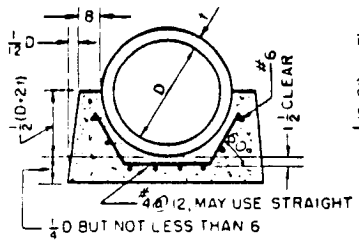
SECTION B-B



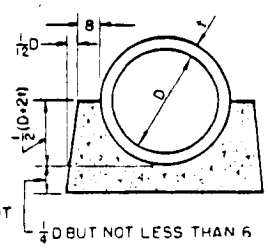
SECTION C-C
(SHOWING STEEL)

SIDES OF ANTI-SEEP COLLARS TO BE FORMED ABOVE BOTTOM OF CRADLE. MAX SPACING OF COLLARS = 25'

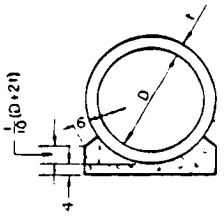
DETAIL OF ANTI-SEEP COLLAR



A1 CRADLE



A2 CRADLE



B1 BEDDING

SLUICE GATES

SECTION S438

	Title	Page
S438.1	General	S438-1
S438.2	Material and Construction of Sluice Gates	S438-1
S438.3	Shop Drawings	S438-2

S438.1 General. The Contractor shall furnish, install, and place into satisfactory operation all sluice gates as specified herein, indicated on the drawings, or otherwise required for a complete installation. The specifications and drawings call attention to certain features but do not purport to cover all details entering into the design of the equipment.

The sluice gates shall be as manufactured by Rodney Hunt Company, Orange, Massachusetts, or approved equal. The sluice gates shall be for an opening 24" wide by 36" high series 240-L with a Model S-5002 Crank-operated floorstand.

S438.2 Material and Construction of Sluice Gates. The sluice gates shall conform to AWWA Standard C501.

Sluice gates shall be cast iron, fully bronze-mounted with side wedges for seating head conditions where necessary, and bottom and top wedges for unseating head conditions. Machined surfaces shall be finished to exact dimensions. Disks and frames shall have machined dovetail grooves into which the bronze seat facings shall be driven and securely fastened. Reinforcing ribs shall be cast opposite the grooves in the disk. All holes for bolts and studs shall be drilled. Frames shall be of the flat or flange frame type as indicated on the drawings, having the rear face machined and drilled for bolting directly to cast-iron wall thimbles set flush with the concrete wall. Wall thimbles shall be type F section and shall be made of one-piece cast-iron construction of adequate thickness to withstand the stress of operation and installation. Front flanges shall be machined and shall be provided with drilled and/or tapped holes for installation of bolts of studs as necessary. Large rectangular thimbles shall be provided with holes in the invert to allow satisfactory concrete placement beneath the thimble. The entire stem, including extension stem, if any, of the sluice gates shall be of type 304 stainless steel. The stem shall be fitted with a stop to prevent over-closing of the gate. Stems shall be designed to transmit at least 2-1/2 times the rated output of the floorstand in compression. Stem guides shall be provided and installed in accordance with the manufacturer's recommendations.

The sections of extension stems shall be joined together by solid, manganese-bronze, or stainless-steel couplings to match the stems, and threaded and keyed to the stems. All couplings of the same size shall be interchangeable. Stems shall be furnished with adjustable, bronze-bushed, stem guides, spaced as necessary or as indicated on the drawings. Guides shall be supported by cast-iron brackets bolted to the concrete.

Operators of the type indicated on the drawings and herein specified shall be provided with each sluice gate.

The operator shall be crank-operated with a removable crank.

The operator shall be mounted on a wall bracket, bolted through the wall to a plate on the opposite side.

The stem cover shall be galvanized steel. A dial position indicator shall be included.

All exposed surfaces shall be finished with the manufacturer's standard coating for the indicated conditions of operation.

S438.3 Shop Drawings. As required by the General Specifications, the Contractor shall submit shop drawings for approval. The drawings shall show the materials to be furnished, component parts, and method of anchorage.

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CLEANING

SECTION S701

	Title	Page
S701.1	General	S701-1
S701.2	Safety Requirements	S701-1
S701.3	Cleaning Materials.	S701-1
S701.4	Cleaning During Construction.	S701-1
S701.5	Final Cleaning.	S701-2

S701.1 General. The Contractor shall maintain the work area and adjacent areas in a neat sanitary condition for the duration of the Project.

S701.2 Safety Requirements. The Contractor shall maintain the Project in accordance with U.S. Department of Labor, Safety and Health Regulations, CFR 20 Part 1926 and all subsequent amendments.

Store volatile wastes in covered metal containers.

Prevent accumulations of wastes which create hazardous conditions.

Provide adequate ventilation during use of volatile or noxious substances.

Conduct cleaning and disposal operations to comply with local and state ordinances and anit-pollution laws and as approved by the Engineer/Owner.

Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

Do not dispose of wastes into streams or waterways.

S701.3 Cleaning Materials. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

S701.4 Cleaning During Construction. Execute cleaning to insure that building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

Wet down dry materials and rubbish to lay dust and prevent blowing dust.

Clean site and public properties, and dispose of waste materials, debris and rubbish daily.

Dispose of waste materials, debris and rubbish as approved by the Engineer/Owner.

Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

S701.5 Final Cleaning. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces.

Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

Broom clean paved surfaces; rake clean other surfaces of grounds.

Remove snow and ice from building access.

Tear down, remove and dispose of all temporary buildings and structures as approved by the Engineer/Owner.

Upon removal of temporary toilet facility, remove, disinfect, and cover all organic matter as approved by the Engineer/Owner.

Remove all tools, equipment, machinery and surplus materials from the Project.

Restore to a condition equal to the original condition all portions of the site not designated for alteration and all public and private property that was damaged.

Maintain cleaning until Project or portion thereof, is occupied by Owner.

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LOAMING AND SEEDING

SECTION S702

	Title	Page
S702.1	General.	S702-1
S702.2	Loaming.	S702-1
S702.3	Fertilizing and Rolling.	S702-2
S702.4	Seeding.	S702-2
S702.5	Temporary Cover Crop	S702-2
S702.6	Inspection and Acceptance.	S702-2

S702.1 General. The Contractor shall furnish all labor, materials, and equipment necessary to do all loaming and seeding as indicated on the drawings and as herein specified.

The Contractor shall be responsible for obtaining a good, healthy growth of lawn quality grass on all areas that are specified to be seeded or areas that the Engineer/Owner directs the Contractor to loam and seed.

The areas to be seeded shall be properly conditioned by fine grading and raking to remove all sticks, stones, rocks, and other objectionable material to form a finely pulverized seed bed. The ground surface shall be graded as indicated on the drawings and/or as specified by the Engineer/Owner.

The Contractor may desire, but is not expressly required, to obtain the recommendations of the local agricultural agent as to type and quantities of soil conditioners, fertilizers, and seed mixtures that should be applied for a dense, rigorous growth of perennial lawn quality grass.

S702.2 Loaming. After approval of the rough grading, the Contractor shall place loam on all areas indicated on the drawings, on other grassed areas damaged by his operations, and as directed by the Engineer/Owner.

Loaming of areas other than established lawns disturbed during the process of construction shall not be required unless, in the opinion of the Engineer/Owner, the area to be seeded is of such composition that it is unsuitable for vegetation. If required by the Engineer/Owner, the area to be seeded shall be covered with two (2) inches of loam, compacted in place. Disturbed established lawn area shall have a loam cover at least equal to that which was disturbed but not less than two (2) inches, compacted in place.

Loam shall be a natural, fertile, friaable soil, typical of productive soils in the vicinity, obtained from naturally well drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth.

All loam from stripping which is not used at the job site shall be removed from the site and deposited as directed.

Loam shall not be delivered to the site in frozen or muddy condition.

S702.3 Fertilizing and Rolling. While the surface is still loose, approved soil conditioners and fertilizers shall be spread and thoroughly worked into the loam. The loam shall then be raked until the surface is finely pulverized and smooth and shall be compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades.

S702.4 Seeding. Seed shall be of an approved mixture of the most recent year's crop, clean, high in germinating value, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.

Seeding operations may be carried on from the time the ground becomes workable in the spring until October 15, unless otherwise directed by the Engineer/ Owner.

If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.

Seed shall be sown at the approved rate, on a calm day, and preferably by machine but if by hand, only be experienced workmen. Water seeding will not be permitted.

One-half the seed shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of 1/4 inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.

Wherever poor germination occurs in areas larger than three square feet, the Contractor shall reseed, roll, and water as necessary to obtain proper germination.

S702.5 Temporary Cover Crop. If there is insufficient time in the planting season to complete the seeding, fertilizing and permanent seeding may be left until the following planting season, at the option of the Contractor or on order of the Engineer/Owner. In that event, a temporary cover crop of buckwheat, domestic rye grass, or other approved seed shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized, and the permanent seed crop shall be sown as specified.

S702.6 Inspection and Acceptance. At the beginning of the next planting season after that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The lawns shall be watered, weeded, cut, and otherwise maintained until the end of that planting season when they will be accepted.

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PAVEMENT AND PAVEMENT REPLACEMENT

SECTION S703

	Title	Page
S703.1	General	S703-1
S703.2	Replacing State Highway Pavements	S703-1
S703.3	Preparation for Surfacing - State and State Aid Highways	S703-2
S703.4	Preparation for Surfacing - Other than State Highways	S703-2
S703.5	Bituminous Concrete Pavement	S703-2
S703.6	Portland Cement Concrete Pavement (DELETED)	S703-2
S703.7	Blade Mix	S703-2
S703.8	Double-Tack Coat (DELETED)	S703-2
S703.9	Maintenance of Pavement	S703-2
S703.10	Gutters and Curbs	S703-2
S703.11	Gravel Surfaces	S703-2
S703.12	Temporary Pavement	S703-3
S703.13	Time for Placing Permanent Pavement	S703-3

S703.1 General. The Contractor shall do all work and shall furnish all labor, materials, and equipment necessary to replace all pavement removed or damaged by his operations.

Where operations of the Contractor have resulted in removal or damage to pavement, pavement foundation, or appurtenances, the affected portions thereof shall be removed to the extent ordered by the Engineer and replaced so that the whole roadway will have a true and uniform surface and will conform to the proper grade and cross section. All pavement to be removed shall be cut neatly with as little damage as possible to adjoining pavement. Bituminous concrete surface and concrete pavement shall be broken out with a pavement breaker to a distance of twelve inches outside the limits of the actual excavation. Where possible, reinforcing steel in concrete pavement shall be cut and bent back to allow excavation. All Portland Cement concrete pavement, and bituminous concrete pavement over Portland Cement concrete pavement, and bituminous concrete pavement 3-1/2 inches thick or less shall be replaced in kind to a thickness equal to the existing pavement. Bituminous concrete pavement greater than 3-1/2 inches thick shall be replaced with 2-inch thick base and 1-1/2-inch thick surface courses of bituminous concrete pavement.

All work in State Highways shall conform to the applicable sections of the latest State of Vermont Department of Highways, Standard Specifications for Highway and Bridge Construction.

S703.2 Replacing State Highway Pavements. Nothing contained herein shall relieve the Contractor from carrying out all orders given by State Highway officials in connection with the replacement of pavement which is part of the State Highway System or State Aid Roads. Prior to doing any work which will affect a State Highway, a permit shall be obtained from the State of Vermont Department of Highways.

S703.3 Preparation for Surfacing - State and State Aid Highways. All trench backfill material shall be thoroughly compacted with mechanical tampers as described in the Vermont Highway Specifications under Item 601.10. All loose or damaged material in the existing paving shall be removed, and the existing surface course trimmed back, as directed by the Engineer, so as to ensure a satisfactory bond between it and the new surfacing.

S703.4 Preparation for Surfacing - Other than State Highways. The trench shall be backfilled as stated in Section 101 of these specifications and a gravel base course having a thickness of not less than 12 inches after compaction shall be placed before resurfacing. The base course shall be placed in layers of not over six inches and shall be thoroughly compacted. The base course shall be constructed of materials approved by the Engineer. All loose or damaged material in the existing pavement shall be removed and the existing surface course trimmed back, as directed by the Engineer.

S703.5 Bituminous Concrete Pavement. The Contractor shall prepare the trench area and base course for repaving as previously specified. The new surface shall be bituminous concrete pavement meeting Vermont State Highway Department Specifications for Item 406, Bituminous Concrete Pavement. The thickness shall be equal to the existing pavement or as directed by the Engineer.

S703.6 Portland Cement Concrete Pavement. DELETED.

S703.7 Blade Mix. The Contractor shall prepare the trench area and base course as previously specified. The new surface shall consist of two applications of approved bituminous material applied on the prepared sub-base, followed by a blade mix seal of pea stone and stone grits. The blade mix surface shall conform in materials and construction to the Vermont State Highway Department Specifications for Item 404, Type V.

S703.8 Double-Tack Coat. DELETED.

S703.9 Maintenance of Pavement. The Contractor shall maintain pavement placed under this contract until the expiration of the guarantee period and shall promptly fill with similar material all depressions and holes that may occur so as to keep the pavement in a safe and satisfactory condition for traffic.

S703.10 Gutters and Curbs. All gutters and curbs which have been damaged by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations. Suitable materials and methods shall be used for such restoration and shall be subject to approval by the Engineer.

S703.11 Gravel Surfaces. Gravel surfaces disturbed by the Contractor's operations shall be restored to a condition at least equal to that which existed before his operations began. Care shall be taken to ensure compaction of materials so that subsequent settlement does not result.

S703.12 Temporary Pavement. The Contractor shall place temporary pavement in areas specifically designated by the Engineer. The temporary pavement shall be approved bituminous concrete pavement one inch minimum thickness and shall be placed as soon as practical after the trenches have been backfilled.

The Contractor shall maintain in satisfactory condition the temporary pavement placed under this contract until the permanent pavement is constructed and shall repair any damaged or deteriorated sections promptly as directed by the Engineer. All temporary pavement shall be removed and disposed of prior to placing permanent pavement.

Temporary paving will not necessarily be designated for all paved areas which are disturbed by the Contractor's operations. Areas not specifically designated for temporary paving shall be maintained in satisfactory conditions as specified at the Contractor's expense.

S703.13 Time for Placing Permanent Pavement. Permanent pavement shall not be constructed until after the trenches have set a minimum of thirty (30) days. If it is not possible for the Contractor to schedule his operations so that this may be accomplished prior to the completion date, as stated in the contract, an extension of time will be granted to complete this work.

* * * *

DUST CONTROL

SECTION S706

	Title	Page
S706.1	General.	S706-1
S706.2	Materials.	S706-1
S706.3	Dust Control with Water.	S706-1
S706.4	Dust Control with Calcium Chloride	S706-1

S706.1 General. This work shall consist of treating the project area to control dust in accordance with this specification and to the satisfaction of the Engineer/Owner.

S706.2 Materials. All water used shall be reasonably clear and free of harmful amounts of oil, salt, acids, alkalies, sugar, organic matter or other substances injurious to the finished product, plant life or the establishment of vegetation.

Where the source of water is relatively shallow, the intake shall be maintained at such a depth and so enclosed silt, mud, grass and other foreign materials.

Calcium chloride shall conform to the requirements of AASHTO M 144. Either regular flake calcium chloride, Type 1, or concentrated flake, pellet or other granular calcium chloride, Type 2, may be used.

S706.3 Dust Control with Water. Water shall be applied to such sections of the project area as the Engineer may designate. The number of applications and the amount of water used shall be based upon field and weather conditions and as ordered by the Engineer/Owner.

The equipment for water application shall be equipped with an adequate shut-off valve control in the cab and shall be approved by the Engineer/Owner. The equipment shall be available at all times in readiness to perform the work at any time including Sundays and Holidays upon order of the Engineer/Owner.

S706.4 Dust Control with Calcium Chloride. Calcium chloride shall be applied in such a manner and by such devices that uniform distribution is obtained over the entire area on which it is ordered by the Engineer/Owner.

Unless otherwise ordered by the Engineer/Owner, 0.5 pound of calcium chloride shall be applied per square yard for dust control.

It shall not be used on surfaces on which bituminous material will be applied, unless directed by the Engineer/Owner.

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SOIL EROSION AND SEDIMENTATION CONTROL

SECTION S707

	Title	Page
S707.1	General	S707-1
S707.2	Quality Assurance	S707-1
S707.3	Submittals	S707-1
S707.4	Clean-up and Approval	S707-1
S707.5	Erosion Control Measures	S707-1-6

S707.1 General. The Contractor shall furnish all labor, materials and equipment necessary to complete and maintain all the erosion control measures as indicated on the drawings, as herein specified, or as directed. No site work shall take place on the job without the required control measures in place, in good condition, and approved by the Engineer.

The Contractor shall keep disturbed areas to a minimum. Temporary and/or permanent cover shall be installed as soon as possible after area has been disturbed. No area which has been disturbed by construction shall be left untreated from October 15 to April 15.

S707.2 Quality Assurance. Contractor shall be responsible for monitoring all temporary control measures for the duration of the project. All permanent control measures shall be maintained for the normal contract warranty period. The Contractor shall be responsible for the replacement of any measure which fails during these periods at his own expense and to the satisfaction of the Engineer.

S707.3 Submittals. Contractor may submit alternative soil erosion and sedimentation control measures to the Engineer for approval prior to construction if they meet or exceed items indicated herein.

The Contractor is to provide timely, advance submittals of seed samples, nursery certificates for vegetative covers, and plantings he intends to use.

S707.4 Clean-up. All temporary control measures shall be removed and disposed of in a manner approved by the Engineer, when in the opinion of the Engineer the permanent control measures are sufficiently established.

S707.5 Erosion Control Measures. The following erosion control measures shall apply to this project: No's 1, 4, 5 & 6. Many of these items were obtained from the Erosion and Sediment Control Handbook for Connecticut, 1976, which was prepared in part by the United States Soil Conservation Service.

EROSION CONTROL MEASURE NO. 1

PERMANENT VEGETATIVE COVER

General - This measure shall apply to all areas disturbed during construction unless otherwise indicated on the drawings or directed by the Engineer.

Site Preparation -

a. Site grading shall be completed and approved prior to seeding.

b. All cultural operations shall be performed parallel to the contours of the slope.

c. At least four inches of topsoil shall be provided over extremely adverse soil conditions. Surfaces compacted by construction machinery should be disked or chisled before topsoil is added.

d. Apply lime at the rate of two tons of ground limestone per acre (100 lbs. per 1,000 square feet.)

e. Apply fertilizer as follows:

-Spring seeding. Work deeply into soil, before seeding, 300 lbs. of 10-10-10 fertilizer per acre (seven lbs. per 1,000 square feet); seed; then six to eight weeks later apply on the surface an additional 300 lbs. of 10-10-10 fertilizer per acre.

-Fall seeding. Work deeply into soil, before seeding, 600 lbs. of 10-10-10 fertilizer per acre (14 lbs. per 1,000 square feet).

Establishment -

a. Smooth and firm seedbed with cultipacker or other similar equipment prior to seeding (except when hydroseeding).

b. Select adapted seed mixture from the following table. Note seeding dates.

c. Apply seed uniformly according to rate indicated in the table by broadcasting application (drilling or hydraulic application may be used in areas approved for such applications by the Engineer.)

d. Cover grass and legume seeds with not more than 1/4 inch of soil with suitable equipment (except when hydroseeding).

e. Mulch immediately after seeding. Refer to mulch measures.

PERMANENT GRASS AND LEGUME SEEDING

SEED MIXTURES, RATES, AND DATES

Seed Mixture[5,6]	Percent by Weight	Seeding Rates in Lbs.[1] 1000 sq. ft.	Seeding Rates in Lbs.[1] Acre	Seeding Dates	Special Adaptation
KY 31 Tall Fescue Red Fescue	50 50	1½	50	April 1 - June 15 Aug. 15 - Sept. 1	Droughty Areas
KY 31 Tall Fescue[2] Annual Ryegrass	80 20	1½	50	April 1 - June 15 Aug. 15 - Sept. 1	Heavy Use Area
Red Fescue[4] Crownvetch	60 40	1	40	April 1 - June 15	No Mow Areas Droughty Areas
Crownvetch Perennial Ryegrass	60 40	½	25	April 1 - June 15	No Mow Areas Droughty Areas
Reed Canary Grass Redtop	80 20	1	50	April 1 - June 15 Aug. 15 - Sept. 1	Wildlife or Wet Areas
Red Fescue[3] Kentucky Blue grass Perennial Ryegrass	70 20 10	2	80	April 1 - June 15 Aug. 15 - Sept. 1	High Maintenance (lawns)
KY 31 Tall Fescue Birdsfoot Trefoil	70 30	1	40	April 1 - June 1	No Mow Areas Wet Areas

[1] These are minimum seeding rates and should be increased if adverse conditions exist

[2] Straight KY 31 tall fescue may be used for soccer or football fields (minimum 150# up to 250# per acre.)

[3] 10% of birdsfoot trefoil may be added to this mixture.

[4] Ky 31 tall fescue may be used in place of red fescue.

[5] May add 5% of perennial ryegrass for quick fall cover.

[6] Contractor may use seed mixtures other than those specified if submitted and approved for use by the Engineer.

EROSION CONTROL MEASURE NO. 4

MULCHING

General - Apply plant residues or other suitable materials, not produced on the site, to the surface of the soil where indicated on the drawings or as directed by the Engineer.

Application - See the following tables for materials and application rates.

MULCHING MATERIALS AND APPLICATION RATES

Mulch Material	Quality	Application Rates		Installation
		Per 1000 Sq. Ft.	Per Acre	
*Hay or straw	Air dried, free from undesirable seeds	75-100 lbs. or 2-3 bales	1.5-2 tons 90-110 bales	Spread uniformly by hand, leave 10-20% of the ground exposed
Wood Fiber Cellulose (partly digested wood fibers)	Air dried, non-toxic and no growth inhibiting factors	25-40 lbs.	0.5 - 1.0 ton	Apply with hydro-mulcher
Gravel or Crushed Stone	Washed Size 1" to 2-½"	9 cu. yds.		Spread uniformly
Wood Chips	Free from coarse material	500 lbs. dry; to 900 lbs. wet	10 tons dry; to 20 tons wet	Spread uniformly at at a depth of 4"

*To be utilized with erosion control measures no's. 1 & 2 unless otherwise indicated.

S707-2

EROSION CONTROL MEASURE NO. 5

JUTE, EXCELSIOR AND POLYPROPYLENE MATTING

General - A loosely woven netting of jute yarn, wood excelsior, or polypropylene placed on bare soil to minimize erosion during the establishment of vegetation. Netting shall be installed as indicated herein, and where indicated on the drawings or as directed by the Engineer.

Material - Jute mat shall be cloth of a uniform plain weave of undyed and unbleached single jute yarn, 48 inches in width plus or minus one inch and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of plus or minus five percent. The yarn should be of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than one half its normal diameter.

Excelsior mat shall be wood excelsior, 48 inches in width plus or minus one inch, and weighing 0.8 pounds per square yard plus or minus 10 percent. The excelsior material should be covered with a netting to facilitate handling and to increase strength.

Polypropylene mat shall be a uniform 1" x 2" mesh of extruded and formed, UV green polypropylene, 48 inches in width and weighing .02 pounds per square yard plus or minus 10 percent.

Staples for anchoring soil stabilization shall be made of six to ten inch lengths of No. 8 plain iron wire.

Installation -

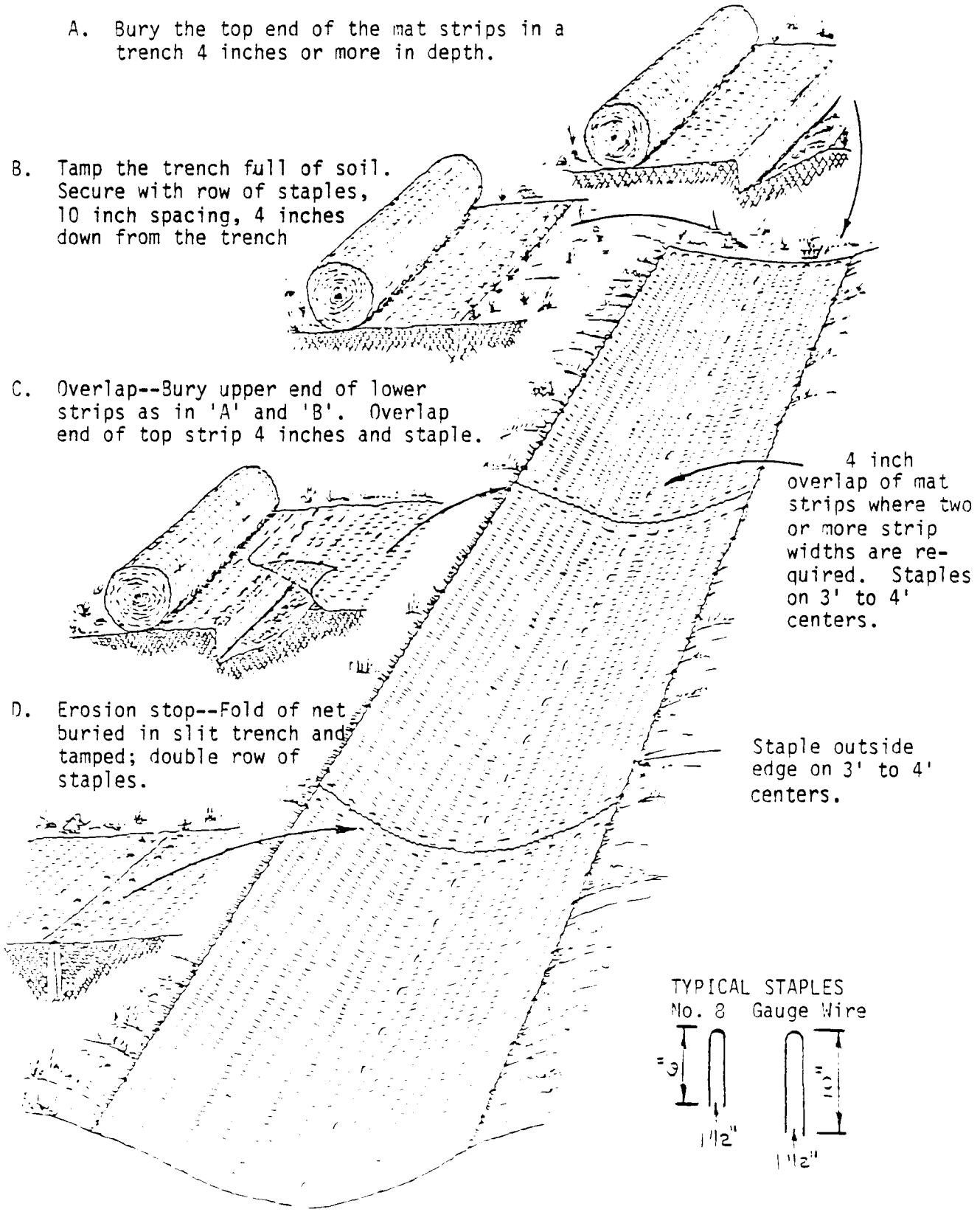
1. Site Preparation - Shape and grade the waterway, channel or area to be protected.

Remove rocks, clods greater than 1½ inches in diameter, sticks, and other material that will prevent contact of the mat with the soil surface.

2. Seeding - Lime, fertilize and seed the existing soil in accordance with the applicable seeding standard. Do Not Cultipack.

3. Laying the Matting - Start laying the matting from the top of the channel or slope, and unroll downgrade so that one edge of the strip coincides with the channel center. Lay a second strip parallel to the first on the other side of the channel and allow at least a two-inch overlap for jute matting. Excelsior matting may be butted. See attached sketches.

DETAIL FOR STABILIZING WATERWAYS WITH MATTING



NOTE: Similar for installation of matting on slopes.

4. Securing the Matting - Bury the top end of matting strips in a trench four inches or more deep. Tamp the trench full of soil. Reinforce with a row of staples driven through the mat about four inches downhill from the trench. These staples should be about 10 inches apart. Then staple the overlap in the center of then channel. These staples should be three to four feet apart. The outside edges may be stapled similarly at any time after the center has been stapled. Closer stapling along the sides is required where concentrated water may flow into the channel.

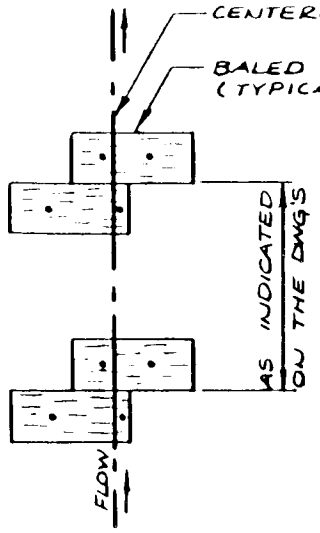
Succeeding strips of matting, farther down the channel or slope, are secured in a similar manner.

Where one roll of matting ends and another roll begins, the end of the top strip overlaps the trench where the upper end of the lower strip is buried. Make the overlap at least four inches and staple securely. Rolls of excelsior matting may be butted at the ends and securely stapled.

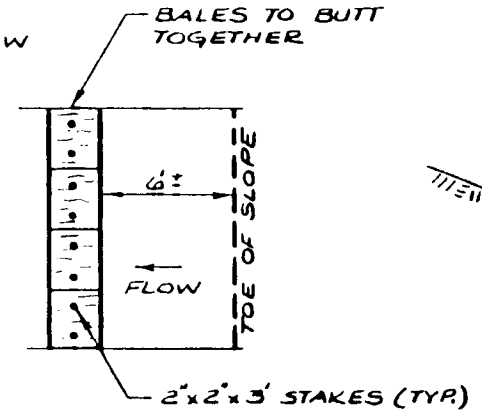
5. Erosion Stops - At any point matting may be folded for burying in silt trenches and secured as were the upper ends. This checks water flow and erosion that may begin under the matting. It also gives improved tie-down. The procedure is required on steep slopes of sandy soil and gentler slopes subject to seepage. Spacings vary from 25 to 100 feet.

6. Diversions - Where diversions outlet into a waterway, the outlet should be protected with matting used in the same manner as in the main channel. The matting for the outlet is laid first so that matting in the main channel will overlap the outlet strip.

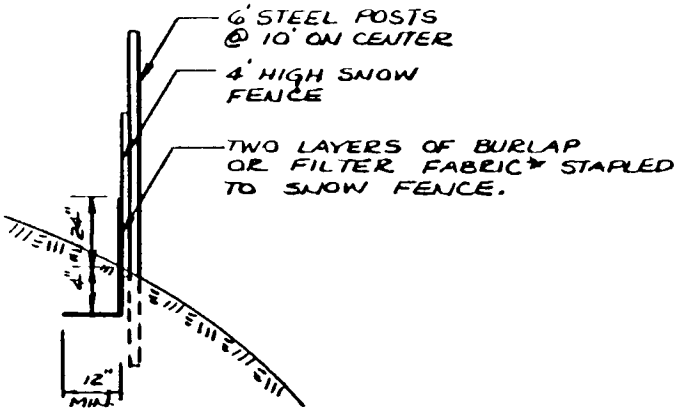
7. Matting Soil Contact - Induce contact between matting and soil by rolling, after laying, stapling and seeding is complete. Perfect contact is vital to keep waterflow over, not under the matting.



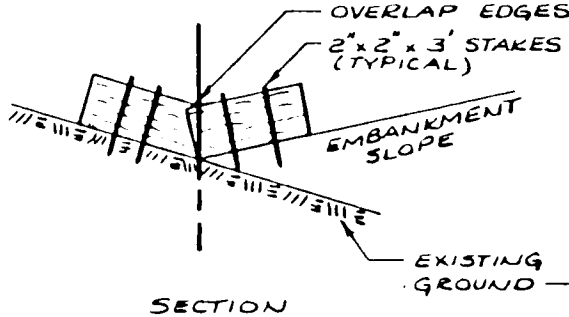
PLAN
NO SCALE



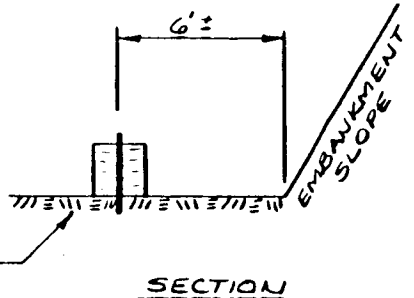
PLAN
NO SCALE



SECTION
NO SCALE
TYPE C



SECTION
NO SCALE
TYPE A



SECTION
NO SCALE
TYPE B

NOTE:

* FILTER FABRIC SHALL BE MIRAFI: 140 AS MANUFACTURED BY "CELANESE FIBERS MARKETING COMPANY." "DUPONT" EQUIVALENT OR APPROVED EQUAL.

NOTES

1) EROSION CHECKS SHALL BE INSTALLED AS INDICATED IN THE DETAILS SHOWN AND WHERE DESIGNATED ON THE DRAWINGS.
2) EROSION CHECKS SHALL REMAIN IN PLACE UNTIL PERMANENT EROSION CONTROL MEASURES HAVE BEEN ESTABLISHED AND ARE APPROVED BY THE ENGINEER.
3) CHECKS SHALL BE PERIODICALLY INSPECTED TO INSURE THEY ARE IN GOOD CONDITION AND THAT AN EXCESSIVE BUILD UP OF SILT AND DEBRIS HAS NOT OCCURRED.

DuBois & King, Inc.
engineering and environmental services

EROSION CONTROL MEASURE NO 6

EROSION CHECKS (SILT BARRIERS)

SOMA	FEB '81
JKD	MISC.
JMR	E-1693
SPEC. 5707	

S707-9

PROJECT CLOSEOUT

SECTION 799

	Title	Page
799.1	General	799-1
799.2	Substantial Completion.	799-1
799.3	Final Inspection.	799-3
799.4	Reinspection Costs.	799-3
799.5	Deleted	799-3
799.6	Instruction	799-4
799.7	Evidence of Payments and Release of Liens	799-4
799.8	Final Application for Payment	799-4
799.9	Final Certificate	799-4
799.10	Post Construction Inspection.	799-4

799.1 General. This section provides instructions to the Contractor, the Engineer, and the Owner in scheduling the sequence of events and requirements leading to final acceptance of the Project, and occupancy by the Owner; and the responsibilities of the respective parties.

799.2 Substantial Completion. The Contractor is advised that Substantial Completion must be attained at a reasonable time prior to the Contract Completion Date and attaining Final Completion. Generally, this shall be at least 45 to 60 days prior to the Contract Completion Date to allow for the Contractor to complete all punch list and outstanding work items and arrange for a final completion inspection by the Engineer and/or government agencies as appropriate.

The Contractor shall:

1. Submit written certification to the Engineer, that the Project or designated portion of the Project, is substantially complete.

2. Submit a written request for a Substantial Completion inspection by the Engineer.

The Engineer will make an inspection within ten days after receipt of certification, together with Owner's Representative.

Should the Engineer consider that Work is substantially complete:

1. The Engineer will prepare and issue a Certificate of Substantial Completion, containing:

   a. Effective date of Substantial Completion.

   b. Engineer's punch list of items to be completed or corrected.

   c. The time within which Contractor shall complete or correct work of listed items.

   d. Time and date Owner will assume possession of Work or designated portion thereof.

e. Responsibilities of Owner and Contractor for:

(1) Insurance.

(2) Utilities.

(3) Operation of mechanical, electrical and other systems.

(4) Maintenance and cleaning.

(5) Security.

(6) Warranties (list exceptions if any)

f. Signatures of:

(1) Engineer.

(2) Contractor.

(3) Owner.

2. For Owner occupancy of Project or Designated Portion of Project:

a. The Contractor shall:

(1) Perform final cleaning in accordance with Section 701.

(2) Furnish and fill all vessels that are required to be filled with the appropriate materials. The materials and method of filling shall be as recommended by the manufacturer and as approved by the Engineer. These vessels include, but are not limited to the following:

(a) Storage Tanks. (Chemicals, petroleum products, etc)

(b) Process Tanks.

(c) Fuel Tanks.

(d) Reservoirs.

(e) Lagoons.

(f) Barrels.

(g) Gas Cylinders.

b. The Owner will occupy the Project under provisions stated in the Certificate of Substantial Completion.

Should the Engineer consider that Work is not substantially complete:

1. He will promptly notify the Contractor in writing, stating the reasons.

2. The Contractor shall complete the Work, and send second written notice to the Engineer, certifying that the Project, or designated portion of the Project, is substantially complete and request reinspection.

3. The Engineer will reinspect the Work.

799.3 Final Inspection. The Contractor shall submit written certification that:

1. Work has been completed in accordance with Contract Documents.

2. Equipment and systems have been tested in presence of Owner's Representative and are fully operational.

3. Project is completed, and ready for final inspection.

The Engineer will make final inspection within ten days after receipt of the certification.

Should the Engineer consider that work is finally complete in accordance with requirements of the Contract Documents, he will request the Contractor to deliver Project Closeout submittals.

Should the Engineer consider that work is not finally complete:

1. He will notify the Contractor in writing, stating the reasons.

2. The Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that the Work is complete.

3. The Engineer will reinspect the Work.

799.4 Reinspection Costs. Should the Engineer be required to perform second inspections because of failure of Work to comply with original certifications of the Contractor, the Owner will compensate the Engineer for additional services, and deduct amount paid from final payment to the Contractor.

799.5 DELETED

799.6 Instruction. The Contractor shall instruct Owner's personnel in operation of all systems, mechanical, electrical and other equipment.

799.7 Evidence of Payments and Release of Liens. The Contractor shall submit:

1. Contractor's Affidavit of Payment of Debts and Claims.

2. Contractor's Affidavit indemnifying the Owner or Owner's agents harmless from all claims as stated in the General Conditions.

799.8 Final Application for Payment. The Contractor shall submit final application in accordance with requirements of General and Supplementary Conditions.

799.9 Final Certificate for Payment. The Engineer will issue final certificate in accordance with provisions of General Conditions.

799.10 Post-Construction Inspection. Prior to expiration of one year from Date of Substantial Completion, the Engineer will make visual inspection of Project in company with Owner and Contractor to determine whether correction of Work is required, in accordance with provisions of the General Conditions.

For Guarantees beyond one year, the Engineer will make inspections at request of the Owner after notification to the Contractor.

The Engineer will promptly notify the Contractor, in writing, of any observed deficiencies which shall be promptly corrected by the Contractor at his expense.

* * *

MEASUREMENT AND PAYMENT

SECTION 801

	Title	Page
801.1	General	801-1
801.2	Item 1 - Lowering the Lake & Handling All flow During Construction.	801-1
801.3	Item 2 - Excavation and Stockpile	801-2
801.4	Item 3 - Rock Excavation and Stockpile.	801-2
801.5	Item 4 - Earth Embankment	801-2
801.6	Item 5 - Select Borrow for Earth Embankment	801-3
801.7	Item 6 - Riprap, Stone, and Granular Embankment Materials.	801-3
801.8	Item 7 - Removal of Existing Outlet Pipes 4-36-inch CGMP and 1-22-inch steel pipe.	801-3
801.9	Item 8 - 36-inch Corrugated Galvanized Metal Pipe.	801-3
801.10	Item 9 - 30-inch Low-Level Outlet	801-3
801.11	Item 10 - Temporary Road	801-4
801.12	Item 11 - Pavement Replacement	801-4
801.13	Item 12 - Steel Beam Guard Rails.	801-4
801.14	Item 13 - Miscellaneous Reinforced Concrete	801-5
801.15	Item 14 - Miscellaneous Earth Excavation and Backfill.	801-5
801.16	Item 15 - Dry Hydrant Removal and Reinstallation.	801-5
801.17	Item 16 - Loaming and Seeding	801-5
801.18	Item 17 - Clean-up.	801-6
801.19	Item 18 - ADD ON - Cast Iron Sluice Gate 24" x 36"	801-6
801.20	Item 19 - Add-on Observation Wells.	801-6

801.1 General. The following sections describe the measurement of and the payment for work to be done under the respective items listed in the Proposal.

Each unit or lump sum price stated in the Proposal shall constitute full compensation for each completed Item of the work as indicated on the drawings and as specified.

801.2 Item 1 - Lowering the Lake and Handling All Flow During Construction. The lump sum price for this Item shall constitute full compensation for all pumping, sheeting, cofferdams, channels, flumes, drains, surveys and/or other temporary diversion and protective works necessary to lower the lake during the construction period and to handle and care for the flow of water from Silver Lake at the project site while reconstruction of the dam is in progress, all as specified.

801.3 Item 2 - Excavation and Stockpile. The quantity of material to be measured for payment under this Item shall be the actual number of cubic yards of earth excavated and stockpiled, measured in place before excavation. The unit price shall include the entire cost of excavating earth to the designated widths and depths as directed, segregating materials by loads, draining or drying suitable materials, transportation of materials to disposal areas and to temporary stockpile, removal of oversize materials from otherwise suitable materials, disposing of oversize materials if unsuitable or stockpiling if suitable for use in the permanent structure and disposal of excavated waste materials. The unit cost for this Item shall constitute full compensation for all labor, tools, equipment and materials necessary for the required work.

801.4 Item 3 - Rock Excavation and Stockpile. Where rock is encountered, it shall be uncovered but not excavated until measurements have been made by the Engineer, unless in the opinion of the Engineer, satisfactory measurement can be made in some other manner.

The quantity of rock to be paid for under this item shall be the number of cubic yards of rock measured in place before excavation within the limits of normal excavation as indicated on the drawings, unless rock excavation beyond such limits has been authorized by the Engineer in writing; in which case measurement shall be made to the authorized limits.

Excavated rock which has not been disposed of shall not be included for payment. Reinforced concrete, in excess of one cubic yard, is eligible for payment under this item. Other pavements and pavement bases shall not be measured for payment under this item.

The bidder shall include in his bid for other items involving excavation the cost of doing the entire excavation as earth. The price for this item being intended to cover the difference between the cost of rock excavation and the cost of earth excavation. The price for this item shall be paid in addition to that paid for earth excavation under other appropriate items.

The price for this item shall include compensation for rock excavation to the designated widths and depths as directed, segregating materials by loads, transportation of materials from the excavation site to points of final use, to disposal area onto temporary stockpile areas, removal of unsuitable materials and disposal of excavated waste materials.

801.5 Item 4 - Earth Embankment. The quantity of material to be measured for payment, under this item, shall be the actual number of cubic yards of material measured in place in the completed embankment to the lines, grades, slopes, and thicknesses shown on the drawings or as established by the Engineer/Owner. The cross-sections obtained by surveys made after completion of excavation for dam embankment foundation will be used in computing the quantity of embankment placed. No allowance will be made in measurement for payment for settlement, shrinkage, and consolidation of the foundation or of the material in the embankment. In measuring embankment for payment, the volume of structures, riprap, crushed stone bedding, granular filters, pipe bedding materials, and of other work for which items for payment are provided in the contract, will be deducted.

Payment under this item shall include the cost; of transportation from stockpile area to the embankment, preparing the embankment foundations, placing and compacting the material, supplementary wetting on the fill, if necessary, and any additional work required on the embankment to accomplish uniform moisture application, preparing bonding surfaces, and all other operations required to secure adequate bond between embankment in place and embankment to be placed.

Payment for this item will be in addition to payment made for excavation of the materials.

801.6 Item 5 - Select Borrow for Earth Embankment. The quantity of select borrow to be paid under this item shall be the number of cubic yards actually furnished, as ordered, measured inplace after compaction. The unit price for this item shall include compensation for furnishing and transporting the material. Placing and compacting the select borrow will be paid for under Item 4, Earth Embankment.

801.7 Item 6 - Rip-rap, Stone, and Granular Embankment Materials. The quantity of materials to be paid for under the subdivision of this item shall be the number of cubic yards actually placed, as ordered, measured in place after compaction. The unit prices for the subdivisions of this item shall include compensation for furnishing, transporting, placing, and compacting the materials.

Payment shall be made at the price per cubic yard for the following:

Item 6a - Bank-run sand and gravel filter layer.
Item 6b - Crushed stone bedding for rip-rap.
Item 6c - Dumped rip-rap.
Item 6d - Pipe bedding.

801.8 Item 7 - Removal of Existing Outlet Pipes, 4-36" CGMP and 1-22" Steel Pipe. The lump sum price for this item shall constitute full compensation for all labor, materials and equipment involved in removing the four 36-inch CGMP and the 22-inch steel pipe as indicated on the drawings and as directed. The bid shall include the cost of removal and disposal of the existing pipe outlets.

No excavation paid for under other items shall be included in the measurement for this item.

801.9 Item 8 - 36-inch Corrugated Galvanized Metal Pipe. The lump sum price for this item shall constitute full compensation for all labor, materials and equipment involved in furnishing, placing, and installing in place the 36-inch CGMP emergency spillway pipes, including all bedding preparation, and necessary connections to the existing structure as indicated on the drawings or as directed.

801.10 Item 9 - 30-inch Low Level Outlet. The lump sum price for this item shall constitute full compensation for all labor, materials, and equipment involved in furnishing, placing and installing in place the 30-inch diameter reinforced concrete pipe, including bedding preparation and all incidental work shown on drawings or as directed.

801.11 Item 10 - Temporary Road. The lump sum price for the temporary road shall constitute full compensation for all labor, tools, materials, and equipment necessary to construct and remove the temporary road as indicated on the drawings and as directed.

The bidder shall include in his bid the cost to construct the temporary road, maintain temporary road in safe working conditions throughout duration of the project, provide necessary means to control traffic, removal of temporary road upon completion of the project, and restoring affected areas to their existing condition, as indicated on the drawings and as specified.

801.12 Item 11 - Pavement Replacement. The quantity of pavement replaced shall be measured by the square yard of completed pavement. Limits of payment shall be as indicated on the contract drawings or as directed by Engineer.

The quantities of pavement measured shall be paid for at the unit prices per square yard for the appropriate subdivisions of this item, which prices shall constitute full compensation for furnishing all labor, materials, tools, and equiment necessary for replacing the pavements complete as specified.

Payment shall be made at the price per square yard for the following:

Item 11a - Bituminous concrete pavement replacement, 2 inches thick or greater

Item 11b - Bituminous concrete pavement replacement, less than 2 inches thick.

Item 11c - Temporary pavement replacement.

Pavement damaged or removed by the Contractor for his own convenience of operation or outside the construction limits shall not be measured for payment, but shall be replaced by the Contractor at his own expense.

801.13 Item 12 - Steel Beam Guardrails. The unit prices for the subdivisions of this item shall constitute full compensation for all labor, tools, materials, and equipment necessary to furnish and install and/or remove and reinstall steel beam guard rais as indicated on the drawings and as directed.

Payment shall be made at the unit price per linear foot for the following:

Item 12a - Furnish and install new steel beam guard rail.

Item 12b - Remove, stockpile, and reinstall existing steel beam guard.

Guard rail damage by the Contractor outside the construction limits shall not be measured for payment, but shall be replaced by the Contractor at his own expense.

801.14 Item 13 - Miscellaneous Reinforced Concrete - Class A Concrete Including Steel Reinforcement. The quantity of Class A concrete masonry including steel reinforcement to be measured for payment under this item shall be the actual amount of concrete placed to the neat lines as indicated on the drawings or as directed.

The unit price for the concrete masonry and reinforcement shall include compensation for furnishing and placing concrete, reinforcing, furnishing and placing concrete forms, all joints, finishing concrete for all concrete work indicated on drawings or as directed.

No payment will be made for concrete used to backfill unauthorized excavation.

801.15 Item 14 - Miscellaneous Earth Excavation and Backfill. Under this item the Contractor shall be paid for additional and miscellaneous earth excavation and backfill ordered by the Engineer. The unit price for this item shall include compensa- tion for the work of excavating and backfilling and all work incidental thereto, including drainage.

Miscellaneous earth excavation and backfill will include such items as excavation and backfill for test pits, test holes, existing rip-rap, removal of existing stone walls, and disposal of unsuitable material, all as directed by the Engineer. The unit price for this item shall include compensation for backfilling as required, with material from the excavation.

801.16 Item 15 - Dry Hydrant - Removal and Reinstallation. The lump sum price for this item shall constitute full compensation for all labor, materials, and equipment involved in removing the existing dry hydrant and 10-inch water line, properly store the hydrant, and then reinstall at the same location with new 10-inch ductile iron water pipe, as directed by the Engineer/Owner or as indicated by the drawings.

New dry hydrant installation shall be tested and approved before payment.

801.17 Item 16 - Loaming and Seeding. The quantity of loaming and seeding to be measured for payment under this item shall be measured in square yards of the work done within the prescribed limits indicated on the drawings and as specified.

The unit price for this item shall include compensation for placing loam to the required depth, furnishing additional loam as necessary, grading, fertilizing, seeding, and all work incidental to establishing a satisfactory growth of grass.

Loaming and seeding paid under other items shall not be measured for payment under this item.

801.18 Item 17 - Clean Up. The lump sum price for this item shall constitute full compensation for cleaning up all debris and construction materials not incorporated into the finished structures and removal of this debris and materials from the site of the work.

The price for this item shall include full compensation for furnishing all labor, materials, tools, and equipment necessary to accomplish all miscellaneous work necessary to restore to a condition equal to the original condition all portions of the site not designated for alteration and all public and private property that was damaged.

801.19 Item 18 - ADD-ON 24" x 36" Cast Iron Sluice Gate. The lump sum price for this item shall constitute full compensation for all labor, materials and equipment involved in furnishing, placing, installing and testing in place a 24" x 36" cast iron sluice gate, operator, and appurtenant work, as indicated on drawings or as specified.

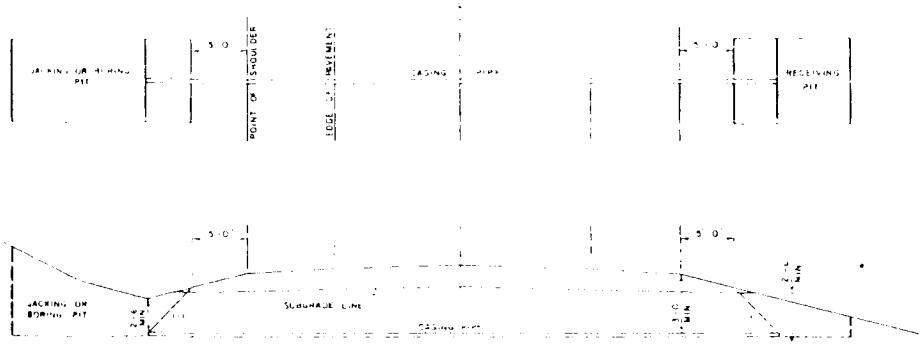
801.20 Item 19 - ADD-ON Observation Wells. The lump sum price for this item shall constitute full compensation for all labor, materials and equipment involved in furnishing, placing and installing two groundwater observation wells as indicated on the drawings and as specified.

* * * *

STANDARD DETAILS

D-20	Highway Crossings for Underground Utilities
E-8	Typical Approach Signs Sheets 1 and 2
800-1	Sample Schedule

DETAIL A
JACKING OR BORING
RURAL - TYPICAL



DETAIL B
JACKING OR BORING
URBAN - TYPICAL



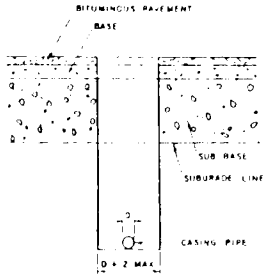


USING SHEET PILING

OPEN CUT AND PAVEMENT REPLACEMENT
APPLICABLE ONLY WHEN SPECIFICALLY AUTHORIZED BY HIGHWAY PERMIT

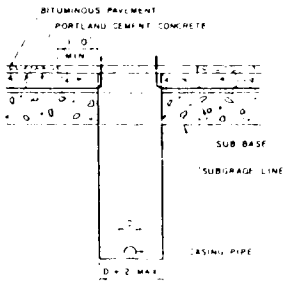
DETAIL C
OPEN CUT WITH
BITUMINOUS CONCRETE PAVEMENT

BITUMINOUS TREATED BASE MATERIALS TO BE REPLACED WITH BITUMINOUS CONCRETE



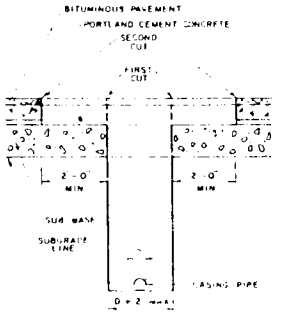
DETAIL D
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

LONGITUDINAL STEEL TO BE CUT AND BENT BACK TO ALLOW FOR TRENCH EXCAVATION. REINFORCING BARS TO BE BENT BACK IN PLACE, SPLICED AND NEW CROSS REINFORCING STEEL TO BE TIED TO THE LONGITUDINAL BARS PRIOR TO REPLACING THE PORTLAND CEMENT CONCRETE



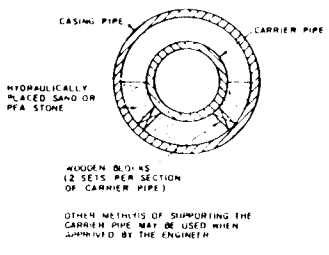
DETAIL E
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

THE FIRST CUT WILL BE TO THE DESIRED WIDTH OF THE TRENCH. SACRIFICIAL TO BE MADE TO THE ROAD SURFACE. THE SECOND CUT WILL THEN BE MADE AND ALL MATERIAL REMOVED TO THE BOTTOM ELEVATION OF THE CONCRETE SLAB. THE SUB-BASE WILL THEN BE RE-COMPACTED AND THE PORTLAND CEMENT CONCRETE REPLACED

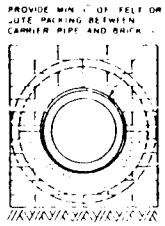


IN THE EVENT THAT AN ADJACENT TRANSVERSE JOINT IS LESS THAN FOUR FEET FROM THE FIRST CUT, THE PAVEMENT SHALL BE REMOVED TO THAT JOINT

DETAIL F
CASING AND CARRIER PIPE



OTHER METHODS OF SUPPORTING THE CARRIER PIPE MAY BE USED WHEN APPROVED BY THE ENGINEER



WALL TO BE CONSTRUCTED AT ENDS OF CASING PIPE OR AS DIRECTED BY THE ENGINEER

CONSTRUCT WALL OF BRICK OR OTHER SUITABLE MATERIAL ON UNDISTURBED FOUNDATION

GENERAL NOTES

1. SHEET PILING MAY BE DRIVEN VERTICALLY FIVE (5) FEET, MEASURED FROM POINT, ON ONE (1) FOOT PATH OF SIDEWALK, TO ALLOW FOR A [illegible]
2. EARTH BACKFILL TO BE MADE IN SIX (6) INCH LIFTS AND COMPACTED TO LESS THAN 95% MAX. DRY DENSITY
3. SEE DETAIL 'A' OR 'B' FOR DETERMINING SLEEVE LENGTH
4. IN THE EVENT THAT PERMISSION IS GRANTED TO CUT AN EXISTING CEMENT CONCRETE OR BITUMINOUS PAVEMENT, ALL CUTS SHALL BE MADE WITH A SAW TO A MINIMUM DEPTH OF 1½"
5. BITUMINOUS PAVEMENTS TO BE REPLACED WITH BITUMINOUS CONCRETE, CEMENT CONCRETE AND SUB BASE TO BE REPLACED IN KIND. WATER SUBGRADE TO BE REPLACED WITH EXCAVATED MATERIAL OR AS DIRECTED BY HIGHWAY ENGINEER
6. SUB BASE TO BE REPLACED IN SIX (6) INCH COMPACTED LAYERS
7. PORTLAND CEMENT CONCRETE PATCHES SHALL BE PROPERLY CURED [illegible] DAYS BEFORE BEING SUBJECTED TO TRAFFIC LOADS.

   WHEN HIGH EARLY STRENGTH CEMENT IS USED, PROPER CURING [illegible] DAYS SHALL BE REQUIRED BEFORE BEING SUBJECTED TO TRAFFIC [illegible] WHEN A HIGH STRENGTH QUICK SETTING CONCRETE PATCHING [illegible] APPROVED IT SHALL BE PROPERLY CURED [illegible] TO THE MANUFACTURER'S RECOMMENDATIONS BEFORE BEING SUBJECTED TO TRAFFIC LOADS

REVISIONS AND CORRECTIONS

1 1975 - CARRIER PIPE AND PORTLAND CEMENT NOTES REVISED

APPROVED

DATE December 23, 1974

Elt Etchaay
CHIEF ENGINEER

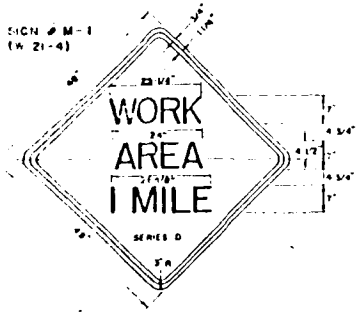
R O Mueller
ASST. CHIEF ENGINEER

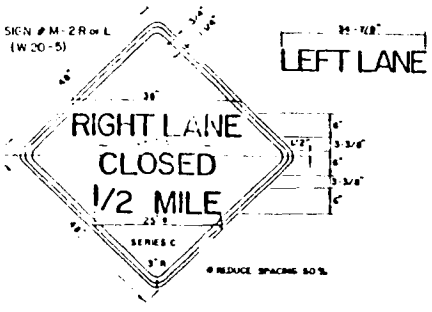
G M Lane
HIGHWAY ENGINEER

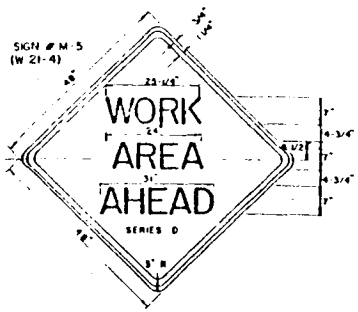
HIGHWAY CROSSINGS FOR UNDERGROUND UTILITIES

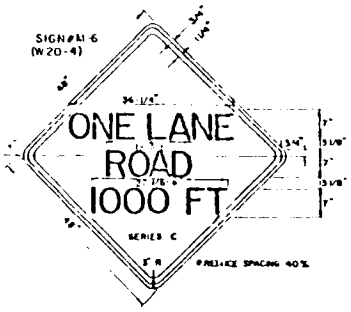
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

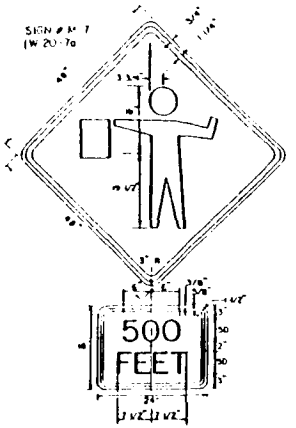
D-2

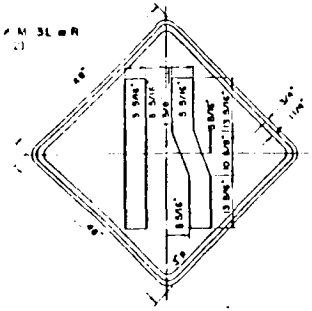


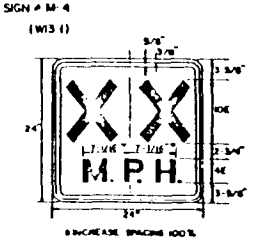


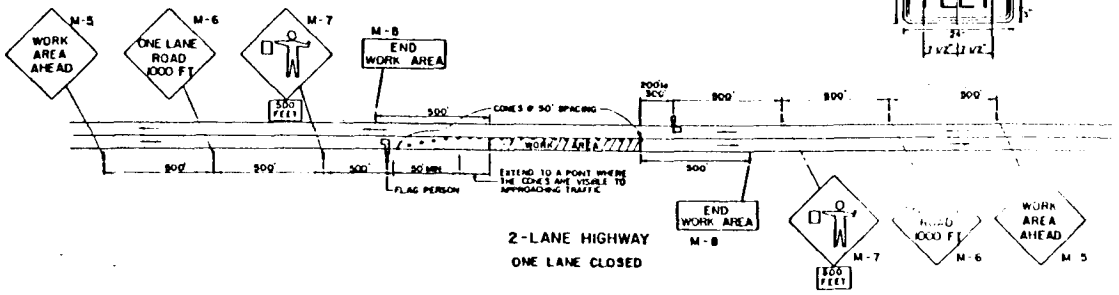




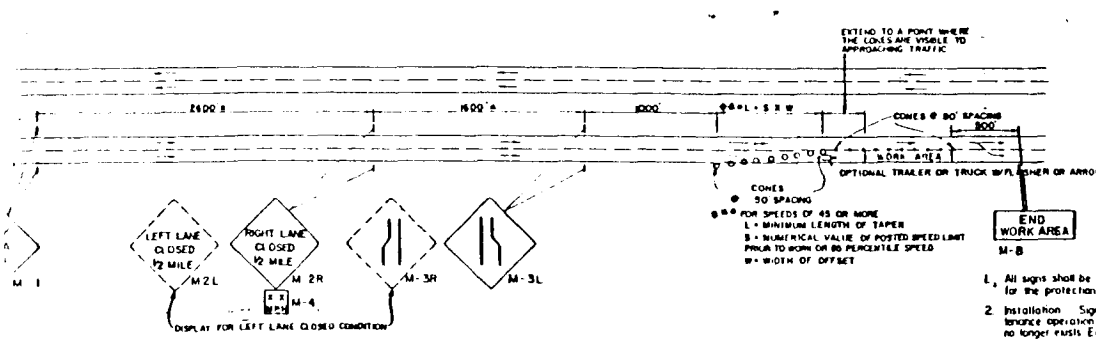




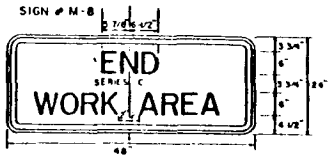




2-LANE HIGHWAY
ONE LANE CLOSED



4-LANE DIVIDED HIGHWAY
ONE LANE CLOSED



NOTES

1. All signs shall be covered or removed at the end of the working day unless required for the protection and safety of the traveling public
2. Installation - Signs and barricades shall be in place prior to the start of the maintenance operation to which they apply and shall be removed promptly when the need no longer exists. Each sign shall be erected in a neat and workmanlike manner on wood or metal posts set securely in the ground, or on portable supports for temporary use, or on barricades when appropriate. As a general rule, roadside signs shall be 5 feet above road level with the nearest edge at least 6 feet outside the shoulder point. The installation of all signs and barricades shall be subject to the approval of the Engineer
3. Numbers in parenthesis indicate M.U.T.C.D. sign designations
4. "ROAD WORK" or "BRIDGE WORK" may be substituted as the appropriate legend for signs # M-1 or M-5

Reflectorization
All reflectorized material shall consist of encapsulated lens reflective sheeting.
The text and borders may be screened, lettering film, or hand painted
Cones used for traffic control at night shall have a minimum 6" wide reflectorized material

Colors
The warning signs shown on this sheet shall have black text, border, and symbols on a reflectorized orange background. The orange shall conform with the standard colors adopted by the American Association of State Highway and Transportation Officials and approved by the U.S. Department of Transportation Federal Highway Administration.

Text Design
Letters, digits, spacing, and text dimensions shall conform with the standard alphabets and designs prescribed in the manual on Uniform Traffic Control Devices

Specifications
Warning signs shall meet the applicable state specifications for traffic signs

Sign Base Material:
The sign base material used for the warning signs on this sheet may be of any of the following, with minimum thickness as noted:

Flat sheet aluminum	0.125	Inches
High density overlayed plywood	3/4	Inches
Galvanized sheet steel	12	Gage

5. ON TOWN, CITY AND INCORPORATED VILLAGE HIGHWAY SYSTEMS THE MINIMUM NUMBER OF SIGNS IS AS FOLLOWS
MINIMUM NUMBER OF SIGNS REQUIRED ARE M-6 AND M-7
MINIMUM SIZE OF THE SIGNS SHALL BE 36" x 36"
THE SIGN SIZE REDUCTION IS FOR DAYTIME MAINTENANCE OPERATIONS OF SHORT DURATION

VISIONS & CORRECTIONS
- AMEND UNDER DIRECTION OF FEDERAL HWY. ADMIN. STRATION
- EFFECTIVE MATERIAL CHANGE
- LAYOUT MATERIAL NOTE CHANGED
- S REFERENCED TO NUMBERS IN M.U.T.C.D.
- SIZE NUMBERS
- PERSONS SIGN CHANGED TO SYMBOL
- ALED FOR REVISED NUMBER AND SIZE OF SIGNS
- MODIFIED SPEED SIGN PER FHWA
- AREA" LEGEND AND NOTES ADDED GENERAL SIGN

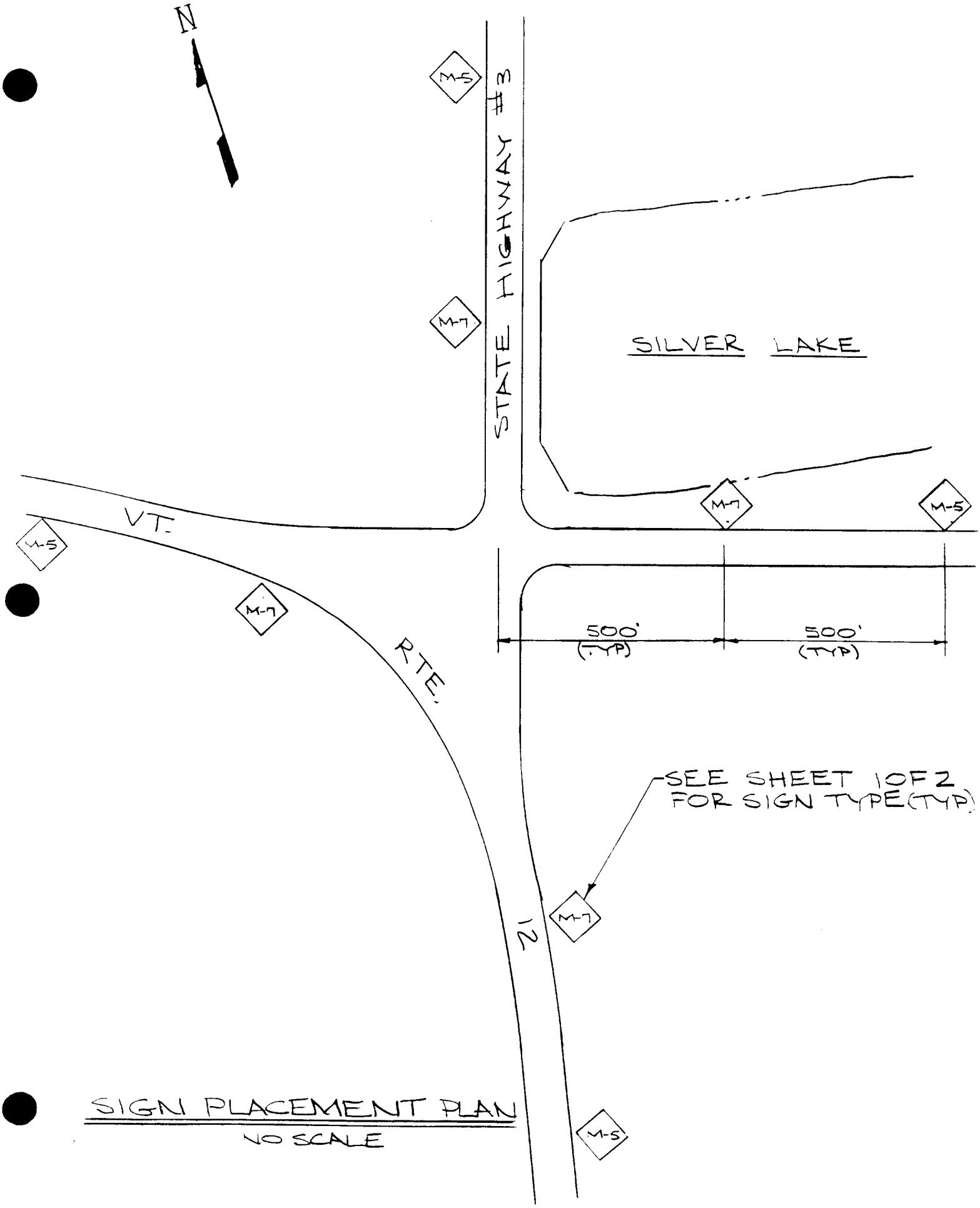
APPROVED
DATE Jan. 26, 1972
R.J. Arnold
CHIEF ENGINEER
E.B. Otterbein
ASST. CHIEF ENGINEER
R.M. Lane
HIGHWAY ENGINEER

TYPICAL MAJOR MAINTENANCE OPERATION
(BRIDGE AND ROADWAY) APPROACH SIGNS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

SHT. 1 of 2



SIGN PLACEMENT PLAN

NO SCALE

PROJECT: (NAME AND DESCRIPTION) FERNDALE, W.W.T.F.

CONTRACTOR: L. D. SWETT, INC.

ITEM NO.	ITEM DESCRIPTION	SCHEDULE VALUE	YEAR 1977 SEPT.	OCT.	NOV.	DEC.
	SITE WORK					
1	CLEARING & GRUBBING	1000	0–100			
2	PAVEMENT	500				
3	FENCING	700				
4	LOAMING & SEEDING	300				
5	LANDSCAPING	500				
6	ETC.					
	CONTROL BUILDING					
7	CONCRETE	4000		0–100		
8	BLOCK MASONRY	2000				
9	BRICK MASONRY	2000				100
10	STAIRS	500			0	
11	DOORS AND WINDOWS	1000				
12	ROOFING	2000			0–100	100
13	ELECTRICAL	1000		0–15	15	
14	PLUMBING	500		0–10		
15	VENTILATING	300				
16	HEATING	400				
17	ETC.	100				
	PROCESS TANKS					
18	CONCRETE	1000		0	75	
19	RAILINGS	800				
20	GRATING	300				
21	ETC.	200				
	TOTAL	19100				
ANTICIPATED MONTHLY VALUE OF WORK			1000	3400	2950	1950
ACCUMULATED MONTHLY VALUE OF WORK			1000	4400	7350	9300
ACCUMULATED SCHEDULED PROGRESS %			5.1	23.0	38.5	48.7
NET PAYMENTS DUE			900	3060	2655	1755

PERCENT COMPLETE AT THE START AND FINISH OF ACTIVITY PERIOD.

REMARKS: RETAINAGE ASSUMED AT 10 %

DuBois & King Inc.
engineering and environmental services
RANDOLPH, VERMONT / CONCORD, NEW HAMPSHIRE

SAMPLE SCHEDULE

DRAWN BY	DATE
RLB	3.76
CHECKED BY	PROJ. NO.
JHW	MISC
PROJ. ENG.	DRAW. NO.
—P	800-1

STANDARD DETAIL