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SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01100

SPECIAL PROJECT PROCEDURES

[03/01]

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SECTION 01100

SPECIAL PROJECT PROCEDURES
[03/01]

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. GOVERNMENT CODE OF FEDERAL REGULATIONS (CFR)

33 CFR 320-330	General Regulatory Policies, Permits, Enforcement and Definitions

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan

Contractor shall provide an accident prevention plan including an activity hazard analysis to the Contracting Officer within 15 calendar days after receipt of award. Plan shall be in accordance with Contract Clause entitled "ACCIDENT PREVENTION (NOV 1991) - ALTERNATE 1.

Payrolls and Basic Records

Contractor shall submit payrolls and basic records in accordance with the CLAUSE entitled "PAYROLLS AND BASIC RECORDS (FEB 1988)".

Progress Chart; G-AOF

Contractor shall submit progress chart in accordance with the Contract clause entitled "SCHEDULE FOR CONSTRUCTION CONTRACTS (APR 1984)".

Non-listed, Non-Commercially Active Stone or Material Source; G-ECD.

If after award of a contract, the Contractor proposes to furnish stone, or granular materials from non-listed, or non-commercially active sources, the following information and data for each non-listed or non-commercially active source of stone, or granular material shall be furnished forty-five (45) or more calendar days prior to the date the Contractor is scheduled to obtain materials from such source(s).

a. Name and address (Property Owner).

b. Location, site map, and legal description (or appropriate substitute) of the area.

c. Previous land use information.

d. A topographic map of the area.

e. Photographs showing the area proposed for use.

f. Written permission of the owners of the proposed non-listed or non-commercially active sources(s).

g. Written permission of the owners of the access properties involved.

h. All data required to assess potential environmental impacts. This information is required in order to determine the necessity for environmental documentation for any non-commercially active, non-listed source(s).

i. Documentation of coordination of the use of proposed non-commercially active, non-listed source(s) with Federal, State and local agencies having an interest and furnish written approval of these agencies for use of such source(s).

(1) Field Supervisor, U.S. Fish and Wildlife Service, Ecological Services, 2651 Coolidge Road, East Lansing, Michigan 48823. Phone: 517-351-2555.

(2) Chief, Office of Strategic Environmental Analysis, B 19J,, U.S. Environmental Protection Agency, 77 West Jackson Blvd., Chicago, Illinois 60604-3590.

(3) Chief, Land and Water Mgmt. Division, Michigan Department of Environmental Quality, P. O. Box 30458, Lansing, Michigan 48909.

(4) State Historic Preservation Officer, Michigan Bureau of History, 717 W. Allegan, Lansing, Michigan 48918-1800.

j. The proposed reduction, if any, in the applicable unit or lump-sum prices the BIDDING SCHEDULE if the request were to be approved by the Government.

Survey Note Format; G-AOF.

Submit the proposed survey note format prior to performing any survey work at the work site.

Video Cassettes; G-AOF.

Prior to the start of work, video recordings shall be delivered within seven (7) calendar days.

SD-07 Certificates

As-Built Technician's Qualifications

Submit the identity and qualifications of the persons assigned to prepare the as-built information at least 10 calendar days in advance of preparing the drawings.

As-built Drawings; G-AOF.

Within ten (10) calendar days after the substantial completion date as established by the Contracting Officer, submit the as-built details of the work performed under this contract on a set of blue-line prints of the contract drawings marked in red. Following review and approval by the Government, the Contractor shall prepare electronic and mylar copies of as-built drawings for submittal within 15 calendar days following receipt of comments from the Government. Electronic files shall be submitted in Microstation 95 (.dgn) CADD file format, suitable for plotting with Intergraph IPLOT Software. The electronic medium for file transfers shall be agreed to prior to the time of submittal and shall be compatible with current industry standards and hardware configurations.

Survey Information

Upon completion of the contract work, the originals of all field notes, sketches, recordings and computations made by the Contractor in performing the layout work shall be submitted in ring binders.

1.3 REGULATORY REQUIREMENTS

1.3.1 Additional Work Proposed and Not Authorized

1.3.1.1 Work Subject to 33 CFR 320-330

Any additional work (not specifically shown on the plans or delineated in the specifications) proposed by the Contractor in or affecting navigable waters, including wetlands (as defined in 33 CFR 320-330, published in the Federal Register Vol.51, No. 219, Thursday, November 13, 1986) shall not be performed without a Department of the Army Permit. This requirement shall be applicable to all work, permanent or temporary, and/or fill(s). The Department of the Army Permit shall be approved by the District Engineer or Deputy District Engineer in accordance with the laws of the United States and the regulations promulgated thereunder, including, but not limited to, the River and Harbor Act of 1899, the Clean Water Act and the National Environmental Policy Act of 1969, as amended. Corps employees (Contracting Officer's Representatives (COR) or inspectors) are not delegated authority to authorize such work. Information on making application for such permit(s) may be obtained by contacting one of the offices as listed hereinafter. When applying for information or a permit, a copy of any correspondence should be directed to the Contracting Officer of this contract. If a permit is not obtained, the additional work cannot be accomplished. Any delay in processing the permit will not constitute the basis of a claim under this contract. The fact that the Contractor is performing work under a Department of the Army Contract will give the Contractor no greater rights than any other applicant for a Department of the Army Permit.

MICHIGAN-INDIANA

Regulatory Branch
Engineering and Technical Services Division
U.S. Army Engineer District, Detroit

P. O. Box 1027
Detroit, MI 48231
Telephone: 313-226-6813

1.4 PROJECT/SITE CONDITIONS

1.4.1 Condition and Use of Project Site

The drawings indicate soundings and elevations at the project site as found in condition surveys made as stated on the contract drawings. A notification of at least five (5) calendar days shall be given to the Contracting Officer prior to bringing any construction equipment or material upon the work site. The Contractor shall be responsible for damages that may be suffered due to its operations. The Contractor shall note CLAUSE titled "PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS."

1.4.1.1 Physical Conditions

The physical conditions shown on the drawings are indicative of those that prevailed at the time of the site investigations and may be different than those at the time of construction. Significant variations that would require changes to the plans or specification shall be reported to the Contracting Officer immediately. The information shown on the logs of soil borings on the contract drawings is from borings located within or near the work areas. While the borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches, localized variations of characteristics of the subsurface materials of this region are anticipated. Field logs of borings taken in the project area, soil samples, and other subsurface information obtained or prepared for this contract are available for examination upon request at the Engineering & Construction Division, Design Branch, U.S. Army Corps of Engineers, Detroit District, 477 Michigan Avenue, Detroit, MI 48226.

1.4.1.2 Work and Storage Areas

Work and storage areas will be provided at the site and will be as designated and/or approved by the Contracting Officer. Areas made available to the Contractor will be selected to minimize interference with Government operations and other contractors.

1.4.2 Existing Vegetation, Structures, Equipment, Utilities & Improvements

General locations of applicable existing utilities, vegetation, structures, equipment and improvements, based upon latest information available to the Government have been shown on the drawings. However, it is the Contractor's obligation to establish the exact horizontal and vertical location and size of all existing utility lines which are located within the required work area. The Contractor shall submit a utility locating planfor locating existing utilities and a copy of its utility location findings prior to commencing work on the site. Any utility lines which are not found by the Contractor, but which are known to exist at the project site, shall be reported to the Contracting Officer immediately. The Contracting Officer will have the option of directing commencement of work at the site or requiring the Contractor to submit further plans for locating the utility lines. Once the utilities have been located and marked, the Contractor shall be deemed to have the location made known to it pursuant to CLAUSE titled "PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS." If the Contractor

damages any existing utility line, vegetation, structure, equipment or improvement, a report thereof shall be made immediately to the Contracting Officer. In any event, existing utility lines, vegetation, structures, equipment or improvements shall be protected from damage, and if damaged, shall be repaired by the Contractor at its own expense.

1.4.3 Vehicular Access

Throughout the period of work on this contract, the Contractor shall maintain an all-weather roadway through or around its work area when work therein would otherwise block an existing roadway. Such permanent or temporary roadways shall be kept open for use by emergency vehicles, as well as residential and commercial traffic at all times.

1.4.4 Utility Services

1.4.4.1 Contractor-Furnished Utility Services

The Contractor shall furnish, all water, electric current and other utilities required for its use.

1.4.5 Protection and Maintenance of Traffic

1.4.5.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic. The method of dust control shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads shall be removed unless otherwise approved by the Contracting Officer. Any dirt or mud which is tracked onto paved or surfaced roadways shall be promptly cleaned away.

1.4.5.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe and public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.4.6 Contract Supervision and Representation

The Contractor's local representative shall be available to Government representatives during duty hours, 8 a.m. to 4:30 p.m., on normal working days and shall be available by telephone at other times. The name of the Contractor's representative and the contact telephone number shall be furnished to the Government.

1.4.7 Quantity Surveys

The CLAUSE titled "QUANTITY SURVEYS" is applicable other than for measurement of quantities of work performed for stone construction utilizing new stone. Measurement and payment for stone construction is as specified in SECTION 01025, "MEASUREMENT AND PAYMENT" and SECTION 02486, "STONE CONSTRUCTION".

1.4.8 Layout of Work and Surveys

1.4.8.1 Layout of Work

The following requirements are in addition to the requirements of CLAUSE titled "LAYOUT OF WORK." The Government has established bench marks and horizontal control points at the site of the work. Horizontal control points and descriptions of bench marks are shown on the drawings and on sheets enclosed in SECTION 01999. The elevations of bench marks are referred to mean water level (IGLD 1955).

1.4.8.2 Surveyor Requirements

From these control points and bench marks, the Contractor shall lay out the work by establishing all lines, grades, range markers and gauges at the site as necessary to control the work. All survey information shall be recorded in accordance with standard and approved methods and in the survey note format approved by the Contracting Officer. All field notes, sketches, recordings and computations made by the Contractor in performing the layout work shall be available at all times during the progress of the work for ready examination by the Contracting Officer or his or her duly authorized representative and upon completion of the contract work the originals shall be turned over to the Contracting Officer in ring binders.

1.4.8.3 Suspension

The Contracting Officer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn upon satisfactory replacement of location and limit marks. Such suspension shall be at no additional cost to the Government and shall not entitle the Contractor to an extension of time for completing the work.

1.4.8.4 Verification

The Government may make checks as the work progresses to verify lines and grades established by the Contractor and to determine the conformance of the completed work as it progresses with the requirements of contract specifications and drawings. Such checking by the Contracting Officer or his or her representative shall not relieve the Contractor of its responsibility to perform all work in accordance with the contract drawings and specifications and the lines and grades given therein.

1.5 SEQUENCING AND SCHEDULING

1.5.1 Construction Period Restriction

The Contractor's attention is directed to the allowed and prohibited construction periods as established by the State of Indiana for this project as specified in SECTION 01130, "ENVIRONMENTAL PROTECTION" Paragraph, "PROTECTION OF FISH AND WILDLIFE RESOURCES", Subparagraph,

"State of Indiana - Allowed and Prohibited Work Periods". The number of calendar days within which the Contractor is required to complete the work under this contract, as established in the Clause titled "COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK", is exclusive of the above referenced periods during which construction is prohibited and the days in these periods will not be counted when computing the required completion date.

1.5.2 Sunday, Holiday' Night and Extended Hours of Operations

When the Contractor elects to work more than 8 hours per day, Monday through Friday or on Saturdays, Sundays, holidays or nights when not prohibited herein, notice of its intention to do so shall be given to the Contracting Officer not less than forty-eight (48) hours in advance thereof. Adequate lighting for thorough inspection of night operations shall be provided by the Contractor at its expense.

1.5.3 Work Period Restrictions

No work is allowed at the project sites during the following periods:

c. Holiday periods as follows:

(1) 6 p.m. 29 August to 8 a.m. 2 September 2003

(2) 6 p.m. 26 November to 8 a.m. 1 December 2003

The above-stated no-work periods, as applicable, are included in the number of calendar days within which the Contractor is required to complete the work as established in CLAUSE titled "COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK" and therefore the above-stated no-work periods will not entitle the Contractor to additional time for completing the work.

1.5.4 Start Work

Evidence that the Contractor has started procurement of materials, preparation and submission of shop drawings, preparation of subcontracts, and other preparatory work will satisfy the requirement that work commence within ten (10) calendar days after receipt of Notice to Proceed. (See Clause titled COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK, FAR 52.212-0003.)

1.6 REPORT REQUIREMENTS

1.6.1 Accident Prevention Plan

Contractor shall provide an accident prevention plan including an activity hazard analysis to the Contracting Officer within 15 calendar days after receipt of award. Plan shall be in accordance with Contract Clause entitled "ACCIDENT PREVENTION (NOV 1991) - ALTERNATE 1.

1.6.2 Payrolls and Basic Records

Contractor shall submit payrolls and basic records in accordance with the CLAUSE entitled "PAYROLLS AND BASIC RECORDS (FEB 1988)".

1.6.3 Progress Chart

Contractor shall submit progress chart in accordance with the Contract

clause entitled "SCHEDULE FOR CONSTRUCTION CONTRACTS (APR 1984)".

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Use of Materials from Non-Listed, Non-Commercially Active Sources

If after award of the contract, the Contractor proposes to use stone from a source or sources other than approved commercially active sources or the sources listed in SECTION 02486, "STONE CONSTRUCTION", Paragraph, "STONE MATERIALS", Subparagraph, "Sources" or to use soil, granular or aggregate materials for fill from a non-commercially active source or sources, the Contractor shall submit data as required in the Paragraph entitled "SUBMITTALS". The data shall be accompanied by a request for approval. Non-listed, non-commercially active stone or material sources shall not be used unless the proposal and use of the source(s) are approved by the Contracting Officer in accordance with applicable provisions of the contract. All expenses incurred by the Government and the Contractor in connection with the Contractor's request for approval for the use of materials from non-listed, non-commercially active sources shall be borne by the Contractor and all use of such materials and all operations in connection therewith shall be at the Contractor's risk. No extension of the time for completion of the work will be granted as the result of disapproval or approval of the Contractor's request to use a non-listed, non-commercially active source or sources. If not approved, the Contractor shall use materials from the applicable listed or commercially active source(s).

2.2 AS-BUILT DRAWINGS

The as-built drawing details shall be accurate and of professional quality prepared those with adequate as-built technician's qualifications.

PART 3 EXECUTION (NOT APPLICABLE)

3.1 VIDEO RECORDS

Prior to commencing any work at the project site, the Contractor shall produce video tape recordings of the conditions which exist at the project site. After the required work has been completed, a tape of the conditions at the project site shall also be produced. The physical features to be video taped shall be as indicated by the Contracting Officer's Representative at the site. Such physical features shall also include, but are not limited to, the exterior condition of all private property within 100 feet of the boundary of the required work area. The Contractor shall make every effort to obtain permission from each adjacent property owner, whose property may be affected by the construction, to enter upon the premises to make close-up video tape recordings of the exterior and interior of all structures, and upon receiving such permission shall proceed with video taping in accordance therewith. Video tape for the recording shall be of the standard full-size VHS type and shall be run at the standard or normal speed. Image recording shall be clear and provide sharp details. Every segment of tape footage shall be completely identified with either markers or title cards in the scenes, voice-over on the tape or written notes to be submitted with the tape to the Contracting Officer. Video cassettes, G shall be marked with the project name, number, date and general description of the footage.

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01101

REAL ESTATE

[03/01]

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SECTION 01101

REAL ESTATE
[03/01]

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Additional Property Agreements; G-RED.

Copies of any agreements for Contractor-acquired real estate rights for this project shall be furnished before entering thereon.

1.2 REGULATORY REQUIREMENTS

1.2.1 Real Estate Rights

Rights for the use of the Government-furnished work and storage areas have been obtained and the general limits of the areas are shown on the drawings. Copies of instruments conveying rights for use of the work and storage areas shown on the drawings and specified herein are available for inspection in the Engineering & Construction Division, Design Branch, U.S. Army Corps of Engineers, Detroit District, 477 Michigan Avenue, McNamara Building, Detroit, Michigan. Conformance to all applicable requirements of the instruments conveying rights is required. Two (2) copies of each instrument will be furnished to the Contractor. All real estate lakeward of the Ordinary High Water Mark is under Federal jurisdiction and no real estate permit or agreements are necessary for work therein.

1.2.2 Additional Real Estate Rights

Any additional property agreements and/or real estate rights desired by the Contractor shall be obtained by the Contractor at its own expense. Such agreements shall clearly relieve the Government of any responsibility for damages or liability resulting from the Contractor's use of such grounds.

1.3 PROJECT/SITE CONDITIONS

1.3.1 Location and Verification

It shall be the Contractor's responsibility to accurately locate the limits of all lands utilized under the contract. The corner and angle points of each area for which rights have been obtained shall be marked with semipermanent markers except where there is an approved existing property marker. Temporary markers shall be placed at points on alignment. The points on alignment shall be marked at stations so that intervals between points do not exceed 200 feet.

1.3.2 Survey Markers

All markers shall be installed in an area prior to its use and they shall be available for reference during and upon completion of use of the area. Where approved existing property markers are found, a witness stake, as specified in Subparagraph, "Semipermanent Markers" below, shall be provided. If the types of markers specified hereinafter cannot be used, other types, as approved by the Contracting Officer, shall be provided.

1.3.2.1 Semipermanent Markers

The markers shall be a steel rod one-half inch in diameter and four (4) feet long. The steel rod shall be driven vertically into the ground so that the top is flush with the finished ground surface. Each marker shall be witnessed by a 2" x 2" yellow stake extending two (2) feet above the ground surface and driven into the ground until stable, with not less than one (1) foot penetration.

1.3.2.2 Temporary Markers

Markers shall be 2" x 2", red-colored, wood hub stakes driven into the ground until stable (not less than one (1) foot penetration) with two (2) feet projecting above the ground surface. If the period in which temporary markers are to be in place exceeds one (1) construction season, a more permanent type of marker, as approved, shall be provided.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01130

ENVIRONMENTAL PROTECTION

-- End of Section Table of Contents --

SECTION 01130

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261	Identification and listing of Hazardous Waste

ENGINEERING MANUALS (EM)

EM 385-1-1	(3 Sept. 1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT)

MDOT 1996	(1996) Standard Specifications for Construction

1.2 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of plant or animal communities; or degrade the environment from an aesthetic, cultural or historic perspective. Environmental protection is the prevention/control of pollution and habitat disruption that may occur during construction. The control of environmental pollution and damage requires consideration of air, water, land, biological and cultural resources (archaeological and historic resources); and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive materials; and other pollutants.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G-AOF.

Submit in writing an Environmental Protection Plan within ten (10) calendar days after receipt of Notice to Proceed. See Article titled ENVIRONMENTAL

PROTECTION PLAN for details.

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contractor shall be knowledgeable of and comply with all applicable Federal, State, and local laws, regulations, permits and licenses concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations. Note any unique requirements for this contract in the environmental pollution control plan. Also see Clauses titled "CLEAN AIR AND WATER" and "PERMITS AND RESPONSIBILITIES." The Contractor shall provide environmental protective measures and procedures to prevent and control pollution, limit habitat disruption, and correct environmental damage that occurs during construction.

1.4.1 Protection of Features

This section supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. The Contractor shall prepare a list of features requiring protection under the provisions of the contract clause which are not specially identified on the drawings as environmental features requiring protection. The Contractor shall confine its activities to areas defined by the drawings and specifications. The Contractor shall protect those environmental features, indicated specially on the drawings or in the specifications, in spite of interference which their preservation may cause to the Contractor's work under the contract.

1.4.2 Permits

The Contractor shall obtain any necessary permits and licenses that have not been obtained by the Government. This section supplements the Contractor's responsibility under the contract clause PERMITS AND RESPONSIBILITIES to the extent that the Government has already obtained environmental permits.

1.4.3 Environmental Assessment of Contract Deviations

The Contract specifications have been prepared to comply with the special conditions and mitigation measures of an environmental nature which were established during the planning and development of this project. The Contractor is advised that deviations from the drawings or specifications (e.g., proposed alternate borrow areas, disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the construction methods and procedures indicated by the plans and specifications which may have an environmental impact will require a extended review, processing, and approval time by the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.5 ENVIRONMENTAL PROTECTION PLAN

The Contractor shall submit an Environmental Protection Plan for review and acceptance by the Contracting Officer. The Government will consider an interim plan for the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan not later than 30 calendar days

after receipt of the Notice to Proceed. Acceptance is conditional and is predicated upon satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes in the Environmental Protection Plan or operations if the Contracting Officer determines that environmental protection requirements are not being met. The plan shall detail the actions which the Contractor shall take to comply with all applicable Federal, State, and local laws and regulations concerning environmental protection and pollution control and abatement, as well as the additional specific requirements of this contract. The Contractor shall refer to the applicable existing environmental documentation to ensure that the natural, historic, and cultural resources specific or unique to this project are protected. Any necessary coordination with and/or notices to all interested agencies and the public have been made by the Government for environmental documentation prepared by the Government. Copies of the documents are available for review at the offices of the Detroit District, Engineering & Construction Division, Environmental Analysis Branch, 7th Floor, 477 Michigan Avenue, Detroit, MI 48226. No physical work at the site shall begin prior to acceptance of the Contractor's plan or an interim plan covering the work to be performed. The environmental protection plan shall include, but not be limited to, the following:

1.5.1 Federal, State and Local Laws and Regulations

The Contractor shall be knowledgeable of all Federal, State and local environmental laws and regulations which apply to the construction operations under the Contract and shall list any unique requirements applicable to this contract as part of the Environmental Protection Plan.

1.5.2 Spill Control Plan

The Contractor shall include as part of the Environmental Protection Plan, a Spill Control Plan. The plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by the Emergency Response and Community Right-to-Know Act or regulated under State or local laws or regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

a. The name of the individual who will be responsible for implementing and supervising the containment and cleanup.

b. Training requirements for Contractor's personnel and methods of accomplishing the training.

c. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

d. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

e. The methods and procedures to be used for expeditious contaminant cleanup.

f. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation.

This individual shall immediately notify the Contracting Officer in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity spill occurs. The plan shall contain a list of the required reporting channels and telephone numbers.

1.5.3 Recycling and Waste Minimization Plan

The Contractor shall submit a Recycling and Waste Minimization Plan as a part of the Environmental Protection Plan. The plan shall detail the Contractor's actions to comply with the following recycling and waste minimization requirements:

a. The Contractor shall participate in State and local government sponsored recycling programs to reduce the volume of solid waste materials at the source.

1.5.4 Contaminant Prevention Plan

As a part of the Environmental Protection Plan, the Contractor shall prepare a contaminant prevention statement identifying potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water, or ground. The Contractor shall detail provisions to be taken to meet Federal, State, and local laws and regulations regarding the storage and handling of these materials.

1.5.5 Environmental Monitoring

The Contractor shall include in the plan the details of environmental monitoring requirements under the laws and regulations and a description of how this monitoring will be accomplished, including, but not limited to, monitoring of land, air, and water resources, including noise, odors and vibrations.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SPECIAL ENVIRONMENTAL PROTECTION REQUIREMENTS

3.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas where the work is to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible during darkness. The Contractor shall convey to its personnel the purpose of marking and/or protection of all necessary objects.

3.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features to be preserved, indicated and defined on the drawings submitted by the Contractor as a part of the Environmental Protection Plan shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Vegetated soil surfaces disturbed by construction

activities shall be re-vegetated as soon as practicable after completing operations in the disturbed area.

3.1.2.1 Tree Protection

No ropes, cables, or guys shall be fastened to or attached to any tree(s) for anchorage unless specifically authorized by the Contracting Officer. Where such special use is permitted, the Contractor shall provide effective protection to prevent damage to the tree and other land and vegetative resources. Unless specifically authorized by the Contracting Officer, no construction equipment or materials shall be placed or used within the drip line of trees shown on the drawings to be saved. No excavation or fill shall be permitted within the drip line of trees to be saved except as shown on the drawings.

3.1.3 U.S. Department of Agriculture (USDA) Quarantined Considerations

The Contractor shall thoroughly clean all construction equipment at the prior job site in a manner that ensures all residual soil is removed and that egg deposits from plant pests are not present to prevent the spread of non-indigenous and/or pest species. The Contractor shall consult with the USDA Plant Protection and Quarantine (USDA - PPQ) jurisdictional office for additional cleaning requirements that may be necessary.

3.1.3.1 Control of Non-Indigenous Aquatic Nuisance Species

The Contractor shall conduct diligent watercraft operating practices to prevent the spread of Non-Indigent Aquatic Nuisance Species (ANS). Such practices shall include, but not be limited to, cleaning equipment on-site to prevent the spread of seeds, eggs, larvae, or other dispersal vectors (e.g. do not transport soil and plant matter from one location to another); and discharging or exchanging ballast water or other water from a vessel of any type only at a location where the chances for survival of ANS are minimal, such as at cold, deep regions of Lake Superior which are far from shore.

3.1.4 Disposal of Waste Materials

Disposal of any materials, waste, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to streams, rivers, or lakes and in areas not authorized for waste disposal shall not be permitted. If any waste material is dumped or placed in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, ground which has become contaminated through the fault or negligence of the Contractor shall be excavated, disposed of as directed by the Contracting Officer, and replaced with suitable fill material compacted and finished with topsoil and planted as required to re-establish vegetation, all at the expense of the Contractor. Disposal of waste, trash and other materials off the project site shall be in accordance with all applicable Federal, State, and local laws, rules and regulations. Removed vegetation, including trees, shall be put to beneficial reuse and not placed into landfills.

3.1.4.1 Disposal of Solid Wastes

Solid waste is rubbish, debris, waste materials, garbage, and other discarded solid materials (excluding clearing debris and hazardous waste as defined in following paragraphs). Solid waste shall be placed in containers and disposed of on a regular schedule. All handling and

disposal shall be conducted in such a way as to prevent spillage and contamination. The Contractor shall transport all solid waste off Government property and dispose in compliance with Federal, State, and local requirements. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of the landfill area.

3.1.4.2 Disposal of Chemical Waste

Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local laws, rules and regulations.

3.1.4.3 Spillages

Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, ashes, sawdust, waste washings, herbicides and insecticides, rubbish or sewage, and other pollutants from entering public waters.

3.1.5 Clearing Debris

Clearing debris is trees, tree stumps, tree trimmings, and shrubs, and leaves, vegetative matter, excavated natural materials (e.g., dirt, sand, and rock), and demolition products (e.g., brick, concrete, glass, and metals).

a. The Contractor shall collect trees, tree stumps, tree trimmings, shrubs, leaves, and other vegetative matter; and shall transport from Government property for proper disposal in compliance with Federal, State, and local requirements. The Contractor shall segregate the matter where appropriate for proper disposal. Untreated and unpainted scrap lumber may be disposed of with this debris where appropriate.

b. Demolition products shall be transported from Government property for proper disposal in compliance with Federal, State, and local requirements.

3.1.6 Disposal of Contractor Generated Hazardous Wastes

Hazardous wastes are hazardous substances as defined in 40 CFR 261, or as defined by applicable State and local regulations. Hazardous waste generated by construction activities shall be removed from the work area and be disposed in compliance with Federal, State, and local requirements. The Contractor shall segregate hazardous waste from other materials and wastes, and shall protect it from the weather by placing it in a safe covered location; precautionary measures against accidental spillage such as berming or other appropriate measures shall be taken. Hazardous waste shall be removed from Government property within 60 days. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system. A copy of the manifest shall be provided to the Contracting Officer for any hazardous waste disposed of under this contract.

3.1.7 Fuels and Lubricants

Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants and waste oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in

accordance with Federal, State, and local laws and regulations.

3.1.8 Hydrocarbons, Carbon Monoxide, and Oxides of Nitrogen and Sulfur

Vapor/gaseous emissions of hydrocarbons, carbon monoxide, oxides of nitrogen and sulfur oxides from equipment shall be controlled to Federal and State limits at all times.

3.1.9 Odors

Odors from all construction activities, processing and preparation of shall be controlled at all times.

3.1.10 Ground Vibrations

Ground vibrations from construction activities shall be controlled at all times.

3.1.11 Protection from Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize damage to the environment by noise. Construction equipment shall be fitted with noise control devices.

3.2 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

3.2.1 Discovered Historic, Archaeological, and Cultural Resources

If, during construction activities, items are observed that may have historic or archaeological value (e.g., human remains or associated objects, or artifacts are discovered), such items shall be protected in place and the observations shall be reported immediately to the Contracting Officer so that the District Archaeologist may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to, or the destruction of, these resources. The Contractor shall prevent its employees from trespassing on, removing, or otherwise disturbing such resources.

3.3 PROTECTION OF WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

3.4 PROTECTION OF FISH AND WILDLIFE RESOURCES

3.4.1 Protection of Fish, Wildlife and Flora

The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish, wildlife and flora. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning construction operations. See Subparagraph titled "Environmental Protection Plan."

3.5 PROTECTION OF AIR RESOURCES

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques

supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.5.1 Particulates

Airborne particulates, including dust particles, aerosols, and gaseous by-products from construction activities and processing and preparation of materials, shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas free from airborne dust which would cause a hazard or nuisance.

3.6 INSPECTION

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall inform the Contracting Officer of proposed corrective action and take such action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed pollution control facilities and portable pollution control devices for the duration of the Contract or for the length of time construction activities create the particular pollutant.

3.8 TRAINING OF CONTRACTOR PERSONNEL

Contractor personnel shall be trained in environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel monthly. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, installation and care of facilities (vegetative covers, etc.), and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control. Anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants, shall also be discussed. Other items required to be discussed shall include recognition and protection of archaeological sites, artifacts, and historic structures.

3.9 POST CONSTRUCTION CLEANUP OR OBLITERATION

The Contractor shall obliterate all signs of temporary facilities such as haul roads, work area, structures, stock piles of excess or waste materials, fencing, buoys, stakes, or other vestiges of construction within the work, storage and access areas or as directed by the Contracting Officer. Except for surfaced areas, the areas shall be restored to near natural conditions which will permit the growth of vegetation thereon. In areas where restoration to near natural conditions is not required,

surfaces shall be evenly and smoothly dressed, sloped to drain, and the edges of the restored area graded to be flush with the surrounding existing grade even if original contours are not restored. All damaged non-surfaced areas shall be restored by topsoiling, fertilizing, seeding and mulching, unless otherwise specified or directed. The topsoiling, fertilizing, seeding, and mulching shall be in accordance with the applicable provisions of MDOT 1996, DIVISION 8, Section 816 "Turf Establishment"." Dune grass planting shall be in accordance with MDOT 1996, Section 818, Dune Grass Planting.

3.10 RESTORATION OF LANDSCAPE

The Contractor shall restore all landscape features damaged of destroyed during construction operations outside the limits of the approve work areas. Such restoration shall be in accordance with the Contractor's submitted plan, as approved by the Contracting Officer. The work shall be accomplished at the Contractor's expense.

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SECTION 01270A

MEASUREMENT AND PAYMENT

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SECTION 01270A

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

1.1.1 General

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.1.2 Lump Sum Item

Not Applicable

1.2 UNIT PRICE PAYMENT ITEMS

1.2.1 General

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.2.2 Unit Price Items

a. "Service Relocation" [Item No. 0001]

(1) Payment will be made for costs associated with removing existing water, sewer, or watermain service pipe and installation of new water, sewer, or watermain service pipe relocated around the proposed storm sewer. All work shall be in accordance with Section 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES.

(2) Unit of measure: Each

b. "24 inch Headwall" [Item No. 0002]

(1) Payment will be made for costs associated with installation of concrete headwall and placement of riprap as shown on the plans. All work shall be in accordance with Sections 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02230a, CLEARING AND GRUBBING, 02921a, SEEDING, 02300a, EARTHWORK, 02378a, GEOTEXTILES USED AS FILTERS, 02630a, STORM-DRAINAGE SYSTEM, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, and 03307a, CONCRETE FOR MINOR STRUCTURES.

(2) Unit of measure: Each

c. "48 inch Headwall" [Item No. 0003]

(1) Payment will be made for costs associated with installation of concrete headwall and placement of riprap as shown on the plans. All work shall be in accordance with Sections 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02230a, CLEARING AND GRUBBING, 02921a, SEEDING, 02300a, EARTHWORK, 02378a, GEOTEXTILES USED AS FILTERS, 02630a, STORM-DRAINAGE SYSTEM, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, and 03307a, CONCRETE FOR MINOR STRUCTURES.

(2) Unit of measure: Each

d. "48 inch Drainage Structures" [Item No. 0004]

(1) Payment will be made for costs associated with demolition and excavation of existing structure which includes flowable fill to abandon sewer pipe, constructing drainage structures including concrete footing and drainage structure cover, drainage structure taps, cleanout, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 02220a, DEMOLITION, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, 03307a, CONCRETE FOR MINOR STRUCTURES, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, and 03307a, CONCRETE FOR MINOR STRUCTURES.

(2) Unit of measure: Each

e. "60 inch Drainage Structures" [Item No. 0005]

(1) Payment will be made for costs associated with demolition and excavation of existing structure which includes flowable fill to abandon sewer pipe, constructing drainage structures including concrete footing and drainage structure cover, drainage structure taps, cleanout, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 02220a, DEMOLITION, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a,

STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, and 03307a, CONCRETE FOR MINOR STRUCTURES.

(2) Unit of measure: Each

f. "72 inch Drainage Structures" [Item No. 0006]

(1) Payment will be made for costs associated with demolition and excavation of existing structure which includes flowable fill to abandon sewer pipe, constructing drainage structures including concrete footing and drainage structure cover, drainage structure taps, cleanout, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 02220a, DEMOLITION, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, 03200a, CONCRETE REINFORCEMENT, and 03307a, CONCRETE FOR MINOR STRUCTURES.

(2) Unit of measure: Each

g. "Install 12 inch Sewer Pipe" [Item No. 0007]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

h. "Install 15 inch Sewer Pipe" [Item No. 0008]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N,

PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

i. "Install 18 inch Sewer Pipe" [Item No. 0009]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

j. "Install 21 inch Sewer Pipe" [Item No. 0010]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

k. "Install 24 inch Sewer Pipe" [Item No. 0011]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a,

CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

l. "Install 30 inch Sewer Pipe" [Item No. 0012]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

m. "Install 36 inch Sewer Pipe" [Item No. 0013]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

n. "Install 42 inch Sewer Pipe" [Item No. 0014]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

o. "Install 48 inch Sewer Pipe" [Item No. 0015]

(1) Payment will be made for costs associated with excavation of pavement, curb and gutter, and sidewalk, placement of storm sewer, backfilling, pavement replacement, curb and gutter replacement, sidewalk replacement, and site restoration. All work shall be in accordance with Sections 002230a, CLEARING AND GRUBBING, 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES, 02630a, STORM-DRAINAGE SYSTEM, 02721a, SUBBASE COURSES, 02722a, AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE, 02741a, HOT-MIX ASPHALT (HMA) FOR ROADS, 02748a, BITUMINOUS COATS, 02761N, PAVEMENT MARKING, 02770a, CONCRETE SIDEWALK AND CURBS AND GUTTER, 02921a, SEEDING, and 02980a, PATCHING OF RIGID PAVEMENT, 03150a, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOP, and 03200a, CONCRETE REINFORCEMENT.

(2) Unit of measure: Feet

p. "Rock Excavation: First 3730 CYD and Over 3730 CYD" [Item No. 0016]

(1) Payment will be made for costs associated with removal of rock material from the excavation area, including loose and scattered rocks and boulders incidental to excavation activities. All work shall be in accordance with Section 02300a, EARTHWORK.

(2) Unit of measure: CYD

q. "Rip Rap" [Item No. 0017]

(1) Payment will be made for costs associated with placement of rip rap as indicated on the drawings. All work shall be in accordance with Section 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES.

(2) Unit of Measure = CYD

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01312A

QUALITY CONTROL SYSTEM (QCS)

08/01

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SECTION 01312A

QUALITY CONTROL SYSTEM (QCS)
08/01

1.1 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01320A, PROJECT SCHEDULE, Section 01330, SUBMITTAL PROCEDURES, and Section 01451A, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

Hardware

IBM-compatible PC with 500 MHz Pentium or higher processor

128+ MB RAM for work station/ 256+MB RAM for server.

4 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact disk (CD) Reader 8X speed or higher

SVGA or higher resolution monitor (1024X768, 256 colors)

Mouse or other pointing device.

Windows compatible printer. (Laser printer must have 4 MB+ of RAM)

Connection to the Internet, minimum 256k BPS

Software

MS Windows 98, ME, NT, or 2000

Word Processing software compatible with MS Word 97 or newer

Latest version of; Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher

The Contractor's computer system shall be protected by virus protection software that is regularly upgraded with all issued manufacturer's updates throughout the life of the contract.

Electronic mail (E-mail) MAPI compatible.

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control(CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective

of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451A, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports.

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451A, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking.

The Contractor shall use QCS to track deficiencies. Deficiencies

identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking.

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.6.4 Submittal Management

The Government will provide the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts", or Section 01320A, PROJECT SCHEDULE, as applicable. This schedule shall be input and maintained in the QCS database either manually

or by using the Standard Data Exchange Format (SDEF) (see Section 01320A PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be

returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

-- End of Section --

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SECTION 01330

SUBMITTAL PROCEDURES
05/02

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Government-Furnished Information

Submittal register [database and submittal management program] will be delivered to the contractor, by contracting officer [on 3 1/2 inch disk]. Register[database] will have the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-04 Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal. A "G" indicates approval by contracting officer; a blank indicates approval by QC manager.

[The database and submittal management program will be extractable from the disk furnished to contractor, for operation on contractor's IBM compatible personal computer with 640kb RAM, a hard drive, and 3 1/2 inch high density floppy disk drive.]

1.2 DEFINITIONS

1.2.1 Submittal

Shop drawings, product data, samples, operation and maintenance data,and administrative submittals presented for review and approval. Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.2.2 Types of Submittals

All submittals are classified as indicated in paragraph "Submittal Descriptions (SD)". Submittals also are grouped as follows:

a. Shop drawings: As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this contract, by contractor or through contractor by way of subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate portion of work.

b. Product data: Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate portion of work, but not prepared exclusively for this contract.

c. Samples: Physical examples of products, materials, equipment, assemblies, or workmanship that are physically identical to portion of work, illustrating portion of work or establishing standards for evaluating appearance of finished work or both.

d. Operation and Maintenance (O&M) Data:
Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item. The data is required when the item is delivered to the project site.

e. Administrative submittals: Data presented for reviews and approval to ensure that administrative requirements of project are adequately met but not to ensure directly that work is in accordance with design concept and in compliance with contract documents.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal register.
Schedule of values.
Health and safety plan.
Work plan.
Quality control plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further

quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

1.3.1 Approving Authority

Person authorized to approve submittal.

1.3.2 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.4 SUBMITTALS

Submit the following in accordance with the requirements of this section.

SD-01 Preconstruction Submittals

Submittal register; G

1.5 USE OF SUBMITTAL REGISTER [DATABASE]

Prepare and maintain submittal register, as the work progresses.[Use electronic submittal register program furnished by the Government or any other format.] Do not change data which is output in columns (c), (d), (e), and (f) as delivered by government; retain data which is output in columns (a), (g), (h), and (i) as approved.

1.5.1 Submittal Register

Submit submittal register[as an electronic database, using submittals management program furnished to contractor]. Submit with quality control plan and project schedule required by Section 01450N, "Quality Control" and [Section 01321N, "Network Analysis Schedules."] [Section 01320N, "Construction Progress Documentation."] Do not change data in columns (c), (d), (e), and (f) as delivered by the government. Verify that all submittals required for project are listed and add missing submittals. Complete the following on the register[database]:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving

authority to receive submittals.

Column (h) Contractor Approval Date: Date contractor needs approval of submittal.

Column (i) Contractor Material: Date that contractor needs material delivered to contractor control.

1.5.2 Contractor Use of Submittal Register

Update the following fields[in the government-furnished submittal register program or equivalent fields in program utilized by contractor].

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.5.3 Approving Authority Use of Submittal Register

Update the following fields[in the government-furnished submittal register program or equivalent fields in program utilized by contractor].

Column (b).

Column (l) List date of submittal receipt.

Column (m) through (p).

Column (q) List date returned to contractor.

1.5.4 Contractor Action Code and Action Code

Entries used will be as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.5.5 Copies Delivered to the Government

Deliver one copy of submitted register updated by contractor to government with each invoice request. [Deliver in electronic format, unless a paper copy is requested by contracting officer.]

1.6 PROCEDURES FOR SUBMITTALS

1.6.1 Reviewing, Certifying, Approving Authority

QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates contracting officer is approving authority for that submittal item.

1.6.2 Constraints

a. Submittals listed or specified in this contract shall conform to provisions of this section, unless explicitly stated otherwise.

b. Submittals shall be complete for each definable feature of work; components of definable feature interrelated as a system shall be submitted at same time.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.6.3 Scheduling

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

b. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least [15] [_____] working days for submittals for QC Manager approval and [20] [_____] working days for submittals for contracting officer approval. Period of review for submittals with contracting officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

c. For submittals requiring review by fire protection engineer, allow review period, beginning when government receives submittal from QC organization, of [30] [_____] working days for return of submittal to the contractor. Period of review for each resubmittal is the same as for initial submittal.

1.6.4 Variations

Variations from contract requirements require Government approval pursuant to contract Clause entitled "FAR 52.236-21, Specifications and Drawings for Construction" and will be considered where advantageous to government.

1.6.4.1 Considering Variations

Discussion with contracting officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

1.6.4.2 Proposing Variations

When proposing variation, deliver written request to the contracting officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to government. If lower cost is a benefit, also include an estimate of the cost saving. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.6.4.3 Warranting That Variations Are Compatible

When delivering a variation for approval, contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.6.4.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of [10] [_____] working days will be allowed for consideration by the Government of submittals with variations.

1.6.5 Contractor's Responsibilities

a. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and contract documents.

b. Transmit submittals to QC organization in accordance with schedule on approved Submittal Register, and to prevent delays in the work, delays to government, or delays to separate contractors.

c. Advise contracting officer of variation, as required by paragraph entitled "Variations."

d. Correct and resubmit submittal as directed by approving authority. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the contractor shall provide copy of that previously submitted transmittal including all reviewer comments for use by approving authority. Direct specific attention in writing or on resubmitted submittal, to revisions not requested by approving authority on previous submissions.

e. Furnish additional copies of submittal when requested by contracting officer, to a limit of 20 copies per submittal.

f. Complete work which must be accomplished as basis of a submittal in time to allow submittal to occur as scheduled.

g. Ensure no work has begun until submittals for that work have been returned as "approved," or "approved as noted", except to the extent that a portion of work must be accomplished as basis of submittal.

1.6.6 QC Organization Responsibilities

a. Note date on which submittal was received from contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Actions Possible."

(2) When contracting officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is contracting officer, QC organization will certify submittals forwarded to contracting officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number [_____], is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____"
(Signature)

(2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number [_____], is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

h. Update submittal register [database]as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by contracting officer.

i. Retain a copy of approved submittals at project site, including contractor's copy of approved samples.

1.6.7 Government's Responsibilities

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received from QC manager, on each submittal for which the contracting officer is approving authority.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled "Actions Possible" and with markings appropriate for action indicated.

1.6.8 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required , does not have evidence of being reviewed and approved by contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by contractor or for being incomplete, with appropriate action, coordination, or change.

b. Submittals marked "approved" "approved as submitted" authorize contractor to proceed with work covered.

c. Submittals marked "approved as noted" or "approval except as noted; resubmission not required" authorize contractor to proceed with work as noted provided contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is approved.

1.7 FORMAT OF SUBMITTALS

1.7.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to office of approving authority. Transmit submittals with transmittal form

prescribed by Contracting Officer and standard for project. The transmittal form shall identify Contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.7.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Section number of the specification section by which submittal is required.

d. Submittal description (SD) number of each component of submittal.

e. When a resubmission, add alphabetic suffix on submittal description, for example, SD-10A, to indicate resubmission.

f. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier contractor associated with submittal.

g. Product identification and location in project.

1.7.3 Format for Shop Drawings

a. Shop drawings shall not be less than 8 1/2 by 11 inches nor more than 30 by 42 inches.

b. Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled "Identifying Submittals."

d. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Shop drawing dimensions shall be the same unit of measure as indicated on the contract drawings. Identify materials and products for work shown.

1.7.4 Format of Product Data

a. Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project.

1.7.5 Format of Samples

a. Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

(1) Sample of Equipment or Device: Full size.

(2) Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

(3) Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

(4) Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

(5) Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.

(6) Color Selection Samples: 2 by 4 inches.

(7) Sample Panel: 4 by 4 feet.

(8) Sample Installation: 100 square feet.

b. Samples Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range.

c. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.

d. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

e. When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.7.6 Format of Operation and Maintenance (O&M) Data

a. O&M Data format shall comply with the requirements specified in Section 01781, Operation and Maintenance Data"

1.7.7 Format of Administrative Submittals

a. When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do

not apply contractor's approval stamp to document, but to a separate sheet accompanying document.

1.8 QUANTITY OF SUBMITTALS

1.8.1 Number of Copies of Shop Drawings

a. Submit [six] [_____] copies of submittals of shop drawings requiring review and approval only by QC organization and [seven] [_____] copies of shop drawings requiring review and approval by Contracting Officer. 1.8.2 Number of Copies of Product Data

Submit product data in compliance with quantity requirements specified for shop drawings.

1.8.3 Number of Samples

a. Submit [two] [_____] samples, or [two] [_____] sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to contractor.

b. Submit one sample panel. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.8.4 Number of Copies of Operation and Maintenance Data

Submit [Five][three][_____] copies of O&M Data to the Contracting Officer for review and approval

1.8.5 Number of Copies of Administrative Submittals

a. Unless otherwise specified, submit administrative submittals compliance with quantity requirements specified for shop drawings.

1.9 FORWARDING SUBMITTALS

1.9.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement of fabrication, forward to the [Commander, LANTNAVFACENGCOM, Code CI4A1, 1510 Gilbert Street, Norfolk, Virginia, 23511-2699] [Architect-Engineer: [_____],] submittals required in the technical sections of this specification, including shop drawings, product data and samples. One copy of the transmittal form for all submittals shall be forwarded to the Resident Officer in Charge of Construction.

[The Architect-Engineer for this project] [LANTNAVFACENGCOM] will review and provide surveillance for the Contracting Officer to verify Contractor-approved submittals comply with the contract requirements.

[The Architect-Engineer for this project] [LANTNAVFACENGCOM] will review and approve for the Contracting Officer those submittals reserved for

Contracting Officer approval to verify submittals comply with the contract requirements.

1.9.1.1 O&M Data

[The Architect-Engineer for this project] [LANTNAVFACENGCOM] will review and approve for the Contracting Officer O&M Data to verify the submittals comply with the contract requirements.; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

a. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

[1.9.1.2 Submittals Reserved for LANTNAVFACENGCOM Approval

As an exception to the standard submittal procedure specified above, submit the following to the Commander, LANTNAVFACENGCOM, Code CI4A1, 1510 Gilbert Street, Norfolk, Virginia 23511-2699:

[a. Section [_____], "[_____]": Pile driving records]

[b. Section [_____], "[_____]": All fire protection system submittals]

[c. Section [_____], "[_____]": All fire alarm system submittals]

[d. Section 15901, "Space Temperature Control Systems": SD-06 field test report submittals]

[e. Section 15910N, "Direct Digital Control Systems": SD-06 field test report submittals]

[f. Section 15950N, "HVAC Testing/Adjusting/Balancing": All submittals]

[g. Section 15951N, "Testing Industrial Ventilation Systems": All submittals]

[h. Section 16272N, "Three-Phase Pad Mounted Transformers": All submittals]

[i. Section 16273N, "Single-Phase Pad Mounted Transformers": All submittals]

[j. Section 16301N, "Overhead Transmission and Distribution": Transformer submittals]

[k. Section 16360N, "Secondary Unit Substations": Transformer submittals

[l. Section 16361N, "Primary Unit Substations": Transformer submittals]
][1.9.1.3 Overseas Shop Drawing Submittals

All submittals shall be sent via overnight express mail service. All costs associated with the overnight express mail service shall be borne by the construction contractor. Costs associated with the overnight express mail

of submittals related to proposed submittal variances of resubmittals necessary as a result of noncompliant or incomplete contractor submittals shall be the responsibility of the contractor.

]1.10 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.10.1 Designer of Record Approved

Designer of Record approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". The Contractor shall provide the Government the number of copies designated hereinafter of all Designer of Record approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation and Accepted Proposal. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below. Design submittals shall be in accordance with Section 01012 DESIGN AFTER AWARD. Generally, design submittals should be identified as SD-05 DESIGN DATA submittals.

1.10.2 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Government approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer.
Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.10.3 Government Reviewed Design or Extension of Design

The Government will review all (___%) and (__%) design submittals for conformance with the technical requirements of the solicitation. Section 01012 DESIGN AFTER AWARD covers the design submittal and review process in detail. Government review is required for extension of design construction submittals, used to define contract conformity, and for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain contract compliance. The Government may, but is not required, to review extensions of design such as structural steel or reinforcement shop drawings.

1.10.4 Information Only

All submittals not requiring Government approval will be for information only.All submittals not requiring Designer of Record or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.
All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.11 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for [dimensions, the design of adequate connections and details, and the satisfactory construction of all work][design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work.] . After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.12 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal.The Contractor shall make all corrections required by the Contracting Officer, obtain the Designer of Record's approval when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any "information only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal shall be resubmitted as one requiring "approval" action, requiring both Designer of Record and Government approval. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.13 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.14 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System ManagerQuality Control (CQC) System Manager and the Designer of Record, if applicable, and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly

identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.15 SUBMITTAL REGISTER

At the end of this section is a submittal [register] [list] showing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. [The Contractor shall maintain a submittal register for the project in accordance with Section 01312A QUALITY CONTROL SYSTEM (QCS).][The Government will provide the initial submittal register in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall track all submittals.]

The Designer of Record shall develop a complete list of submittals during design. The Designer of Record shall identify required submittals in the specifications, and use the list to prepare the Submittal Register. The list may not be all inclusive and additional submittals may be required by other parts of the contract. The Contractor is required to complete the submittal register and submit it to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The submit dates and need dates used in the submittal register shall be coordinated with dates in the Contractor prepared progress schedule. Updates to the submittal register showing the Contractor action codes and actual dates with Government action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the submittal register shall also be revised and both submitted for approval.

1.16 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of [_____] calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. An additional [_____] calendar days shall be allowed and shown on the register for review and approval of submittals for [food service equipment] [and] [refrigeration and HVAC control systems].

1.17 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only

submittals in accordance with the instructions on the reverse side of the form. These forms [will be furnished to the Contractor][are included in the QCS software that the Contractor is required to use for this contract]. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.18 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.18.1 Procedures

[_____] [_____][The Government will further discuss detailed submittal procedures with the Contractor at the [Preconstruction Conference][Post-Award Conference].

1.18.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.19 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.20 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. [_____] copies of the submittal will be retained by the Contracting Officer and [_____] copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

1.21 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. For design-build construction the Government will retain [_____] copies of information only submittals.

1.22 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR (Firm Name)   _____ Approved _____ Approved with corrections as noted on submittal data and/or attached sheets(s).   SIGNATURE: _____ TITLE: _____ DATE: _____

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record shall stamp and sign to certify that the submittal meets contract requirements.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

08/02

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS
08/02

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B 564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number.

ALUMINUM ASSOCIATION (AA)

900 19th Street N.W.
Washington, DC 20006
Ph: 202-862-5100
Fax: 202-862-5164
Internet: http://www.aluminum.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 N. Capital St., NW, Suite 249
Washington, DC 20001
Ph: 800-231-3475 202-624-5800
Fax: 800-525-5562 202-624-5806
Internet: http://www.aashto.org

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)
222 West Las Colinas Blvd., Suite 641
Irving, TX 75039-5423
Ph: 972-506-7216 or 800-290-2272
Fax: 972-506-7682
Internet: http://www.concrete-pipe.org
e-mail: info@concrete-pipe.org

AMERICAN WATER WORKS ASSOCIATION(AWWA)
6666 West Quincy
Denver, CO 80235
Ph: 800-926-7337 - 303-794-7711
Fax: 303-794-7310

Internet: http://www.awwa.org

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
Internet: http://www.amweld.org

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)
8 S. Michigan Ave, Suite 1000
Chicago, IL 60603
Ph: 312-322-0405
Fax: 312-332-0706
Internet: http://www.naamm.org
e-mail: naamm@gss.net

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
Ph: 617-770-3000
Fax: 617-770-0700
Internet: http://www.nfpa.org

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)
400 Commonwealth Dr.
Warrendale, PA 15096-0001
Ph: 724-776-4841
Fax: 724-776-5760
Internet: http://www.sae.org
e-mail: custsvc@sae.org

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)
2655 Villa Creek Dr., Suite 155
Dallas, TX 75234
Ph: 214-243-3902
Fax: 214-243-3907
Internet: http://www.uni-bell.org
e-mail: info@uni-bell.org

U.S. ARMY CORPS OF ENGINEERS (USACE)

Order CRD-C DOCUMENTS from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services Branch, TIC
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
Ph: 601-634-2664
Fax: 601-634-2388
Internet: http://www.wes.army.mil/SL/MTC/handbook/handbook.htm

Order Other Documents from:
USACE Publications Depot
Attn: CEIM-SP-D
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081

Fax: 301-394-0084
Internet: http://www.usace.army.mil/publications
or http://www.hnd.usace.army.mil/techinfo/index.htm

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION [01451]

CONTRACTOR QUALITY CONTROL

[03/01]

-- End of Section Table of Contents --

SECTION [01451]

CONTRACTOR QUALITY CONTROL
[03/01]

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1995) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock Used in Engineering Design and Construction
ASTM E 329	(1995c) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Plan; G-

At least ten (10) calendar days prior to commencing work submit a Quality Control Plan.

Preparatory Inspection Checklist

Within 48 hours after any preparatory phase meeting submit the original preparatory inspection checklist.

Initial Inspection Checklist

Within 48 hours after any preparatory phase meeting submit the original

preparatory inspection checklist.

Daily Inspection Reports

Within 24 hours following any previous calendar day submit the original daily inspection report.

CQC System Manager; G-

At least ten (10) calendar days prior to commencing work submit the qualification of the CQC manager.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with Clause titled "INSPECTION OF CONSTRUCTION." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of Clause titled "INSPECTION OF CONSTRUCTION." The plan shall identify personnel, procedures, control, instructions, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. Information required in the paragraph titled "IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SUSTEM (RMS)" shall be incorporated into the Contractor's Quality Control plan, as applicable.

b. A description of the quality control organization, including a

chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project superintendent.

c. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

d. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters shall also be furnished to the Government.

e. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators suppliers, and purchasing agents. These procedures shall be in accordance with SECTION 01330, "SUBMITTAL PROCEDURES".

f. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

g. Procedures for tracking preparatory, initial, and follow-up control phases, including documentation.

h. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

i. Reporting procedures, including proposed reporting formats.

j. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may be generally considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list shall be as agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in its CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

Immediately after adjournment of the required Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC plan shall be submitted in draft form for a review a minimum of 3 working days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, administration of the system for both on-site and off-site work, and the interrelationship of the Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government and are to be signed by both the Contractor and the Contracting Officer or the Contracting Officer's Representative. The minutes shall be separate from the Preconstruction Conference minutes and shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.3.1 Finalize CQC Plan

Immediately following the Preconstruction Conference, the Contractor shall finalize the CQC plan, taking into account comments made at the conference, and shall formally submit the CQC plan for acceptance. The Contractor shall allow up to 10 calendar days for review and acceptance of the finalized submittal.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the on site work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be a construction person with a minimum of 3 years in related work. This CQC system manager shall be on site at all times during construction and shall be employed by the prime Contractor The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for

the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: [electrical], [mechanical], [civil], [structural], [environmental], [architectural], [materials technician,] [submittals clerk], [occupied family housing coordinator]. These individuals [shall be directly employed by the prime Contractor] [may be employees of the prime or subcontractor]; shall be responsible to the CQC System Manager; shall be physically present at the construction site during work on their areas of responsibility; and shall have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals [shall have no other duties other than quality control.] [may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.]

Experience Matrix

Area	Qualifications
a. Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience.
b. Mechanical	Graduate Mechanical Engineer with 2 years experience or person with 5 yrs related experience.
c. Electrical	Graduate Electrical Engineer with 2 yrs related experience or person with 5 yrs related experience.
d. Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience.
e. Architectural	Graduate Architect with 2 yrs experience or person with 5 yrs related experience.
f. Environmental	Graduate Environmental

Engineer with 3 yrs experience.

g. Submittals Submittal Clerk with 1 year expereince.

h. Occupied family housing Person, customer relations, typing, coordinator experience.

i. Concrete, Pavements, and Soils Materials Technician with 2 yrs experience for the appropriate area.

3.4.4 Additional Requirements

In addition to the above experience and education requirements the CQC System Manager shall have completed the course titled "Construction Quality Management For Contractors". This course is periodically offered at one or more of the Area Offices within the District.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times that the work related to the applicable skill is ongoing. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be as specified in SECTION 01330,titled "SUBMITTAL PROCEDURES". The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC system manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been

tested, submitted, and approved.

d. Review of provisions have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 24 hours in advance of beginning any of the required action of the preparatory control phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by a completed Preparatory Inspection Checklist and by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. A completed initial inspection checklist

of this phase shall be prepared by the CQC system manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Implementation of Government Resident Management System (RMS)

The Contractor shall utilize the Government-furnished CQC Management Report, NCE Form 63 for its daily reports. (Copy enclosed in SECTION 01999). Other Contractor desired reporting forms may be used in addition to this form. The Contractor shall use a government-furnished RMS CQC computer module for managing the quality control for this project.

3.6.5 Additional Preparatory and Initial Phases

Additional preparatory and initial phases may be conducted on the same definable features of work as determined by the Government if the quality of on-going work is unacceptable; or if there are changes in the applicable QC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedures

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test, shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $3,000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

At the completion of all work the CQC system manager shall conduct an

inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph "DOCUMENTATION" below, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final Inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied, A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptable complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain Daily Inspection Reports of quality control operations, activities, and tests performed, including the work of subcontractors. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed today, giving location, description, and by whom. For dredging projects, the report shall always include the character

and types of materials removed. Whenever there is a significant change in the materials, the location of such change shall be included in the reports.

d. Control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site, with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Identify submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. List instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that the workmanship complies with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s)covered by the report, except that reports need not be submitted for days on which no work is performed. All calendar days shall be accounted for throughout the life of the contract. The first report following a period of no work shall be for that day and all the no-work days since the last reported work day. Reports shall be sequentially numbered for this project, signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms for the CQC Management Report, Preparatory Inspection Checklist, Initial Inspection Checklist, and other required reports and plans are enclosed in SECTION 01999. The Contractor shall tailor the checklists to include all reporting and quality control requirements specific to this project.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order

stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor or subcontractor.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION [12345]

LISTING OF ENCLOSED DOCUMENTS, EXHIBITS AND OTHER ATTACHEMENT

[03/01]

-- End of Section Table of Contents --

SECTION [12345]

LISTING OF ENCLOSED DOCUMENTS, EXHIBITS AND OTHER ATTACHEMENT
[03/01]

PART 1 GENERAL

1.1 ENCLOSURES

This Section contains documents referenced in other Sections of the specifications. They are consolidated in this Section for the convenience of the Contractor and the Government. The Contractor may reproduce the enclosed forms for its use or obtain a supply of the forms from the Contracting Officer.

TITLE

CONSTRUCTION QUALITY MANAGEMENT REPORT - NCE FORM 63, 6 MAY 77. (2 Sides)

PREPARATORY INSPECTION CHECKLIST (3 SIDES)

INITIAL INSPECTION CHECKLIST (2 SIDES)

ACCIDENT PREVENTION PROGRAM ACTIVITY HAZARD ANALYSIS- NCE FORM 129, 6 JUNE 1986.

RESIDENT MANAGEMENT SYSTEM FORMS (SAMPLES)

A. CURRENT ACTIVITY SUMMARY (SMPL)

B. INITIAL INSPECTION WORKSHEET

C. PREPARATORY INSPECTION WORKSHEET

D. CONTRACTOR QUALITY CONTROL REPORT (QCR)

E. TRANSMITTAL SHEET (4025-R)

RMS CORRESPONDENCE CODES

SUBMITTAL REGISTER - ENG FORM 4288, MAY 91

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATIONS OF COMPLIANCE ENG FORM 4025, MAY 91 (2 SIDES)

GENERAL DECISION NO. MI030095

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

CONSTRUCTION QUALITY CONTROL MANAGEMENT

DATE_____ REPORT_____
CONTRACTOR _____ CONTRACT NO._____
PROJECT NAME _____ LOCATION _____
WEATHER TYPE_____ TEMP. MAX_____ MIN_____ RAINFALL_____ GAGE READING_____
EMPLOYEES: SUPV._____SKILLED_____ LABORERS_____LENGTH OF SHIFT _____HR_____

WORK RESPONSIBILITY: NAME (PRIME OR SUBCONTRACTOR) AND AREA OF RESPONSIBILITY .
A._____

B. _____

C. _____

D. _____

E. _____

WORK PERFORMED TODAY: (LOCATION, DESCRIPTION, QUANTITY AND RESPONSIBILITY BY LETTER REFERENCE
(Relate to Items on the Progress Chart or CPM)

INSPECTION: (DESCRIPTION OF INSPECTION AND LOCATION. INCLUDE OFF-SITE, MATERIALS AND EQUIPMENT INSPECTION.)

A. PREPARATORY PHASE:

B. INITIAL PHASE:

C. CONTINUOUS PHASE:

RESULTS OF INSPECTION: (INCLUDE FINDINGS, DEFICIENCIES OBSERVED & CORRECTIVE ACTION)

NCE FORM 63 EDITION OF 22 JUNE 76 IS OBSOLETE
6 MAY 77

RESULTS OF SURVEILLANCE CONTINUED:

_____

TEST PERFORMED: TYPE, LOCATION, RESULTS INCLUDING FAILURES & REMEDIAL ACTION, (ATTACH COPY OF TEST REPORT OR NOTATION WHEN IT WILL BE FURNISHED.)

_____

WORK ITEMS BEHIND SCHEDULE: REASON, EFFECT ON PROGRESS SCHEDULE AND ACTION TAKEN.

_____

JOB SAFETY: (REPORT CONDITIONS, DEFICIENCIES, CORRECTIVE ACTION & RESULTS.)

_____

REMARKS: LIST ATTACHMENT AND OTHER MANAGEMENT ACTIONS TAKEN TO ASSURE QUALITY CONSTRUCTION

IF INSPECTION & RESULTS ARE NOT LISTED THEN IT IS ASSUMED THAT QUALITY CONTROL IS NOT BEING IMPLEMENTED.
THE ABOVE REPORT IS COMPLETE AND CORRECT AND ALL MATERIALS & SUPPLIES INCORPORATED IN THE WORK ARE IN COMPLIANCE WITH THE TERMS OF THE CONTRACT EXCEPT AS NOTED:

_____
CONTRACTOR'S APPROVED REPRESENTATIVE SIGNATURE

PREPARATORY INSPECTION CHECKLIST

CONTRACT NO:_____ DATE:_____

TITLE:_____ SPECS. SECTION:_____

MAJOR DEFINABLE SEGMENT OF WORK:_____

A. PERSONNEL PRESENT:

	NAME	POSITION	COMPANY
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____

B. TRANSMITTAL INVOLVED:

	NUMBER & ITEM	CODE	CONTRACTOR OR GOVERNMENT APPROVAL
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

PREPARATORY INSPECTION CHECKLIST

B-I. Have all items involved been approved Yes_____ No_____

B-II. What item have not been approved?

	ITEM	STATUS
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

C. Are all materials on hand? Yes_____No_____

C-I. Are all materials on hand accordance with approvals? Yes_____No_____

C-II. Items not on hand or not in accordance with transmittals:

1. _____
2. _____
3. _____
4. _____

D. Test required in accordance with contract requirements:

	TEST	PARAGRAPH
1.	_____	_____
2.	_____	_____
3.	_____	_____

PREPARATORY INSPECTION CHECKLIST

E. ACCIDENT PREVENTION PREPLANNING – HAZARD CONTROL MEASURES:

E-1 Applicable Outlines)Attach completed copies):

1. _____
2. _____
3. _____
4. _____
5. _____

E-II Operational Equipment Checklist

ATTACHED FOR:

1. _____
2. _____
3. _____

ON FILE FOR:

1. _____
2. _____
3. _____

_____
QUALITY CONTROL – PRIME CONTRACTOR

INITIAL INSPECTION CHECKLIST

CONTRACT NO: _____ DATE: _____

Description and Location of Work Inspected: _____

_____ Specs. Section:_____

REFERENCE CONTRACT DRAWING:

_____

A. PERSONNEL PRESENT :

	NAME	POSITION	COMPANY
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____

B. MATERIALS BEING USED ARE IN STRICT COMPLIANCE WITH THE CONTRACT PLANS

AND SPECIFICATION: YES_____ NO_____

IF NOT,EXPLAIN:_____

_____

_____

INITIAL INSPECTION CHECKLIST

C. PROCEDURES AND WORK METHODS WITNESSED ARE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS: YES____ NO_____
IF NOT, EXPLAIN: _____

D. WORKMANSHIP IS ACCEPTABLE: YES_____ NO _____ STATE AREAS WHERE IMPROVEMENT IS NEEDED: _____

E. SAFETY VIOLATIONS AND CORRECTIVE ACTION TAKEN: _____

_____
QUALITY CONTROL REPRESENTATIVE

ACCIDENT PREVENTION PROGRAM
ACTIVITY HAZARD ANALYSIS

Page of

1. Contract No.	2. Project	3. Facility
4. Date	5. Location	6. Estimated Start Date

7. Item	8. Phase of Work	9. Safety Hazard	10. Precautionary Action Taken

11. Contractor (Signature & Date)

12. Report discussed with contractor/ superintendent on	13. Contracting Officer (Signature & Date)

US Army Corps of Engineers

Current Activity Summary

08 Jul 2002

Project Name: Repair of North & South Piers, Baloney Harbor, MI
Contract Number: DACW35-02-C-####

Location Name

Activity Number	Activity Description	QUANTITY	UNIT PRICE	AMOUNT
CLIN 0001	***North and South Pier Repairs***	***1***	***$3,437,787.18 / LS***	***$3,437,787.18***
1001	Bonds			$49,136.00
1002A	Prepare & Mobilize Equipment			$94,864.00
1002B	Prepare Site			$72,500.00
1002C	Office Trailers & Utilities			$22,500.00
1003A	Demobilize Equipment			$5,000.00
1003B	Site Restoration			$2,500.00
1003C	As-Built Drawings			$2,500.00
1004A	Furnish SSP			$750,000.00
1004B	Furnish Special Piles			$50,000.00
1004C	Furnish SSP Pile Shoes			$30,000.00
1004D	Fabricate Template			$6,000.00
1004E	Excavate Driving Line			$100,000.00
1004F	Set & Drive SSP			$500,000.00
1004G	Backfill Driving Line			$50,000.00
1004I	South Driving Line Obstruction Removal			$117,787.18
1005A	Furnish Misc. Steel			$193,000.00
1005B	Furnish Tie-Rods			$20,000.00
1005C	Furnish Plate Washers			$15,000.00
1005D	Furnish Fastners			$12,000.00
1005E	Place Misc. Steel			$280,000.00
1006A	Demo Concrete & Remove (Rubblemound)			$100,000.00
1006B	Excavate Existing Cribs (Rubblemound Area)			$185,000.00
1006C	Disposal of Demo Materials (Rubblemound Area)			$25,000.00
1007A	Furnish H-Pile Materials			$22,800.00
1007B	Install H-Piles			$27,200.00
1008A	Furnish Rebar			$135,000.00
1008B	Place Concrete (2000 CY @ $250.00/CY)			$500,000.00
1009A	Furnish Handrails			$60,000.00
1009B	Place Handrails			$7,000.00
1009C	Paint Handrails			$3,000.00
				$3,437,787.18
CLIN 0002	***Fill Stone:***	***0***	***$0.00 / NA***	***$0.00***
	No Activities Assigned to this Bid Item.			
CLIN 0002AA	***First 18,000 tons***	***18,000***	***$22.50 / TN***	***$405,000.00***
2001	Furnish & Place Fill Stone - 1st 18,000 Tons			$405,000.00
				$405,000.00
CLIN 0002AB	***Over 10,000 tons***	***2,000***	***$22.50 / TN***	***$45,000.00***
2101	Furnish & Place Fill Stone - Over 18,000 Tons			$45,000.00
				$45,000.00
CLIN 0003	***Underlayer Stone:***	***0***	***$0.00 / NA***	***$0.00***
	No Activities Assigned to this Bid Item.			
CLIN 0003AA	***First 4,500 Tons***	***4,500***	***$31.50 / TN***	***$141,750.00***
3001	Furnish & Place Underlayer Stone - 1st 4,500 Tons			$141,750.00
				$141,750.00
CLIN 0003AB	***Over 4,500 tons***	***450***	***$31.50 / TN***	***$14,175.00***
3101	Furnish & Place Underlayer Stone - Over 4,500 Tons			$14,175.00
				$14,175.00
CLIN 0004	***Scour Stone:***	***0***	***$0.00 / NA***	***$0.00***

US Army Corps of Engineers

Current Activity Summary

08 Jul 2002

Location Name

Project Name: Repair of North & South Piers, Baloney Harbor, MI
Contract Number: DACW35-02-C-####

Activity Number	Activity Description	QUANTITY	UNIT PRICE	AMOUNT
CLIN 0004	***Scour Stone: (Continued)***	***0***	***$0.00 / NA***	***$0.00***
	No Activities Assigned to this Bid Item.			
CLIN 0004AA	***First 3,500 tons***	***3,500***	***$27.50 / TN***	***$96,250.00***
4001	Furnish & Place Scour Stone - 1st 3,500 Tons			$96,250.00
				$96,250.00
CLIN 0004AB	***Over 3,500 tons***	***600***	***$27.50 / TN***	***$16,500.00***
4101	Furnish & Place Scour Stone - Over 3,500 Tons			$16,500.00
				$16,500.00
CLIN 0005	***Bedding Stone:***	***0***	***$0.00 / NA***	***$0.00***
	No Activities Assigned to this Bid Item.			
CLIN 0005AA	***First 3,000 tons***	***3,000***	***$28.00 / TN***	***$84,000.00***
5001	Furnish & Place Bedding Stone - 1st 3,000 Tons			$84,000.00
				$84,000.00
CLIN 0005AB	***Over 3,000 tons***	***600***	***$28.00 / TN***	***$16,800.00***
5101	Furnish & Place Bedding Stone - Over 3,000 Tons			$16,800.00
				$16,800.00
CLIN 0006	***Armor Stone:***	***0***	***$0.00 / NA***	***$0.00***
	No Activities Assigned to this Bid Item.			
CLIN 0006AA	***First 6,000 tons***	***6,000***	***$34.00 / TN***	***$204,000.00***
6001	Furnish & Place Armor Stone - 1st 6,000 Tons			$204,000.00
				$204,000.00
CLIN 0006AB	***Over 6,000 tons***	***825***	***$34.00 / TN***	***$28,050.00***
6101	Furnish & Place Armor Stone - Over 6,000 Tons			$28,050.00
				$28,050.00

Sum of CLINs	**$4,489,312.18**
Sum of Activities	**$4,489,312.18**
Difference	**$0.00**

INITIAL INSPECTION WORKSHEET

DEFINABLE FEATURE OF WORK : Site Cast Concrete

A. ACTIVITIES INCLUDED UNDER Site Cast Concrete -

ABC Company, Inc

1008A	Furnish Rebar	$135,000.00
1008B	Place Concrete (2000 CY @ $250.00/CY)	$500,000.00
		$635,000.00

B. QUALITY CONTROL REQUIREMENTS -

SUBMITTALS REQUIRED -

00700	1	SF 1413 for Subcontracts		Not submitted
03250	1	Expansion Joint Materials	A	Approved
03307	1	Batching and Mixing Equipment	F	Receipt
03307	2	Conveying and Placement Equipment	F	Receipt
03307	3	Reinforcing Steel (Mat Steel, Bar Steel	A	Approved
03307	4	Concrete Mixture Proportions;	A	Approved
03307	5	Cementitious Material	A	Approved
03307	6	Aggregates	A	Approved
03307	7	Manufacturer's Literature	A	Approved
03307	8	Batching & Mixing Equipment - Redi-Mix	F	Receipt
03307	9	Conveying & Placing Equipment - Redi-Mix	F	Receipt
03307	10	Concrete Mix Proportions - Redi-Mix	A	Approved
03307	11	Cementitious Material - Redi-Mix	A	Approved
03307	12	Aggregates - Redi Mix	A	Approved
03307	13	Manufacturer's Data; AEA - Redi-Mix	A	Approved
03307	14	Manufacturer's Data; WRA - Redi-Mix	A	Approved
05500	2	Welders	F	Receipt
05552	4	Mill Certs - Ladder Grab Rails	A	Approved

QC TESTS -

CT # 00001	Obtain 1 Cylinder for strength testing at 7 days and 2 Cylinders for 28 days. Minimum of one set per day or 1 set per every 150 CY placed. (ASTM C-94) Required strength at 7 Days = 2,800 p.s.i.; 28 Days = 4,000 p.s.i.	Not Performed
CT # 00002	Check Batch slips for water/cement ratio not to exeeced 0.40 by weight	Not Performed
CT # 00003	Check Slump at both mixer and discharge ends: Pumped = 3" - 7" at discharge Maximum of 5" at Mixer if no admixture used Maximum of 7" at mixer if admixture is used 2 checks per shift is minimum required	Not Performed
CT # 00004	2 Air Content tests required per shift. Check approved mix design for maximum and minimum values acceptable.	Not Performed

C. QA/QC PUNCH LIST ITEMS -

INITIAL INSPECTION WORKSHEET

DEFINABLE FEATURE OF WORK : Site Cast Concrete

C. QA/QC PUNCH LIST ITEMS - Cont.

INCLUDE ADDITIONAL COMMENTS ON DAILY REPORT

_____
_____
_____

D. LABOR RATES -

LABOR CLASSIFICATIONS	BASIC RATE	FRINGE BENEFITS	PLUS %	TOTAL WAGE/HR

E. INSPECTION CHECKS -

		IN COMPLIANCE Yes/ No/ NA
1.	Check rebar for proper bar sizes, per approved shop drawings.	___ ___ ___
2.	Check for 3" clearance of rebar from form sides and top surface.	___ ___ ___
3.	Check for proper use of concrete vibrators	___ ___ ___
4.	Check for correct finish elevations.	___ ___ ___
5.	Concrete finish shall meet approval of on-site Government Representative. Make sure all finshers are aware of approved finishing method and degree of brooming.	___ ___ ___
6.	Ensure embedded items are not displaced during placement and finishing of the concrete.	___ ___ ___
7.	_____	___ ___ ___
8.	_____	___ ___ ___
9.	_____	___ ___ ___
10.	_____	___ ___ ___

F. JOB SITE SAFETY -

		IN COMPLIANCE Yes/ No/ NA
1.	All employees working over water are required to wear workvests (PFDs)	___ ___ ___
2.	All employees are to wear hard hats.	___ ___ ___
3.	Concrete Pump must be shut down prior to cleaning.	___ ___ ___
4.	Review Activity Hazard Analysis for Concrete Work prior to performing this work.	___ ___ ___
5.	_____	___ ___ ___
6.	_____	___ ___ ___
7.	_____	___ ___ ___
8.	_____	___ ___ ___

G. QA Evaluation Notes -

		DISCUSSED Yes/ No/ NA
1.	_____	___ ___ ___
2.	_____	___ ___ ___
3.	_____	___ ___ ___
4.	_____	___ ___ ___

PREPARATORY INSPECTION WORKSHEET

DEFINABLE FEATURE OF WORK : Site Cast Concrete

A. ACTIVITIES INCLUDED UNDER Site Cast Concrete -

ABC Company, Inc.

1008A	Furnish Rebar	$135,000.00
1008B	Place Concrete (2000 CY @ $250.00/CY)	$500,000.00
		$635,000.00

B. QUALITY CONTROL REQUIREMENTS -

SUBMITTALS REQUIRED -

00700	1	SF 1413 for Subcontracts		Not submitted
03250	1	Expansion Joint Materials	A	Approved
03307	1	Batching and Mixing Equipment	F	Receipt
03307	2	Conveying and Placement Equipment	F	Receipt
03307	3	Reinforcing Steel (Mat Steel, Bar Steel	A	Approved
03307	4	Concrete Mixture Proportions;	A	Approved
03307	5	Cementitious Material	A	Approved
03307	6	Aggregates	A	Approved
03307	7	Manufacturer's Literature	A	Approved
03307	8	Batching & Mixing Equipment - Redi-Mix	F	Receipt
03307	9	Conveying & Placing Equipment - Redi-Mix	F	Receipt
03307	10	Concrete Mix Proportions - Redi-Mix	A	Approved
03307	11	Cementitious Material - Redi-Mix	A	Approved
03307	12	Aggregates - Redi Mix	A	Approved
03307	13	Manufacturer's Data; AEA - Redi-Mix	A	Approved
03307	14	Manufacturer's Data; WRA - Redi-Mix	A	Approved
05500	2	Welders	F	Receipt
05552	4	Mill Certs - Ladder Grab Rails	A	Approved

C. QA/QC PUNCH LIST ITEMS -

INCLUDE ADDITIONAL COMMENTS ON DAILY REPORT

D. LABOR RATES -

LABOR CLASSIFICATIONS	BASIC RATE	FRINGE BENEFITS	PLUS %	TOTAL WAGE/HR

PREPARATORY INSPECTION WORKSHEET

DEFINABLE FEATURE OF WORK : Site Cast Concrete

E. REVIEW CONTRACT DRAWINGS AND SPECIFICATIONS -

DRAWING / SPEC. NO	COMMENTS / CONFLICTS

		DISCUSSED Yes/ No/ NA
1.		___ ___ ___
2.		___ ___ ___
3.		___ ___ ___
4.		___ ___ ___

F. REPETITIVE DEFICIENCIES FOUND ON PREVIOUS PROJECTS -

		DISCUSSED Yes/ No/ NA
1.		___ ___ ___
2.		___ ___ ___
3.		___ ___ ___
4.		___ ___ ___

G. INSPECTION CHECKS -

		IN COMPLIANCE Yes/ No/ NA
1.		___ ___ ___
2.		___ ___ ___
3.		___ ___ ___
4.		___ ___ ___

H. JOB SITE SAFETY -

		IN COMPLIANCE Yes/ No/ NA
1.		___ ___ ___
2.		___ ___ ___
3.		___ ___ ___
4.		___ ___ ___

I. QUALITY ASSURANCE EVALUATION NOTES -

		DISCUSSED Yes/ No/ NA
1.		___ ___ ___
2.		___ ___ ___
3.		___ ___ ___
4.		___ ___ ___

CONTRACTORS QUALITY CONTROL REPORT (QCR)
DAILY LOG OF CONSTRUCTION - CIVIL

REPORT NUMBER 92

DATE 22 Jun 2001 - Friday

PROJECT North & South Pier Repair, Baloney Harbor, MI

CONTRACT NUMBER DACW35-02-C-#### NA

CONTRACTOR ABC Company, Inc. 555 Imagination Road, Fantasy, MI 49494

WEATHER
Weather Caused No Delay
Temperature Min 80 °F, Max 63 °F; 0.01 IN Precipitation; 10 MPH Wind

QC NARRATIVES

Activities in Progress:

Set and drove 24 sheets of SSP

Installing Miscellaneous Steel Waler sections c/s 4+00W to 4+50W

123 Tons of Fill stone placed between existing structure and req'd SSP wall from c/s 6+25 W to 6+75W.

Safety Inspection / Safety Meetings:

Weekly Safety Meeting held today - Use of PPE - Hrad hats & Work Vests

PREP/INITIAL DATES (Preparatory and initial dates held and advance notice)

A preparatory inspection was held today for the following feature:

Miscellaneous Steel & Handrail

An initial inspection was held today for the following feature:

Miscellaneous Steel & Handrail

ACTIVITY START/FINISH

The following activity was started today:

Activity No	Description
2001	Furnish & Place Fill Stone - 1st 18,000 Tons

No activities were finished today

QC REQUIREMENTS

The following 4 QC requirements were completed today:

Requirement No	Type	Description	Results
CT-00001	QC Testing	Check Plumbness of piles during driving	Completed
CT-00002	QC Testing	Check horizontal placement of piling (Check for Pile-Walk)	Completed
CT-00003	QC Testing	Check vibratory hammer driving rate for SSP - 12"/minute is the minimum rate. If exceeded, switch to Impact hammer.	Completed
CT-00004	QC Testing	Video Tape Interlocks of piling after driving SSP	Completed

QA/QC PUNCH LIST (Describe QC Punch List items issued, Report QC and QA Punch List items corrected)

The following QC Punch List item was issued today:

Item No	Location	Description
QC-00001	4+25W	Cut-off sheets to finish grade from 4+00W to 4+50W

No Punch List items were corrected today

CONTRACTORS ON SITE (Report first and/or last day contractors were on site)

No contractors had their first or last day on site today

LABOR HOURS

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
	IRONWORKER	3.0	10.0
	PILE DRIVING SETTER	2.0	10.0

ABC Company, Inc.	PILE DRIVER OPERATOR		1.0	10.0
Total hours worked to date: 30.0		Total	6.0	30.0

EQUIPMENT HOURS

The following equipment hours were Reported today:

Equipment ID	Description	Standby Hours	Operating Hours
00000002	Vibratory Hammer	0.0	10.0
00000003	Arc Welder	0.0	8.0
00000004	Crane - 100' Boom	0.0	10.0
Total operating hours to date: 28.0		Total 0.0	28.0

ACCIDENT REPORTING (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION **On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.**

QC REPRESENTATIVE'S SIGNATURE	DATE	SUPERINTENDENT'S INITIALS	DATE

RMS CORRESPONDENCE CODE

CODE	DESCRIPTION
A/E	ARCHITECT/ENGINEER
ASB	AS-BUILT INFORMATION
C	COE LETTER TO CONTRACTOR
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
FAX	FACSIMILE TRANSMISSION
FIA	FREEDOM OF INFORMATION REQUEST
H	CONTRACTOR LETTER - FROM HOME OFFICE
LOC	LOCAL GOVERNMENT UNIT
LRE	DETROIT DISTRICT CORPS OF ENGINEERS
MDN	MICHIGAN DEPARTMENT OF NATURAL RESOURCES
MEM	COE IN-HOUSE MEMORANDUM
MFR	MEMORANDUM FOR RECORDS
MSC	MISCELLANEOUS CORRESPONDENCE
MTN	MINUTES OF MEETINGS
NTP	NOTICE TO PROCEED
PNM	PRICE NEGOTIATION MEMORANDUM
POC	POINTS OF CONTACT LIST
QAR	QUALITY ASSURANCE REPORT
QCR	QUALITY CONTROL REPORT
RFI	CONTRACTOR REQUEST FOR INFORMATION
RFP	COE REQUEST FOR PROPOSAL TO CONTRACTOR
S	CONTRACTOR LETTER - FROM SITE OFFICE
SEG	SNELL ENVIRONMENTAL GROUP
SUB	SUBCONTRACTOR LETTER
TEL	TELEPHONE CONVERSATION RECORDS
VM	VOICE-MAIL

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
STORM SEWER PROJECT, CITY OF ISHPEMING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01100	SD-01 Preconstruction Submittals															
			Accident Prevention Plan	1.6.1														
			Payrolls and Basic Records	1.6.2														
			Progress Chart	1.6.3	G	AOF												
			Non-listed, Non-Commercially	2.1.1	G	ECD												
			Active Stone or Material Source															
			Survey Note Format	1.4.8.2	G	AOF												
			Video Cassettes	3.1	G													
			SD-07 Certificates															
			As-Built Technician's	2.2														
			Qualifications															
			As-built Drawings	2.2	G	AOF												
			Survey Information	1.4.8.2														
		01101	SD-01 Preconstruction Submittals															
			Additional Property Agreements	1.2.2	G	RED												
		01130	SD-01 Preconstruction Submittals															
			Environmental Protection Plan		G	AOF												
		01330	SD-01 Preconstruction Submittals															
			Submittal register	1.5.1	G													
		01451	SD-01 Preconstruction Submittals															
			Quality Control Plan	3.2	G													
			Preparatory Inspection Checklist	3.6.1														
			Initial Inspection Checklist	3.6.2														
			Daily Inspection Reports	3.9														
			CQC System Manager	3.4.2	G													
			CQC System Manager	3.4.2	G													

SUBMITTAL REGISTER

CONTRACT NO.

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STORM SEWER PROJECT, CITY OF ISHPEMING

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02220a	SD-03 Product Data															
			Work Plan	1.2	G	AOF												
		02230a	SD-03 Product Data															
			Materials Other Than Salable	3.4.1	G	AOF												
			Timber															
		02302N	SD-06 Test Reports															
			material tests	1.8.6	G	G												
			material tests	1.8.6	G	G												
			Pipe bedding	2.1.7	G	AOF												
			Topsoil tests	1.8.4	G	AOF												
			Test for moisture-density relation	1.8.3	G	AOF												
			Density and moisture tests	1.8.5	G	AOF												
			SD-07 Certificates															
			Shoring and sheeting plan	1.8.1	G	AOF												
			Dewatering plan	1.8.2	G	AOF												
		02317a	SD-01 Preconstruction Submittals															
			Permits	1.4	G	AOF												
			SD-02 Shop Drawings															
			Shop Drawings	1.4	G	AOF												
			SD-03 Product Data															
			Blasting Plans	1.4	G	AOF												
			SD-06 Test Reports															
			Survey Report	1.5	G	AOF												
			Blasting Records	1.4	G	AOF												
		02378a	SD-04 Samples															
			Geotextile	2.1.1	G	AOF												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
STORM SEWER PROJECT, CITY OF ISHPEMING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02378a	SD-07 Certificates															
			Geotextile	2.1.1	G	AOF												
		02510N	SD-03 Product Data															
			Piping Materials	2.1.1	G	AOF												
			Water distribution main	2.1	G	AOF												
			Water service line	2.2	G	AOF												
			Hydrants	1.4.2	G	AOF												
			Indicator posts	2.1.2.2	G	AOF												
			Corporation stops	2.2.2.1	G	AOF												
			Valve boxes	2.1.2.3	G	AOF												
			Valve boxes	2.2.2.9	G	AOF												
			SD-05 Design Data															
			Design calculations of water	2.1.1	G	AOF												
			piping															
			SD-07 Certificates															
			Water distribution main	2.1	G	AOF												
			Water service line	2.2	G	AOF												
			lining and coating	2.1.1	G	AOF												
			Lining	2.1.1.1	G	AOF												
			hydrants	1.4.2	G	AOF												
			SD-08 Manufacturer's Instructions															
			Installation	3.1.1														
		02531A	SD-07 Certificates															
			Portland Cement	3.2	G	AOF												
			Joints	2.3	G	AOF												
		02630a	SD-03 Product Data															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
STORM SEWER PROJECT, CITY OF ISHPEMING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02630a	Placing Pipe	3.3	G	AOF												
			SD-04 Samples															
			Pipe for Culverts and Storm	2.1	G	AOF												
			Drains															
			SD-07 Certificates															
			Resin Certification	1.4	G	AOF												
			Pipeline Testing	1.4	G	AOF												
			Hydrostatic Test on Watertight	1.4	G	AOF												
			Joints															
			Determination of Density	1.4	G	AOF												
			Frame and Cover for Gratings	1.4	G	AOF												
		02721a	SD-03 Product Data															
			Equipment	1.6	G	AOF												
			Waybills and Delivery Tickets	1.4.4	G	AOF												
			SD-06 Test Reports															
			Sampling and Testing	1.4	G	AOF												
		02722a	SD-03 Product Data															
			Plant, Equipment, and Tools	1.6	G	AOF												
			Waybills and Delivery Tickets	1.4.4	G	AOF												
			SD-06 Test Reports															
			Sampling and testing	1.4	G	AOF												
			Field Density Tests	1.4.2.4	G	AOF												
		10430A	SD-02 Shop Drawings															
			Approved Detail Drawings	3.1	G	AOF												
			SD-03 Product Data															
			Modular Exterior Signage System	2.1	G	AOF												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
STORM SEWER PROJECT, CITY OF ISHPEMING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		10430A	Installation	3.1	G	AOF												
			Exterior Signs	3.1	G	AOF												
			Wind Load Requirements	2.1.1.2	G	AOF												
			SD-04 Samples															
			Exterior Sign	1.8	G	AOF												
			SD-10 Operation and Maintenance															
			Data															
			Protection and Cleaning	3.1.2	G	AOF												

TRANSMITTAL OF SHOP DRWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I – REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO:	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL_____

SPECIFICATION SEC. NO *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION

ITEM NO. a.	DISCRIPTION OF ITEMS SUBMITTED *(Type size, model number/etc.)* b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)* c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT SPEC. PARA. NO. e.	 DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION *(see Instruction No. 6)* h.	FOR CE USE CODE i.

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated. _____ NAME AND SIGNATURE OF CONTRACTOR

SECTION II – APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.”. This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specification -- also, a written statement to that effect shall be included in the space provided for “Remarks”.

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted.

B -- Approved, except as noted on drawings.

C -- Approved, except as noted on drawings
Refer to attached sheet resubmission required.

D -- Will be returned by separate correspondence.

E -- Disapproved (see attached)

F -- Receipt acknowledged

FX -- Receipt acknowledged, does not comply as noted with contract requirements

G -- Other *(Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

* U.S. Government Printing Office: 1991

General Decision Number: MI030095 06/13/2003

General Decision Number: **MI030095** 06/13/2003
Superseded General Decision No. MI020095
State: Michigan
Construction Type:
HEAVY
County(ies):
MARQUETTE
HEAVY CONSTRUCTION PROJECTS (does not include airport or bridge construction projects, or sewer or water line work if it is incidental to a highway construction project)
Modification Number Publication Date
0 06/13/2003

COUNTY(ies):
MARQUETTE

BOIL0169E 07/01/2002

	Rates	Fringes
BOILERMAKER (does not include tank building)	27.507	25% + 4.90

BRMI0006B 05/01/2001

	Rates	Fringes
BRICKLAYER; MARBLE, TERRAZZO AND TILE SETTER	21.55	8.09
CEMENT MASON	21.30	8.09
POINTER, CAULKER & CLEANER	19.55	8.09

FOOTNOTES:
Marble, terrazzo & tile finishers: $0.25 per hour above the laborer's rate. Same fringe benefit package as the bricklayer.
Stacks: Work on industrial and powerhouse stacks shall receive $2.00 per hour above the journeyman bricklayer rate.
Industrial: Refinishing work on digesters, tanks, lime kilns, chests, boilers, and boiler tubes shall receive $2.00 per hour above the journeyman bricklayer rate.

CARP1510B 05/01/2002

	Rates	Fringes
CARPENTER (includes concrete form work)	22.88	7.29
PILEDRIVER	21.88	7.29
MILLWRIGHT	26.34	7.51

FOOTNOTES:
Waterfront work on the Great Lakes or connecting water navigable to Lake carriers: $0.20 per hour additional.
Work on industrial construction, defined as industrial manufacturing and processing plants such as ore plants, paper mills, power houses, foundries, saw mills, wood processing plants, or other industrial complexes: $.25 per hour additional.

ELEC0876D 06/01/2002

	Rates	Fringes
LINE CONSTRUCTION:		
Line technician	27.18	21.5% + 2.20

Cable splicer	28.30	21.5% + 2.20
Operator/ground person (digger, tractor and setting rig with tracks or rough terrain vehicle, large bombardier, backhoe over 85 hp, hydraulic crane 10 ton or over)	20.56	21.5% + 2.20
Light equipment operator/ground person/truck driver/ground person (winch, A-frame, diggers when used for distribution line truck and used for distribution work. Distribution truck driver, 5th wheel type trucks, bucket trucks, ladder trucks and all live boom trucks, all equipment 85 hp or under)	18.06	21.5% + 2.20
Truck driver/ground person (trucks with winch or boom or dump, other than distribution work)	17.21	21.5% + 2.20
Ground person	13.86	21.5% + 2.20

FOOTNOTE:
Operators of 5/8 yd. rated capacity backhoe or over, and operators of 25 ton, rated capacity, crane or over, and operators of heavy duty tension or pulling machinery on 345 KV and above, shall receive the line technician rate of pay.

ELEC1070C 06/01/1997

	Rates	Fringes
ELECTRICIANS:		
Electrical subcontracts over $85,000	21.78	4% + 5.35
Electrical subcontracts $85,000 and under	18.63	4% + 5.35

FOOTNOTE:
Low scale is not applicable on industrial work.

ENGI0324L 05/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS		
STEEL ERECTION:		
Crane operator, main boom & jib 220' or longer	25.09	11.40
Crane operator, main boom & jib 140' or longer	24.84	11.40
Crane operator, main boom & jib 120' or longer	24.59	11.40
Mechanic with truck and tools	25.59	11.40
Regular operator	24.09	11.40
Compressor; forklift; welder	20.84	11.40
Oiler and fire tender	19.54	11.40

ENGI0326A 05/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
GAS DISTRIBUTION AND DUCT INSTALLATION WORK:		
GROUP 1	22.39	11.65
GROUP 2-A	22.29	11.65
GROUP 2-B	22.07	11.65

GROUP 3	21.29	11.65
GROUP 4	20.79	11.65

SCOPE OF WORK:

The construction, installation, treating and reconditioning of pipelines transporting gas vapors within cities, towns, subdivisions, suburban areas, or within private property boundaries, up to and including private meter settings of private industrial, governmental or other premises, more commonly referred to as "distribution work," starting from the first metering station, connection, similar or related facility, of the main or cross country pipeline and including duct installation.

POWER EQUIPMENT - GAS DISTRIBUTION CLASSIFICATIONS

GROUP 1: Mechanic, crane (over 1/2 yd. capacity), backhoe (over 1/2 yd. capacity), grader (Caterpillar 12 equivalent or larger)

GROUP 2-A: Trencher, backhoe (1/2 yd. capacity or less)

GROUP 2-B: Crane (1/2 yd. capacity or less), compressor (2 or more), dozer (D-4 equivalent or larger), endloader (1 yd. capacity or larger), pump (1 or 2 six-inch or larger), side boom (D-4 equivalent or larger)

GROUP 3: Backfiller, boom truck (powered), concrete saw (20 hp or larger), dozer (less than D-4 equivalent), endloader (under 1 yd. capacity), farm tractor (with attachments), pump (2 - 4 under six-inch capacity), side boom tractor (less than D-4 equivalent), tamper (self-propelled)

GROUP 4: Oiler, grease person

ENGI0326P 05/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS		
(includes underground work):		
Crane operator, main boom & jib		
220' or longer	24.69	11.40
Crane operator, main boom & jib		
140' or longer	24.44	11.40
Crane operator, main boom & jib		
120' or longer	24.19	11.40
Mechanic with truck and tools	25.19	11.40
GROUP 1	23.69	11.40
GROUP 2	20.44	11.40
GROUP 3	19.86	11.40
GROUP 4	18.92	11.40

FOOTNOTES:

Swing boom truck operator over 15 tons: $.50 per hour additional.

Hydraulic crane operator 75 tons and under: $.75 per hour additional.

Hydraulic crane operator over 75 tons: $1.00 per hour additional.

Lattice boom crane operator: $1.50 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Regular equipment operator, crane, dozer, front end loader, job mechanic, pumpcrete and squeezecrete, welder

GROUP 2: Air track drill, boom truck (non-swing), concrete mixer, material hoist and tugger, pump 6" and over, beltcrete, sweeping machine, trencher, winches, well points and freeze systems

GROUP 3: Air compressor, conveyor, concrete saw, farm tractor (without attachments), fork truck, generator, guard post driver, mulching machine, pumps under 6-in., welding machine and grease person

GROUP 4: Oiler, fire tender and heater operator

ENGI0326R 10/01/2001

	Rates	Fringes
SEWER RELINING:		
POWER EQUIPMENT OPERATORS:		
GROUP 1	23.67	8.11
GROUP 2	22.28	8.11

SEWER RELINING CLASSIFICATIONS

GROUP 1: Operation of audio-visual closed circuit TV system, including remote in-ground cutter and other equipment used in connection with the CCTV system

GROUP 2: Operation of hot water heaters and circulation systems, water jetters and vacuum and mechanical debris removal systems

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ENGI0326T 10/01/2001

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
HAZARDOUS WASTE REMOVAL:		
LEVEL A:		
GROUP 1	26.57	11.15
GROUP 2	22.87	11.15
Engineer when operating crane with boom and jib or leads 220' or longer	29.52	11.15
Engineer when operating crane with boom and jib or leads 140' or longer	29.22	11.15
Regular crane operator, mechanic, dragline operator, boom truck operator and concrete pump with boom operator	27.54	11.15
LEVELS B AND C:		
GROUP 1	25.62	11.15
GROUP 2	21.93	11.15
Engineer when operating crane with boom and jib or leads 220' or longer	28.57	11.15
Engineer when operating crane with boom and jib or leads 140' or longer	28.27	11.15
Regular crane operator, mechanic, dragline operator, boom truck operator and concrete pump with boom operator	26.59	11.15
LEVEL D:		
GROUP 1	24.32	11.15
GROUP 2	20.63	11.15
Engineer when operating crane with boom and jib or leads 220' or longer	27.27	11.15
Engineer when operating crane with boom and jib or leads 140' or longer	26.97	11.15
Regular crane operator, mechanic, dragline operator, boom truck operator and concrete pump with boom operator	25.29	11.15
LEVEL D WHEN CAPPING LANDFILL:		

GROUP 1 24.07 11.15
GROUP 2 20.38 11.15
Engineer when operating crane with boom and jib or leads 220' or longer 27.02 11.15
Engineer when operating crane with boom and jib or leads 140' or longer 26.72 11.15
Regular crane operator, mechanic, dragline operator, boom truck operator and concrete pump with boom operator 25.04 11.15

HAZARDOUS WASTE REMOVAL CLASSIFICATIONS

GROUP 1: Backhoe, batch plant operator, clamshell, concrete breaker when attached to hoe, concrete cleaning decontamination machine operator, concrete pump, concrete paver, crusher, dozer, elevating grader, endloader, farm tractor (90 h.p. and higher), gradall, grader, heavy equipment robotics operator, loader, pug mill, pumpcrete machines, pump trucks, roller, scraper (self-propelled or tractor drawn), side boom tractor, slip form paver, slop paver, trencher, ultra high pressure waterjet cutting tool system operator, vactors, vacuum blasting machine operator, vertical lifting hoist, vibrating compaction equipment (self-propelled), and well drilling rig

GROUP 2: Air compressor, concrete breaker when not attached to hoe, elevator, end dumps, equipment decontamination operator, farm tractor (less than 90 h.p), forklift, generator, heater, mulcher, pigs (portable reagent storage tanks), power screens, pumps (water), stationary compressed air plant, sweeper, and welding machine

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IRON0008G 05/01/2002

	Rates	Fringes
IRONWORKERS, REINFORCING & STRUCTURAL:		
General contracts $10,000,000 or greater	23.82	12.51
General contracts less than $10,000,000	21.31	12.51

IRON0008J 05/01/2001

	Rates	Fringes
IRONWORKERS:		
Pre engineered metal building erection	16.46	7.96

LABO0005W 10/01/2001

	Rates	Fringes
LABORERS:		
HAZARDOUS WASTE ABATEMENT:		
Work performed inside the building and up to and including 5 ft. outside the building:		
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D	18.75	6.06
Levels A, B or C	19.75	6.06

Work performed over 5 ft.
outside the building:
Work performed in
conjunction with site
preparation not
requiring the use of
personal protective
equipment; Also, Level D 17.93 5.26
Levels A, B or C 18.93 5.26

LABO0259M 09/01/2002

	Rates	Fringes
LABORERS:		
TUNNEL, SHAFT & CAISSON:		
SCOPE OF WORK:		
Tunnel, shaft and caisson work of every type and descripton and all operations incidental thereto, including, but not limited to, shafts and tunnels for sewers, water, subways, transportation, diversion, sewerage, caverns, shelters, aquafers, reservoirs, missile silos and steel sheeting for underground construction.		
TUNNEL, SHAFT & CAISSON:		
GROUP 1	21.12	5.75
GROUP 2	21.21	5.57
GROUP 3	21.31	5.57
GROUP 4	21.47	5.57
GROUP 5	21.73	5.57
GROUP 6	22.04	5.35
GROUP 7	14.31	5.56

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Tunnel, shaft and caisson laborer, dump, shanty, hog house tender, testing (on gas)

GROUP 2: Manhole, headwall, catch basin builder, bricklayer tender, mortar, material mixer, fence erector and guard rail builder

GROUP 3: Air tool operator (jackhammer, bush hammer and grinder), first bottom, second bottom, cage tender, car pusher, carrier, concrete, concrete form, concrete repair, cement invert laborer, cement finisher, concrete shoveler, conveyor, floor, gasoline and electric tool operator, gunite, grout operator, welder, heading dinky person, inside lock tender, pea gravel operator, pump, outside lock tender, scaffold, top signal person, switch person, track, tugger, utility person, vibrator, winch operator, pipe jacking, wagon drill and air track operator and concrete saw operator (under 40 h.p.)

GROUP 4: Tunnel, shaft and caisson mucker, bracer, liner plate, long haul dinky driver and well point

GROUP 5: Tunnel, shaft and caisson miner, drill runner, key board operator, power knife operator, reinforced steel or mesh (e.g. wire mesh, steel mats, dowel bars, etc.)

GROUP 6: Dynamite and powder

GROUP 7: Restoration laborer, seeding, sodding, planting, cutting, mulching and top soil grading; and the restoration of property such as replacing mailboxes, wood chips, planter boxes, flagstones, etc.

LABO0260N 08/01/2001

	Rates	Fringes
ASBESTOS LABORERS		
Includes removing and disposing		

of all insulation materials from walls, ceilings, floors, columns, and all other non-mechanical surfaces; and removal of insulating materials from mechanical systems that are to be demolished; loading/unloading of bagged and tagged materials at the disposal site (includes lead paint abatement clean-up) 17.73 6.07

LABO0334B 09/01/2002

	Rates	Fringes
LABORERS:		
OPEN CUT:		

SCOPE OF WORK:

Open cut construction work shall be construed to mean work which requires the excavation of earth including industrial, commercial and residential building site excavation and preparation, land balancing, demolition and removal of concrete and underground appurtenances, grading, paving, sewers, utilities and improvements; retention, oxidation, flocculation and irrigation facilities, and also including but not limited to underground piping, conduits, steel sheeting for underground construction, and all work incidental thereto, and general excavation.

Open cut construction work shall not include any structural modifications, alterations, additions and repairs to buildings, or highway work, including roads, streets, bridge construction and parking lots or steel erection work and excavation for the building itself and back filling inside of and within 5 ft. of the building and foundations, footings and piers for the building. Open cut construction work shall not include any work covered under Tunnel, Shaft and Caisson work.

OPEN CUT:		
GROUP 1	18.20	5.75
GROUP 2	18.34	5.75
GROUP 3	18.47	5.75
GROUP 4	18.52	5.75
GROUP 5	18.57	5.75
GROUP 6	15.95	5.75
GROUP 7	14.06	5.75

LABORER CLASSIFICATIONS

GROUP 1: Construction laborer

GROUP 2: Mortar and material mixer, concrete form person, signal person, well point person, manhole, headwall and catch basin builder, guard rail builder, headwall, seawall, breakwall, dock builder and fence erector

GROUP 3: Air, gasoline and electric tool operator, vibrator operator, driller, pump person, tar kettle operator, bracer, rodder, reinforced steel or mesh person (e.g., wire mesh, steel mats, dowel bars, etc.), welder, pipe jacking and boring person, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tugger person and directional boring person

GROUP 4: Trench or excavating grade person

GROUP 5: Pipe layer (including crock, metal pipe, multi-plate or other conduits)

GROUP 6: Grouting person, audio-visual television operations and all other operations in connection with closed circuit

television inspection, pipe cleaning and pipe relining work
GROUP 7: Restoration laborer, seeding, sodding, planting, cutting, mulching and top soil grading; and the restoration of property such as replacing mailboxes, wood chips, planter boxes, flagstones, etc.

LABO1329B 05/01/2002

	Rates	Fringes
LABORERS:		
General contracts $15 million or over, and all industrial projects:		
GROUP 1	19.46	6.25
GROUP 2	19.56	6.25
GROUP 3	19.86	6.25
GROUP 4	20.01	6.25
GROUP 5	20.21	6.25
GROUP 6	21.51	6.25
General contracts less than $15 million:		
GROUP 1	18.16	6.25
GROUP 2	18.26	6.25
GROUP 3	18.56	6.25
GROUP 4	18.71	6.25
GROUP 5	18.91	6.25
GROUP 6	20.21	6.25

FOOTNOTE:
Work on waterfront work (working over water) on the Great Lakes or connecting waters navigable to lake carriers: $0.75 per hour additional.

LABORER CLASSIFICATIONS

GROUP 1: All construction laborers on building and heavy construction work, storm and sanitary sewers, tool crib attendant, rod person, oxi-gun operator, worker using propane or acetylene cutting torch, motor-driven buggies, chipping hammers, tamping machines, green cutting (whether run by air, electric or gas), and sandblasters
GROUP 2: Mortar mixer, material mixer (whether done by hand or machine), vibrator operator, concrete mixer, laborer with concrete crew, mixer to pour, including pour from trucks
GROUP 3: Cement gun nozzle operator, blaster, miner, driller, buster operator, layer of all non-metallic pipe
GROUP 4: Caisson worker
GROUP 5: Air track
GROUP 6: Digester, tanks & kilns

PLUM0190G 05/01/2002

	Rates	Fringes
GAS DISTRIBUTION PIPELINE:		
Welding in conjunction with gas distribution pipeline work	25.85	9.67
All other work	16.64	6.97

PLUM0506K 06/01/1998

	Rates	Fringes
PIPEFITTER:		
Work on jobs of which the combined plumbing, heating, cooling and ventilation bids are $50,000 or less	17.87	8.50
All other work	23.13	8.50

SHEE0007T 01/01/2000

	Rates	Fringes
SHEET METAL WORKER	22.30	9.87

SUMI2004A 05/05/2000

	Rates	Fringes
CHAIN SAW LABORER	14.29	
LANDSCAPE LABORER	13.20	4.01
TANK BUILDER	19.50	1.04
TRUCK DRIVERS:		
Boom truck	17.40	5.52
Truck driver - 2-axle	16.41	4.30
Truck driver - 3-axle	16.83	7.44
WELL DRILLER (water well)	27.59	.13

TEAM0328E 07/01/2001

	Rates	Fringes
TRUCK DRIVERS (does not include boom truck, or two or three axle trucks):		
GROUP 1	19.62	3.76/hr.+ 17.80/day
GROUP 2	19.77	3.76/hr.+ 17.80/day
GROUP 3	19.83	3.76/hr.+ 17.80/day
GROUP 4	19.98	3.76/hr.+ 17.80/day

PAID HOLIDAYS:
Memorial Day, Fourth of July, Labor Day and Thanksgiving Day, if the regular work day immediately preceding or following the holiday is either worked or an excused absence.

TRUCK DRIVER CLASSIFICATIONS
GROUP 1: All other trucks
GROUP 2: Heavy duty and semi trucks
GROUP 3: Truck repair and maintenance
GROUP 4: Euclid type equipment

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the

Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.
With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

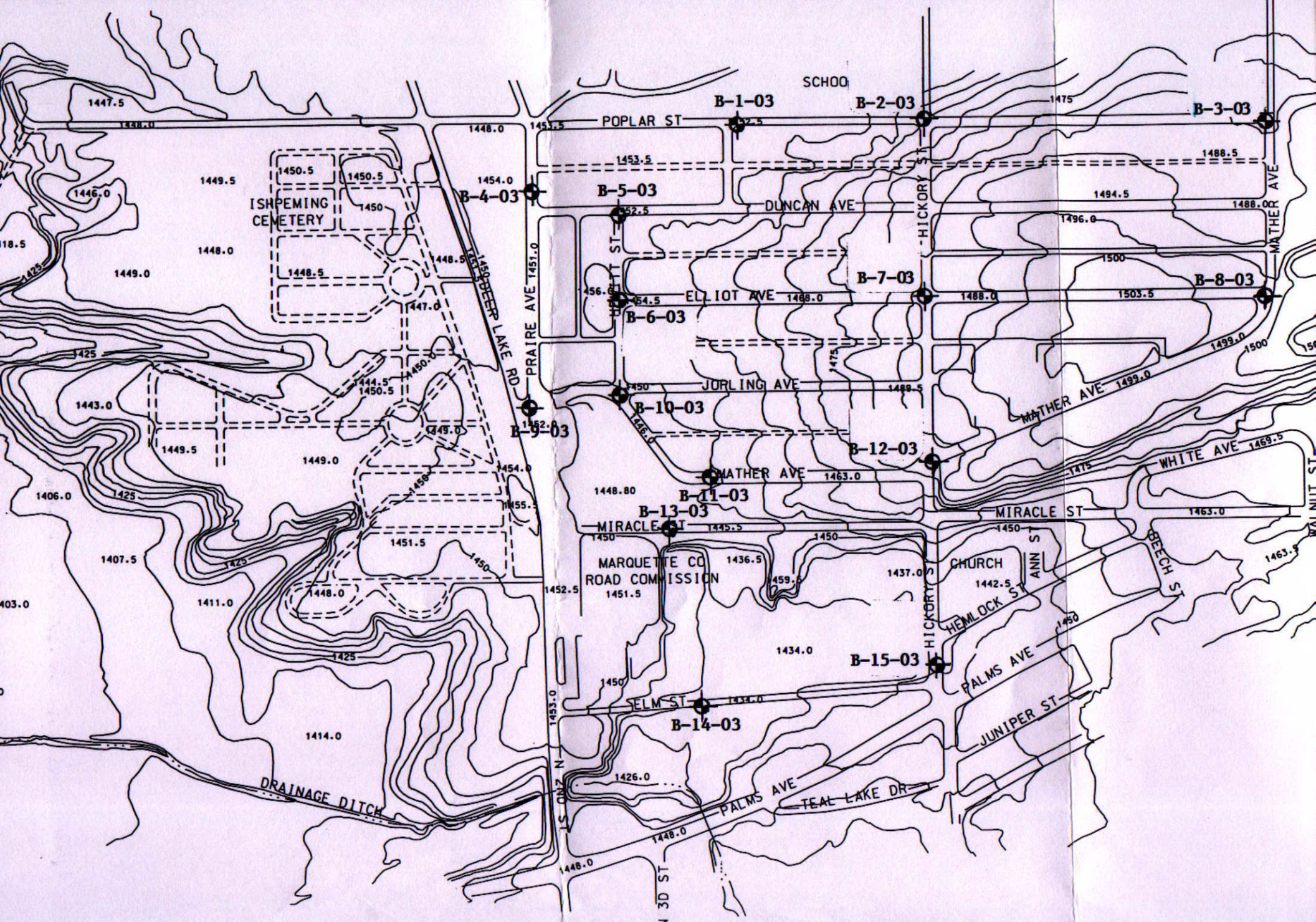
Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.
3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION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B-14-03
B-15-03
POPLAR ST
DUNCAN AVE
ELLIOT AVE
JORLING AVE
MATHER AVE
WHITE AVE
MIRACLE ST
PALMS AVE
JUNIPER ST
TEAL LAKE DR
ELM ST
HEMLOCK ST
BEECH ST
ANN ST
HICKORY ST
PRAIRIE AVE
DEER LAKE RD
ISHPEMING CEMETERY
MARQUETTE CO ROAD COMMISSION
CHURCH
SCHOO
DRAINAGE DITCH
3D ST

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-1-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 42' E of Wade St CL, 9' N of Poplar St CL — ELEV.: 1453.2 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 16.0

DATE STARTED: Apr 24, 03 — DATE COMPLETED: Apr 24, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.5'		1453.2	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	10 17 12 (29)	0.5			Aggregate Base Course 0.8'								
					(FILL) GRAVEL AND ROCK FRAGMENTS, gray, some red-brown fine to medium sand, moist, medium dense								
2	13 15 12 (27)	1.0			2.0'			Note: Top 0.4' of asphalt in 2 layers, intact - bottom 0.1' more weathered and rubbly					
					(SM) SILTY SAND, dark brown, fine to medium, trace of fine gravel, moist, medium dense								
					4.0' ±								
					(SM) SILTY SAND, medium brown, fine, moist, medium dense								
3	28 12 9 (21)	1.3		5			1448.2						
					6.5' ±								
					(SP) SAND, medium brown, fine to medium, trace of silt, moist, medium dense								
4	9 12 7 (19)	1.2											
5	6 8 4 (12)	1.3		10			1443.2						
6	7 8 7 (15)	1.2		15			1438.2						
					16.0'								
					End of Boring								
				20			1433.2						

-AS-Auger Sample; -BS-Bag Sample; -RC-Rock-Core; -GS-Grab Sample; -PS-Piston Tube; -2SS-2" Split Spoon; -3SS-3" Split Spoon; -2ST-2" Shelby Tube; -3ST-3" Shelby Tube

▽ while drilling N/A

▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-1-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-2-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 12' E of Hickory St CL, 9' S of Poplar St CL — ELEV.: 1464.2 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 11.8

DATE STARTED: Apr 25, 03 — DATE COMPLETED: Apr 25, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.6'		1464.2	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	9 20 20 (40)	1.0			Aggregate Base Course 0.9'								
					(SM) SILTY SAND, brown, fine to medium, some fine gravel/rock fragments, moist, medium dense to dense								
2	5 6 9 (15)	1.0						Note: Top 0.3' of asphalt in 2 layers, intact - bottom 0.3' more weathered, one separate layer					
3	12 20 21 (41)	1.3		5	...with fine to coarse rock fragments, dense		1459.2						
4	13 15 16 (31)	1.2											
								Driller's Note:					
5	50/ - - bouncing	NR		10		▽	1454.2	hard drilling from 9.0' to 11.8'					
					11.8'								
					End of Boring and Auger Drilling Refusal								
				15			1449.2						
				20			1444.2						

-AS-Auger Sample | -BS-Bag Sample | -RC-Rock-Core | -GS-Grab Sample | -PS-Piston Tube | -2SS-2" Split Spoon | -3SS-3" Split Spoon | -2ST-2" Shelby Tube | -3ST-3" Shelby Tube

▽ while drilling 10.0 — ▼ after drilling N/A — ▼ N/A after N/A hours

BORING NO.: B-2-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-3-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 9' E of Mather Ave. CL, 1' N of Poplar St CL — ELEV.: 1485.0 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 10.1

DATE STARTED: Apr 25, 03 — DATE COMPLETED: Apr 25, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.5'		1485.0	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	8 10 18 (28)	0.5			Aggregate Base Course 0.8'								
					(FILL) SILTY SAND, brown, fine to coarse, with fine to coarse gravel and rock fragments, wet, medium dense								
2	27 8 6 (14)	0.9			2.0' (FILL) ROCK FRAGMENTS, gray			Note: Top 0.3' of asphalt in 2 layers, intact - bottom 0.2' is a separated rubbly layer					
					4.0' ± (FILL) mix of brown silty sand and gray rock fragments								
3	20 12 6 (18)	1.2		5			1480.0	Driller's Note: hard drilling from 6.0' to 10.1'					
4	50 50/ - bouncing	0.5											
5	50/0.1 - - bouncing	0.1		10	10.1' End of Boring and Auger Drilling Refusal		1475.0						
				15			1470.0						
				20			1465.0						

-AS-Auger Sample; -BS-Bag Sample; -RC-Rock-Core; -GS-Grab Sample; -PS-Piston Tube; -2SS-2" Split Spoon; -3SS-3" Split Spoon; -2ST-2" Shelby Tube; -3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-3-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-8-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 11' W of Mather Ave. CL, 36' S of Elliott St CL — ELEV.: 1497.8 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 9.9

DATE STARTED: Apr 29, 03 — DATE COMPLETED: Apr 29, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.7'		1497.8	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	12 12 9 (21)	0.6			Aggregate Base Course 1.2'								
					(FILL) SILTY SAND, brown, fine to coarse, with fine to coarse gravel/rock fragments, wet, medium dense								
2	12 8 6 (14)	0.3			2.0'			Note: Asphalt in 5 layers, lower layer partly separated					
					(SM) SILTY SAND, brown, fine to coarse, some fine gravel, moist, medium dense								
3	6 12 16 (28)	0.2		5			1492.8						
								Driller's Note: hard drilling from 6.7' to 9.9'					
4	50/0.2 - - bouncing	0.2			...some coarse rock fragments								
5	50/0.1 - - bouncing	0.1			9.9'								
				10	End of Boring and Auger Drilling Refusal		1487.8						
				15			1482.8						
				20			1477.8						

-AS-Auger Sample -BS-Bag Sample -RC-Rock-Core
-GS-Grab Sample -PS-Piston Tube -2SS-2" Split Spoon
-3SS-3" Split Spoon -2ST-2" Shelby Tube -3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling N/A

▽ N/A after N/A hours

BORING NO.: B-8-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ
BORING NO.: B-7-03
1 OF 1

PROJECT: Combined Sewer Separation Project, Ishpeming, MI
CLIENT: DLZ Michigan, Inc.
BORING LOCATION: 12' E of Hickory St CL, 15' S of Elliott St CL ELEV.: 1485.6 +/-
RIG TYPE: Diedrich D-50 Truck Mount DRILL CREW: K. Frome / J. Deau
DRILLING METHOD: 4-1/4" HSA BORING DEPTH: 16.0
DATE STARTED: Apr 29, 03 DATE COMPLETED: Apr 29, 03 REVIEWED BY: W. Rice DATE: 5/5/03
HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.6'		1485.6	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	14 19 20 (39)	0.8			Aggregate Base Course 0.9'								
					(FILL) SILTY SAND, brown, fine to coarse, with fine gravel/rock fragments, wet, dense								
2	8 6 8 (14)	1.5			...dark brown, some rootlets and fine stem pieces			Note: Asphalt in 5 layers, top layer separated					
					4.0' ±								
					(SM) SILTY SAND, brown, fine to medium, some fine to coarse rock fragments, moist, dense								
3	17 24 24 (48)	1.3		5			1480.6	Driller's Note: hard drilling from 5.0' to 13.5'					
4	37 26 34 (60)	1.0											
5	15 24 26 (50)	1.2		10	...wet	▼	1475.6						
								Driller's Note: cobbles and/or boulders from 13.5' to 14.5'					
6	34 44 42 (86)	1.3		15			1470.6						
					16.0'	▽							
					End of Boring								
				20			1465.6						

-AS-Auger Sample -GS-Grab Sample -3SS-3" Split Spoon
-BS-Bag Sample -PS-Piston Tube -2ST-2" Shelby Tube
-RC-Rock-Core -2SS-2" Split Spoon -3ST-3" Shelby Tube

▽ while drilling 15.8
▼ after drilling 10.8

▼ N/A after N/A hours

BORING NO.: B-7-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI

BORING NO.: B-6-03

1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 9' W of Hewitt St CL, 1' S of Elliott St CL

ELEV.: 1457.0 +/-

RIG TYPE: Diedrich D-50 Truck Mount

DRILL CREW: K. Frome / D. Absolon

DRILLING METHOD: 4-1/4" HSA

BORING DEPTH: 14.6

DATE STARTED: Apr 28, 03 DATE COMPLETED: Apr 28, 03 REVIEWED BY: W. Rice DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.3' / Aggregate Base Course 1.1' / (FILL) SILTY SAND, brown, fine to coarse, with fine gravel/rock fragments, moist, medium dense to dense		1457.0	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	12 16 15 (31)	0.8											
2	15 11 11 (22)	1.0						Note: Asphalt in 2 intact layers					
3	40 24 19 (43)	1.2		5			1452.0						
					6.5' ± (SP) SAND, brown, fine to medium, trace of silt, moist, very dense, below 8.2' some interlayering with fine silty sand, trace of gravel			Driller's Note: hard drilling from 6.0' to 14.0' cobbles and/or boulders from 6.0' to 14.0'					
4	24 27 31 (58)	0.8			9.0' ± (SM) SILTY SAND, brown, fine to coarse, with fine gravel, moist, very dense								
5	27 27 60 (107)	1.1		10			1447.0						
					14.6'								
6	50/0.1 - - (-)	NR		15	End of Boring		1442.0						
				20			1437.0						

-AS-Auger Sample -BS-Bag Sample -RC-Rock-Core
-GS-Grab Sample -PS-Piston Tube -2SS-2" Split Spoon
-3SS-3" Split Spoon -2ST-2" Shelby Tube -3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-6-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-5-03

1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 9' S of Duncan St CL, 33' E of Hewitt St CL — ELEV.: 1453.7 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 16.0

DATE STARTED: Apr 28, 03 — DATE COMPLETED: Apr 28, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.4'		1453.7	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	12 10 5 (15)	1.0			SILTY SAND, red-brown, fine to coarse, with fine to coarse gravel, moist, medium dense (aggregate base course) 2.0'								
2	2 3 12 (15)	0.8			(SM) SILTY SAND, dark brown, fine, wet, medium dense 4.0' ±								
3	3 10 13 (23)	1.0		5	(SM) SILTY SAND, medium to light brown, fine, some fine to coarse rock fragments, moist, medium dense		1448.7						
4	75/0.2 - - bouncing	0.2			...fine to coarse, some fine rock fragments								
5	18 27 31 (58)	1.2		10	...fine to medium, no gravel/rock fragments, wet, very dense		1443.7						
6	18 27 23 (50)	1.3		15	...some coarse gravel, moist 16.0'		1438.7						
					End of Boring								
				20			1433.7						

-AS-Auger Sample -BS-Bag Sample -RC-Rock-Core
-GS-Grab Sample -PS-Piston Tube -2SS-2" Split Spoon
-3SS-3" Split Spoon -2ST-2" Shelby Tube -3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-5-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI
BORING NO.: B-4-03
1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 8' W of Prairie Ave. CL, 68' N of Duncan Ave. CL
ELEV.: 1453.7 +/-

RIG TYPE: Diedrich D-50 Truck Mount
DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA
BORING DEPTH: 16.0

DATE STARTED: Apr 24, 03
DATE COMPLETED: Apr 24, 03
REVIEWED BY: W. Rice
DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.4'		1453.7	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 10" core for asphalt					
1	11 10 7 (17)	0.5			Aggregate Base Course 1.1'								
					(FILL) SILTY SAND, brown, fine to coarse, with fine gravel, wet, medium dense								
2	10 17 22 (39)	1.5			...some dark brown material with fine rootlets, dense			Note: Asphalt in 2 intact layers					
3	50/0.4 - - (-)	0.4		5	...no rootlets, with fine to coarse rock fragments		1448.7						
					6.5' ±								
					(SP) SAND, medium brown, fine to medium, moist, medium dense								
4	8 12 15 (27)	1.0											
5	10 13 14 (27)	1.0		10	...some interlayering with fine brown silty sand		1443.7						
					13.0' ±								
					(SM) SILTY SAND, red-brown and brown, fine, horizontal layers 1/8" to 1" thick, moist, medium dense								
6	8 8 11 (19)	1.3		15			1438.7						
					16.0'								
					End of Boring								
				20			1433.7						

-AS-Auger Sample
-BS-Bag Sample
-RC-Rock-Core
-GS-Grab Sample
-PS-Piston Tube
-2SS-2" Split Spoon
-3SS-3" Split Spoon
-2ST-2" Shelby Tube
-3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-4-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-9-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 34' E of Deer Lake Road CL, 30' W of Prairie Ave. CL — ELEV.: 1451.8 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 16.0

DATE STARTED: May 1, 03 — DATE COMPLETED: May 1, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0			1451.8						
1	7 3 6 (9)	1.0			Asphalt 0.1'			4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
					Aggregate Base Course 0.6'								
					(FILL) SILTY SAND, brown, fine to medium, trace of fine gravel, wet, loose to medium dense								
2	13 12 11 (23)	1.0			...with rock fragments			Note: Asphalt in 1 layer, possible pothole patch					
					3.2'								
					(SM) SILTY SAND, brown, fine to medium, moist, medium dense								
3	14 13 50/0.4 (-)	1.3		5	...fine to coarse, some fine to coarse gravel/rock fragments		1446.8	Driller's Note: hard drilling from 5.5' to 12.5' cobbles and/or boulders from 5.5' to 7.0'					
4	14 13 50/0.4 (-)	0.6											
5	39 37 47 (84)	1.5		10	...very dense		1441.8						
6	47 37 28 (65)	0.3		15	...wet	▽	1436.8						
					16.0'								
					End of Boring								
				20			1431.8						

AS-Auger Sample; BS-Bag Sample; RC-Rock-Core; GS-Grab Sample; PS-Piston Tube; 2SS-2" Split Spoon; 3SS-3" Split Spoon; 2ST-2" Shelby Tube; 3ST-3" Shelby Tube

▽ while drilling 15.0 ▽ N/A after N/A hours

▼ after drilling N/A

BORING NO.: B-9-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-10-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 15' E of Hewitt St CL, 12' N of Jopling St CL — ELEV.: 1451.6 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 16.0

DATE STARTED: May 1, 03 — DATE COMPLETED: May 1, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.6'		1451.6	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	14 13 28 (41)	0.8			Aggregate Base Course 1.4'								
2	7 6 8 (14)	0.1			(FILL) SILTY SAND, brown, fine to coarse, some fine gravel, wet, dense ...cobbles at 2.0'			Note: Asphalt in 4 layers, bottom layer separated					
					3.0' ±								
3	12 10 12 (22)	1.1		5	(SM) SILTY SAND, brown, fine, moist, medium dense		1446.6						
4	10 16 15 (31)	1.0			7.5' ±	▼							
					(SM) SILTY SAND, brown, fine to coarse, some fine to coarse gravel/rock fragments, wet, dense			Driller's Note: cobbles and/or boulders from 2.0' to 2.5', 9.0' to 10.0' and 13.5' to 14.5'					
5	50/0.3 - - (-)	0.2		10	...gravelly		1441.6						
6	21 26 37 (63)	0.7		15	...very dense		1436.6						
					16.0'								
					End of Boring								
				20			1431.6						

-AS-Auger Sample
-BS-Bag Sample
-RC-Rock-Core
-GS-Grab Sample
-PS-Piston Tube
-2SS-2" Split Spoon
-3SS-3" Split Spoon
-2ST-2" Shelby Tube
-3ST-3" Shelby Tube

▽ while drilling N/A ▼ N/A after N/A hours

▼ after drilling 7.7

BORING NO.: B-10-03

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635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-11-03

CLIENT: DLZ Michigan, Inc. — 1 OF 1

BORING LOCATION: 12' N of Mather Ave. CL, 630' W of Hickory St CL — ELEV.: 1452.1 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 10.4

DATE STARTED: Apr 29, 03 — DATE COMPLETED: Apr 29, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0			1452.1						
1	12 50 50/0.4 (-)	0.2			Asphalt 0.2' / Aggregate Base Course 0.8' / (FILL) SILTY SAND, brown, fine to coarse, with fine gravel, wet, dense			4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
2	50/0.4 - - (-)	0.1						Note: Asphalt in 2 intact layers Driller's Note: hard drilling from 1.5' to 10.4'					
					4.0' ±								
3	14 11 6 (17)	0.7		5	(SM) SILTY SAND, brown, fine to medium, with fine to coarse gravel/rock fragments, wet, medium dense	▼	1447.1	cobbles and/or boulders from 1.5' to 10.4'					
4	50 34 30 (64)	0.6			...very dense								
5	50/0.2 - - bouncing	0.1		10	10.4'		1442.1						
					End of Boring and Auger Drilling Refusal								
				15			1437.1						
				20			1432.1						

-AS-Auger Sample; -BS-Bag Sample; -RC-Rock-Core; -GS-Grab Sample; -PS-Piston Tube; -2SS-2" Split Spoon; -3SS-3" Split Spoon; -2ST-2" Shelby Tube; -3ST-3" Shelby Tube

▽ while drilling 4.5

▼ after drilling 4.5

▼ N/A after N/A hours

BORING NO.: B-11-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
Telephone: (906)-774-3440 Fax: (906)-774-7776

JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-14-03

1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 9' N of Elm St CL, 444' E of North 2nd St CL — ELEV.: 1434.8 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 16.0

DATE STARTED: May 1, 03 — DATE COMPLETED: May 1, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.6'		1434.8	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	12 14 12 (26)	0.9			Aggregate Base Course 1.1'								
					(FILL) SILTY SAND, red-brown, fine to coarse, with fine gravel/rock fragments, wet, medium dense								
2	8 12 15 (27)	1.0				▽		Note: Asphalt in 3 layers, ottom layer separated					
3	25 7 7 (14)	1.1		5	5.0' (SP-SM) SAND, brown, fine to medium, some silt, wet, medium dense		1429.8						
4	9 7 3 (10)	0.2			...red-brown, silty, fine								
					9.0' (SM) SILTY SAND, gray, fine to coarse, some fine gravel, wet, loose								
5	2 2 2 (4)	0.7		10			1424.8						
6	15 27 37 (64)	1.2			...gray-brown, very dense								
7	15 17 19 (36)	1.0		15	...brown, dense		1419.8						
					16.0' End of Boring								
				20			1414.8						

[I] -AS-Auger Sample; [B] -BS-Bag Sample; [I] -RC-Rock-Core; [G] -GS-Grab Sample; [P] -PS-Piston Tube; [X] -2SS-2" Split Spoon; [/] -3SS-3" Split Spoon; [/] -2ST-2" Shelby Tube; [/] -3ST-3" Shelby Tube

▽ while drilling 2.8

▼ after drilling N/A

▼ N/A after N/A hours

BORING NO.: B-14-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
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JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI

BORING NO.: B-13-03

1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 9' N of Miracle St CL, 100' E of Alley ELEV.: 1446.1 +/-

RIG TYPE: Diedrich D-50 Truck Mount DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA BORING DEPTH: 13.2

DATE STARTED: May 1, 03 DATE COMPLETED: May 1, 03 REVIEWED BY: W. Rice DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.7'		1446.1	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	11 14 28 (42)	0.5			Aggregate Base Course 1.1'								
					(FILL) SILTY SAND, brown, fine to coarse, some fine gravel, wet, dense								
2	11 7 8 (15)	0.8			...medium dense			Note: Asphalt in 4 layers, bottom layer separated					
3	6 5 6 (11)	1.5		5	...trace of fine rootlets and black stem pieces 5.4'		1441.1						
					(SM) SILTY SAND, dark brown to dark gray, fine to medium, trace of fine gravel, trace of fine rootlets and fine organic matter, moist, dense 6.5' ±								
4	38 50 50/0.3 (-)	1.0			(SM) SILTY SAND, brown, fine to coarse, with fine gravel/ rock fragments, moist, dense to very dense			Driller's Note: cobbles and/or boulders from 8.0' to 11.5'					
5	40 27 37 (64)	0.4		10	...wet	▼	1436.1						
					13.2'			Driller's Note: rock jammed in auger tip					
					End of Boring and Auger Drilling Refusal								
				15			1431.1						
				20			1426.1						

-AS-Auger Sample
-BS-Bag Sample
-RC-Rock-Core
-GS-Grab Sample
-PS-Piston Tube
-2SS-2" Split Spoon
-3SS-3" Split Spoon
-2ST-2" Shelby Tube
-3ST-3" Shelby Tube

▽ while drilling N/A

▼ after drilling 9.8

▼ N/A after N/A hours

BORING NO.: B-13-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
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JOB NO.: 03117.GPJ
BORING NO.: B-12-03
1 OF 1

PROJECT: Combined Sewer Separation Project, Ishpeming, MI
CLIENT: DLZ Michigan, Inc.
BORING LOCATION: 10' W of Hickory St CL, 21' N of Mather Ave. CL ELEV.: 1480.7 +/-
RIG TYPE: Diedrich D-50 Truck Mount DRILL CREW: K. Frome / J. Deau
DRILLING METHOD: 4-1/4" HSA BORING DEPTH: 10.5
DATE STARTED: Apr 29, 03 DATE COMPLETED: Apr 29, 03 REVIEWED BY: W. Rice DATE: 5/5/03
HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt		1480.7	4-1/4" HSA					
1	Auger Sample				0.75' Aggregate Base Course 1.0'			2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
2	34 44 50 (94)	1.5			(SM) SILTY SAND, brown, fine to coarse, with fine gravel, wet ...moist, very dense			Note: Asphalt in 5 layers, bottom layer broken up					
3	50/0.4 - - bouncing	0.4		5	...some fine to coarse rock fragments		1475.7	Driller's Note: hard drilling from 1.0' to 10.5'					
4	44 50/0.2 - bouncing	0.3				▽							
5	50/0.2 - - bouncing	0.1		10	...wet 10.5' End of Boring and Auger Drilling Refusal		1470.7						
				15			1465.7						
				20			1460.7						

-AS-Auger Sample
-BS-Bag Sample
-RC-Rock-Core
-GS-Grab Sample
-PS-Piston Tube
-2SS-2" Split Spoon
-3SS-3" Split Spoon
-2ST-2" Shelby Tube
-3ST-3" Shelby Tube

▽ while drilling 7.7
▼ after drilling 8.0

▽ N/A after N/A hours

BORING NO.: B-12-03

COLEMAN ENGINEERING COMPANY
635 CIRCLE DRIVE
IRON MOUNTAIN, MICHIGAN 49801
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JOB NO.: 03117.GPJ

PROJECT: Combined Sewer Separation Project, Ishpeming, MI — BORING NO.: B-15-03

1 OF 1

CLIENT: DLZ Michigan, Inc.

BORING LOCATION: 20' E of Hickory St CL, 110' S of Hemlock St CL — ELEV.: 1440.8 +/-

RIG TYPE: Diedrich D-50 Truck Mount — DRILL CREW: K. Frome / J. Deau

DRILLING METHOD: 4-1/4" HSA — BORING DEPTH: 8.5

DATE STARTED: May 1, 03 — DATE COMPLETED: May 1, 03 — REVIEWED BY: W. Rice — DATE: 5/5/03

HOLE CLOSURE: Soil Cuttings, Asphalt Patch

SAMPLE NUMBER	SPT VALUES BLOWS/6"(N)	RECOVERY	LEGEND	DEPTH (FT)	SOIL DESCRIPTION	WATER TABLE	ELEV. (FT)	COMMENTS	TEST RESULTS: +4 -4 -200	MOISTURE CONTENT (%)	LL PL	T (tsf)	q_a (tsf)
				0	Asphalt 0.7'		1440.8	4-1/4" HSA 2" SPT Sampling 140# wt, 30" drop 4" core for asphalt					
1	16 16 12 (28)	1.0			Aggregate Base Course 1.1' (FILL) SILTY SAND, brown, fine to coarse, trace of fine gravel, moist, medium dense								
2	10 10 8 (18)	1.0			...some fine gravel	▼		Note: Asphalt in 5 layers, bottom layer broken up					
3	5 5 3 (8)	1.0		5	...loose		1435.8						
					6.5' ±								
					(PT) PEAT, black, fibrous, wet								
4	3 2 25 (27)	1.0			8.4'			sample had petroleum odor					
					(SM) SILTY SAND, brown to gray, fine to coarse, trace of fine gravel, some fibrous organic matter, wet, medium dense 8.5'								
					End of Boring								
				10			1430.8						
				15			1425.8						
				20			1420.8						

[I] -AS-Auger Sample
[B] -BS-Bag Sample
[I] -RC-Rock-Core
[G] -GS-Grab Sample
[P] -PS-Piston Tube
[X] -2SS-2" Split Spoon
[/] -3SS-3" Split Spoon
[◢] -2ST-2" Shelby Tube
[◤] -3ST-3" Shelby Tube

▽ while drilling N/A
▼ after drilling 4.2

▼ N/A after N/A hours

BORING NO.: B-15-03

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DIVISION 02 - SITE WORK

SECTION 02220A

DEMOLITION

-- End of Section Table of Contents --

SECTION 02220A

DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible (in accordance with Section 01572, CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT, if applicable); salvaged items and materials shall be disposed of as specified. All work activities shall be described in Work Plan, as indicated in SUBMITTALS paragraph.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Work Plan; G, AOF

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of

operations in accordance with EM 385-1-1.

1.4 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

1.5 PROTECTION

1.5.1 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, or section will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.5.2 Protection of Structures

Structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, of lateral support until demolished, unless directed otherwise by the Contracting Officer. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.3 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.4 Protection of Trees

Trees within the project site which might be damaged during demolition, and which are indicated to be left in place, shall be protected by a 6 foot high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.5.5 Environmental Protection

The work shall comply with the requirements of Section 01130, ENVIRONMENTAL PROTECTION.

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 USE OF EXPLOSIVES

Use of explosives will not be permitted.

1.8 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available in accordance with local requirements.

1.9 CHECK SURVEYS

The Contractor shall verify elevations and dimensions as shown on the construction drawings and notify the COR of any discrepancies. Before beginning any excavation work, the Contractor shall survey the site and examine the drawings and specifications to determine the extend of work. The Contractor shall coordinate the work of this section with all other work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 EXISTING STRUCTURES

Existing structures indicated shall be removed as indicated. Sidewalks, curbs, gutters and street light bases shall be removed as indicated.

3.2 UTILITIES

When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area.

3.3 FILLING

Holes, and other hazardous openings shall be filled in accordance with Section 02300a, EARTHWORK.

3.4 DISPOSITION OF MATERIAL

Title to material and equipment to be demolished, except Government salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed.

3.4.1 Salvageable Items and Material

Contractor shall salvage items and material to the maximum extent possible.

3.4.1.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

3.4.1.2 Items Salvaged for the Government

Salvaged items to remain the property of the Government shall be removed in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage shall be repaired or replaced to match existing items. Containers shall be properly identified as to contents. The following items reserved as property of the Government shall be delivered to the areas designated: Item directed by the Contracting Officer.

3.4.1.3 Items Salvaged for the Using Service

The following items reserved as property of the using service shall be removed prior to commencement of work under this contract: Item directed by the Contracting Officer.

3.4.1.4 Historical Items

Historical items shall be removed in a manner to prevent damage. The following historical items shall be delivered to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

3.4.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of in the disposal area located and approved by the Contracting Officer. The fill in the disposal area shall remain below elevation and after disposal is completed, the disposal area shall be uniformly graded to drain. Combustible material shall be disposed of off the site.

3.5 CLEAN UP

Debris and rubbish shall be removed from holes and similar excavations. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

3.6 PAVEMENTS

Existing pavements designated for removal shall be saw cut and removed in accordance with the details shown on the drawings and to the limits and depths indicated on the drawings.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02230A

CLEARING AND GRUBBING

-- End of Section Table of Contents --

SECTION 02230A

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.1.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Materials Other Than Salable Timber; G, AOF

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and

disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

3.4.1 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the project limits at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02302N

EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES

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SECTION 02302N

EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

ACPA 01-103	(1990) Concrete Pipe Installation Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 14	(1995) Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C 76	(1997) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 1586	(1984; R 1992) Penetration Test and Split-Barrel Sampling of Soils
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method
ASTM D 4253	(1993) Maximum Index Density of Soils Using a Vibratory Table

ASTM D 4254	(1991) Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) Safety and Health Requirements Manual

STATE OF MICHIGAN, DEPARTMENT OF TRANSPORTATION STANDARD (MDOT)

MDOT SEC 813	Standard Specification for Construction, "SLOPE PROTECTION"; Dated 2003
MDOT SEC 902	Standard Specification for Construction, "AGGREGATES"; Dated 2003

1.2 DEFINITIONS

1.2.1 Backfill

Material used in refilling a cut, trench or other excavation.

1.2.2 Cohesive Materials

Soils classified by ASTM D 2487 as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when fines have a plasticity index greater than zero.

1.2.3 Cohesionless Materials

Soils classified by ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.2.4 Compaction

The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of Compaction" is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D 698 or ASTM D 1557 for general soil types, abbreviated in this specification as "95 percent ASTM D 698 maximum density."

1.2.5 Granular Pipe Bedding

A dense, well-graded aggregate mixture of sand, gravel, or crushed stone (mixed individually, in combination with each other, or with suitable binder soil) placed on a subgrade to provide a suitable foundation for pipe. Granular bedding material may also consist of poorly graded sands or gravels where fast draining soil characteristics are desired.

1.2.6 Hard Material

Weathered rock, dense consolidated deposits, or conglomerate materials (excluding man made materials such as concrete) which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal. Material indicated in the soil boring logs as having a standard penetration resistance as determined by ASTM D 1586 between 60 and 600 blows per foot is arbitrarily defined herein as "Hard Material."

1.2.7 In-Situ Soil

Existing in place soil.

1.2.8 Lift

A layer (or course) of soil placed on top of subgrade or a previously prepared or placed soil in a fill or backfill.

1.2.9 Porous Fill

A granular soil material having a large void ratio when placed and compacted, allowing a free flow of fluid to or from the surrounding soil, with no more than 5 percent of the material passing the No. 200 Sieve.

1.2.10 Refill

Material placed in excavation to correct overcut in depth.

1.2.11 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of "hard material" will not be considered rock excavation because of intermittent use of backhoe-mounted pneumatic hole puncher or rock breaker that is performed merely to increase production. Material identified in the soil boring logs as having a standard penetration resistance as determined by ASTM D 1586 greater than 600 blows per foot is arbitrarily defined herein as "Rock."

1.2.12 Topsoil

In natural or undisturbed soil formations, the fine-grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be a dark-colored, fine, silty, or sandy material with a high content of well decomposed organic matter, often containing traces of the parent rock material. Gradation and material requirements specified herein apply to all topsoil references in this contract. The material shall be representative of productive soils in the vicinity.

1.2.13 Unyielding Material

Rock rib, ridge, rock protrusion, or soil with cobbles in the trench bottom requiring a covering of finer grain material or special bedding to avoid bridging in the pipe or conduit.

1.2.14 Unsatisfactory Material

In-Situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in the trench without excessive consolidation or loss of stability. Also backfill material which contains refuse, frozen material, large rocks, debris, soluble particles, and other material which could damage the pipe or cause the backfill not to compact. Materials classified as PT, OH, or OL by ASTM D 2487 are unsatisfactory.

1.2.15 Unstable Material

Material in the trench bottom which lacks firmness to maintain alignment and prevent joints from separating in the pipe, conduit, or appurtenance structure during backfilling. This may be material otherwise identified as satisfactory which has been disturbed or saturated.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-06 Test Reports

Trench backfill material tests; G, AOF

Pipe bedding; G, AOF

material tests; G, AOF

Topsoil tests; G, AOF

Test for moisture-density relation; G, AOF

Density and moisture tests; G, AOF

Submit Test reports within 15 days of completion

SD-07 Certificates

Shoring and sheeting plan; G, AOF

Dewatering plan; G, AOF

Submit plans within 10 days of award of contract

1.4 REGULATORY REQUIREMENTS

Materials and workmanship specified herein with reference to MDOT State Standard shall be in accordance with the referenced articles, sections, and paragraphs of the standard except that contractual and payment provisions do not apply. Where the term "Engineer" is used, it shall mean the Contracting Officer. Where the term "state" is used, it shall mean "Federal Government."

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver and store materials in a manner to prevent contamination, segregation, freezing, and other damage. Store synthetic fiber filter fabric to prevent exposure to direct sunlight.

1.6 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. No pipes or other man-made obstructions, except those indicated, will be encountered.

c. The character of the material to be excavated or found in the trench is as indicated. In addition to rock as indicated and as defined in paragraph entitled "Definitions," hard material in the form of conglomerate clay, sand, silt, or gravel will be encountered. Remove such hard material to the lines and grades indicated regardless of the hardness or quantity. Removal of rock to the lines and grades indicated shall be done at the unit price bid for "Rock Excavation." Base bids on cubic yards of rock excavation.

d. Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

e. Suitable backfill and bedding material in the quantities required is not available at the project site.

f. Blasting will not be permitted.

1.7 PROTECTION

1.7.1 Dewatering Plan

Base on site surface and subsurface conditions, available soil and hydrological data.

1.7.2 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within two feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

1.8 QUALITY ASSURANCE

1.8.1 Shoring and Sheeting Plan

Describe materials of shoring system to be used. Indicate whether or not components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a professional engineer registered in any jurisdiction. Indicate sequence and method of installation and removal.

1.8.2 Dewatering Plan

Describe methods for removing collected water from open trenches and diverting surface water or piped flow away from work area. Record performance and effectiveness of method or system in use and submit weekly.

1.8.3 Test for moisture-density relation

Submit 7 days prior to commencing utility excavation.

1.8.4 Topsoil tests

Submit topsoil tests verifying conformance to required parameters prior to commencing seeding operations.

1.8.5 Density and moisture tests

Submit field test data not listed above sufficiently in advance of construction so as not to delay work. Submit within 14 days of test date.

1.8.6 Trench backfill material tests

Submit field test data not listed above sufficiently in advance of construction so as not to delay work. Submit within 14 days of test date.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

Provide soil materials as specified below free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, ice, or other deleterious and objectionable materials.

2.1.1 Backfill

Bring trenches to grade indicated on the drawings using material, classified as MDOT MDOT SEC 902 State Standard.

2.1.2 Special Backfill for Structures and Pavements

Backfill trenches under roads, structures, and paved areas with material conforming to class II, MDOT MDOT SEC 902 State Standard.

2.1.3 Sand

Clean, coarse-grained sand classified as fine aggregate in accordance with Section gradation 2NS, 2 MS, or 2SS of the MDOT MDOT SEC 902 State Standard.

2.1.4 Gravel

Clean, coarsely graded natural gravel, crushed stone or a combination thereof identified as dense-graded coarse aggregates in accordance with Section grade 21AA, 21A, 22A, or 23A of the MDOT MDOT SEC 902 State Standard.

2.1.5 Topsoil Material

Salvaged topsoil from stockpile. Furnish additional topsoil from approved sources off the site if stockpiled material is insufficient to complete work indicated.

Free of subsoil, stumps, rocks larger than 3/4 inch in diameter (with maximum 3 percent retained on 1/4 inch sieve), brush, weeds, toxic substances, and other material or substance detrimental to plant growth. Topsoil shall be a natural, friable soil representative of productive soils in the vicinity.

2.1.6 Borrow

Provide materials meeting requirement for pipe bedding, fill, special backfill, sand, gravel, backfill, granular fill, and topsoil. Obtain borrow materials in excess of those furnished from excavations specified herein from approved sources off the site.

2.1.7 Pipe Bedding

TABLE 02302-1 UTILITY EARTHWORK REFERENCES

	PIPE MATERIALS	NAVY SPECIFICATION	SOIL MATERIALS REFERENCE	INSTALLATION REF
a.	Concrete Gravity, Sewer, Culvert	02630N 02530N	ASTM C 76 (Reinforced) ASTM C 14 (Non-Reinforced) Class A, B, or C, bedding material	ACPA 01-103

Provide material for pipe bedding gradation class II of the MDOT Sec 902 State Standard.

2.2 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, glass or polypropylene , ultraviolet resistant filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D 4759:

		Class A	Class B
a.	Grab tensile strength (ASTM D 4632) machine and transversed direction	min. 200	90 lbs.
b.	Grab elongation (ASTM D 4632) machine and transverse direction	min. 15	15 percent
c.	Puncture resistance (ASTM D 4833)	min. 75	45 lbs.
d.	Mullen burst strength (ASTM D 3786)	min. 200	140 psi.
e.	Trapezoidal Tear (ASTM D 4533)	min. 75	45 lbs.
f.	Apparent Opening Size (ASTM D 4751)	min. .21	.21 mm
g.	Permeability (ASTM D 4491)	k fabric greater than k Soil	
h.	Ultraviolet Degradation (ASTM D 4355)	70 percent Strength retained at 150 hours	

2.3 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum diameter of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring bracing trench boxes and sheeting where indicated. In addition to Section 25 A and B of EM 385-1-1 and other requirements set forth in this contract, include provisions in the shoring and sheeting plan that will accomplish the following:

a. Prevent undermining of pavements, foundations and slabs.

b. Prevent slippage or movement in banks or slopes adjacent to the excavation.

3.1.2 Drainage and Dewatering

Plan for and provide the structures, equipment, and construction for the collection and disposal of surface and subsurface water encountered in the course of construction.

3.1.2.1 Drainage

Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

3.1.3 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 1 foot below the working level.

Operate the dewatering system until construction work below existing water levels is complete. Measure and record the performance of the dewatering system. Have a back-up pump and system available for immediate use.

3.1.4 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the "MISS DIG" alert system at (1-800-482-7171) for assistance in locating existing utilities.

3.1.5 Structures and Surfaces

Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance. Protect existing streams, ditches, and storm drain inlets from water-borne soil by means of filter fabric dams as indicated on the contract drawings. Perform work in accordance with requirements specified in Section 01575N, TEMPORARY ENVIRONMENTAL CONTROLS.

3.1.5.1 Disposal of Excavated Material

Dispose of excavated material so that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work.

3.1.5.2 Stockpile Rock

Stockpile rock from trench excavations in the location indicated and use for constructing sides and bottoms of channels (rip-rap,)as directed by Contracting Officer. Remove excess stockpiled rock upon completion of

construction.

3.1.6 Channels and Ditches

Construct (rip-rap) rock protection in areas indicated to the lines and thicknesses specified to dissipate stream energy and prevent channel erosion. Place rip-rap in bedding of on a layer of filter fabric.

3.2 SURFACE PREPARATION

3.2.1 Stockpiling Topsoil

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be wasted. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

3.2.2 Cutting Pavement, Curbs, and Gutters

Saw cut with neat, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits. When the saw cut is within 6 feet of an existing joint, remove pavement to the existing joint.

3.3 GENERAL EXCAVATION AND TRENCHING

Keep excavations free from water while construction is in progress. Notify the Contracting Officer immediately in writing if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe. Excavate ledge rock, boulders, and other unyielding material to an overdepth at least 6 inches below the bottom of the pipe and appurtenances unless otherwise indicated or specified. Blasting will not be permitted. Overexcavate soft, weak, or wet excavations as indicated. Use bedding material placed in 6 inch maximum layers to refill overdepths to the proper grade. At the Contractor's option, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe and structure on undisturbed soil, or bedding material as specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation. Trench dimensions shall be as indicated.

3.3.1 Shoring and Sheeting

Shore and sheet excavations as described in the plan submitted with various member sizes arranged to prevent injury to persons and damage to structures. Arrange shoring and sheeting to preclude injurious caving during removal. Obtain approval from the Contracting Officer prior to removing shoring, sheeting, or bracing in excavations adjacent to on-grade

slabs, foundations, or other structural elements.

3.4 BEDDING

Of materials and depths as specified for utility lines and utility line structures. Place bedding in 6 inch maximum loose lifts. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints.

3.5 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over it's entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal.

3.6 BACKFILLING

Construct backfill in two operations (initial and final) as indicated and specified in this section. Place initial backfill in 6 inch maximum loose lifts to 1 foot above pipe unless otherwise specified. Ensure that initially placed material is tamped firmly under pipe haunches. Bring up evenly on each side and along the full length of the pipe, or structure. Ensure that no damage is done to the utility or its protective coating. Place the remainder of the backfill (final backfill) in 10 inch maximum loose lifts unless otherwise specified. Compact each loose lift as specified in the paragraph entitled "General Compaction" before placing the next lift. Do not backfill in freezing weather or where the material in the trench is already frozen or is muddy, except as authorized. Provide a minimum cover from final grade of 3 feet for water piping, storm drains, and for sewer mains. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation. Coordinate backfilling with testing of utilities. Testing for the following shall be complete before final backfilling: water distribution, storm drainage, sanitary sewer,and gas distribution systems.

3.7 COMPACTION

Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings. Compact material in accordance with the following unless otherwise specified. If necessary, alter, change, or modify selected equipment or compaction methods to meet specified compaction requirements.

3.7.1 Compaction of Material in Subcuts or Overexcavations

In rock, compact to 95 percent of ASTM D 1557 maximum density. In stable soils, compact to 95 percent of maximum density ASTM D 1557.

3.7.2 Compaction of Pipe and Conduit Bedding

In rock, compact to 95 percent and in soil, compact to 95 percent of ASTM D 1557 maximum density.

3.7.3 Compaction of Backfill

Compact initial backfill material surrounding pipes, cables, conduits, or ducts, to 95 percent of ASTM D 698, ASTM D 1557, ASTM D 4254 maximum density except where bedding and backfill are the same material. Where bedding and backfill are the same material, compact initial backfill to the density of the bedding. Under areas to be seeded or sodded, compact succeeding layers of final backfill to 85 percent of ASTM D 698, ASTM D 1557, ASTM D 4254 maximum density. For utilities under structures and pavements compact succeeding layers of final backfill as specified under paragraph entitled "Special Earthwork Installation Requirements."

3.8 SPECIAL EARTHWORK INSTALLATION REQUIREMENTS

3.8.1 Manholes and Other Appurtenances

Provide at least 12 inches clear from outer surfaces to the embankment or shoring. Remove rock as specified herein. Refill overdepths with gravel to the required grade and compact as specified.

3.8.2 Compaction for Structures and Pavements

Place final backfill in 10 inch maximum loose lifts. If a vibratory roller is used for compaction of final backfill, the lift thickness can be increased to 10 inches. Compact all backfill surrounding pipes, ducts, conduits, and other structures to 95 percent of ASTM D 1557 maximum density except compact the top 12 inches of subgrade to 95 percent of ASTM D 1557 maximum density. Backfill to permit the rolling and compacting of the completed excavation with the adjoining material, providing the specified density necessary to enable paving of the area immediately after backfilling has been completed.

3.8.3 Granular Backfill Without Filter Fabric

3.8.3.1 Open-Joint Pipe

Place both types of granular material specified as pipe is laid forming an aggregate filter around the pipe. Provide Type II material to envelope the pipe a minimum of one-half the pipe diameter or twice the maximum aggregate size, whichever is larger, on each side and on top of the pipe. Place Type I material next to and on top of the Type II material to provide a total fill extending at least one pipe diameter on each side of and 18 inches above the top of the pipe. Place a layer of kraft paper on top of the granular filter before continuing with the backfill.

3.9 RIP-RAP CONSTRUCTION

Construct rip-rap on filter fabric without grout in accordance with MDOT MDOT SEC 813 State Standard, in the areas indicated.

3.9.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.9.2 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.10 FINISH OPERATIONS

3.10.1 Grading

Finish to grades indicated within one-tenth of a foot. Provide sod or topsoil in areas to be seeded or sodded in accordance with requirements specified in Section 02921a, SEEDING. Grade areas to drain water away from structures and to provide suitable surfaces for mowing machines. Grade existing grades that are to remain but have been disturbed by the Contractor's operations.

3.10.2 Spreading Topsoil

Clear areas to receive topsoil for the finished surface of materials that would interfere with planting and maintenance operations. Scarify subgrade to a depth of 2 inches. Do not place topsoil when the subgrade is frozen, extremely wet or dry, or in other conditions detrimental to seeding, planting, or grading. Spread topsoil to a uniform depth of 4 inches over the designated areas.

3.10.3 Disposition of Surplus Material

Surplus or other soil material not required or suitable for filling, backfilling, or grading shall be removed to approved location outside of project site. Comply with requirements of Section 01575N, TEMPORARY ENVIRONMENTAL CONTROLS.

3.10.4 Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur and as required in Section 01575N, "Temporary Environmental Controls." Repair or reestablish damaged grades, elevations, or slopes.

3.10.5 Pavement Repair

Repair pavement, curbs, and gutters as specified in Section 02770a, CONCRETE SIDEWALKS AND CURBS AND GUTTERS. Do not repair pavement until trench or pit has been backfilled and compacted as specified herein. Provide a temporary road surface of gravel over backfilled portion until permanent pavement is repaired. Remove and dispose of temporary road surface material when permanent pavement is placed. As a minimum, maintain one-way traffic on roads and streets crossed by trenches.

3.11 FIELD QUALITY CONTROL

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. Test sand, gravel, bedding, backfill, and topsoil for

conformance to specified requirements. Test backfill to be used under roads and paved areas for conformance to special requirements. Test bedding and backfill for moisture-density relations in accordance with ASTM D 698, ASTM D 1557 and ASTM D 4253 as specified herein. Perform at least one of each of the required tests for each material provided. Perform sufficiently in advance of construction so as not to delay work. Provide additional tests as specified above for each change of source. Perform density and moisture tests in randomly selected locations and in accordance with ASTM D 1556, ASTM D 2922 and ASTM D 3017 as follows:

a. Bedding and backfill in trenches: One test per 50 linear feet in each lift.

b. Appurtenance structures: One test per 100 square feet or fraction thereof in each lift.

Where ASTM D 2922 and ASTM D 3017 are used to test field compaction densities, verify test results by performing at least one test per day using ASTM D 1556 at a location already tested in accordance with ASTM D 2922. Perform at least one additional test using ASTM D 1556 for every ten tests performed with a nuclear device, at locations checked in accordance with ASTM D 2922.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02317

ROCK REMOVAL

05/02

-- End of Section Table of Contents --

SECTION 02317

ROCK REMOVAL
05/02

PART 1 GENERAL

1.1 SUMMARY

A. Section includes removal of identified and discovered rock during excavation, and the use of expansive tools or explosives to assist rock removal. The use of explosives will only be permitted after discussion with the Contracting Oficer's Representative (COR), the local community and the Michigan State Police as to where and when explosives are to be used.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lbf/cu. ft.
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 495	Code for Manufacture, Transportation, Storage, and Use of Explosive Materials.

1.2 MEASUREMENT AND PAYMENT

1.2.1 Rock Removal

A. Basis of Measurement: By the cubic yard measured after removal.

B. Basis of Payment: Includes preparation of rock for removal, explosive or mechanical disintegration of rock, removal from position, loading and removing from site. For over excavation, payment will not be made for over excavated work nor for replacement materials.

1.2.2 DEFINITIONS

A. Site and Trench Rock: Solid mineral material with volume in excess of 0.5 cu yd or solid material that cannot be removed with 3/4 cu yd capacity excavator without drilling or blasting.

B. Rock: Solid mineral material of size that cannot be removed with 3/4 cu yd capacity excavator.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Permits

Permits; G, AOF

Submit copies of all required permits to the COR for documentation prior to transporting explosives to the work site.

SD-02 Shop Drawings

Shop Drawings; G, AOF

Indicate proposed method of blasting, delay pattern, explosive types, type of blasting mat or cover, and intended rock removal method.

SD-03 Blasting Plans

Blasting Plans; G, AOF

Submit for information not less than 30 days prior to starting a new phase of work a proposed Blasting Plan(s) for accomplishing excavation by use of explosives. The Blasting Plan(s) shall include the following data concerning the proposed blasting operation:

A. Location, depth, area, anticipated neat lines, and relationship to adjacent excavations and work.

B. Diameter spacing, burden, depth, pattern and inclination of blast holes.

C. Type, strength, amount in terms of weight and cartridges of explosives to be used in each hole, on each delay, and total of each blast.

D. Distribution of charge in each hole and priming of each hole.

E. Type, sequence, and number of delays; delay pattern, including delays in trunklines; wiring/detonation chord/shock tube diagram including any for blast, size and type of hookup/trunk/signal lines, and lead lines; type and capacity of firing source; type, size and locations of safety switches and lighting gaps if electrical detonators are used.

F. Scaled range of distance used to calculate scaled range if blast will exceed vibration limits.

G. Stemming of holes and matting or covering of blast area, including surface detonating chords, shock tubes, and delays.

H. Qualifications of person directly responsible for supervising loading of shot and for firing it.

I. Other information required by law, regulation and ordinance.

SD-06 Test Reports

Survey Report; G, AOF

Submit survey report on conditions of buildings near locations of rock removal.

Blasting Records; G, AOF

Complete, maintain, and submit permanent blast reports, including logs of each blast. Complete reports shall be prepared and submitted after each blast and shall include:

A. Date, time of shot, and limits of blast by depth or station.

B. Amount of explosive used and number of cartridges.

C. Total number of delays used, and number of holes used for each delay period.

D. A diagram of the reviewed blast pattern showing holes not drilled, holes added and drilled but not loaded, changes in spacing or pattern of delays, or in loading of holes.

E. Total number of holes, maximum charge per hole, and corresponding delay number.

F. Evaluation of blast including tights, areas of significant overbreak and recommended adjustments to the blast pattern for the next blast.

G. Other information required by law, regulation or ordinance such as a permit.

1.4 QUALITY ASSURANCE

A. Seismic Survey Firm: Licensed company specializing in seismic surveys with five years documented experience. The independent testing agency, shall be acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Report types of explosive and size of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operation, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

2. Seismographic monitoring during blasting operations.

B. Explosives Firm: Company specializing in explosives for disintegration of rock, with five years documented experience. The Contractor shall ensure all requirements as described in the required permits are followed at a minimum. The Contractor, in cooporation with the explosives firm, shall submit detailed shop drawings, blasting plans and blasting records in accordance with SUBMITTALS paragraph.

1.5 PROJECT CONDITIONS

A. Conduct survey and document conditions of buildings near locations of rock removal, prior to blasting, and photograph existing conditions identifying existing irregularities. The Contractor shall submit a detailed survey report in accordance with SUBMITTALS paragraph.

B. Advise owners of adjacent buildings or structures in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations.

C. Obtain seismic survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.6 SCHEDULING

A. Schedule Work to avoid disruption to occupied buildings nearby

B. Conduct blasting operations between hours of 10:00 A.M. and 3:00 P.M. only.

1.7 STORAGE OF EXPLOSIVES

A. All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and such storage shall be clearly identified. Where no local laws or ordinances may apply, storage shall be provided in a manner satisfactory to the COR, but no closer than 1000 feet from a traveled road, building or other area of human occupancy.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Explosives

Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.

2.1.2 Delay Device

Type recommended by explosives firm.

2.1.3 Blast Mat Materials

Type recommended by explosives firm.

PART 3 EXECUTION

3.1 EXAMINATION

Verify site conditions and note subsurface irregularities affecting Work of this section.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. The Contractor shall contact all utility owners within the area of proposed blasting and inform them of the intent to use explosives and inquire as to any additional requirements as needed. This contact shall be made as soon as practical in advance of the use of explosives so that the utility company can mobilize to protect their property

C. The Contractor shall be solely responsible for the safe use of explosives under this contract, including any structural or other property damage resulting from transportation, storage, and use of explosives in rock excavation, control of fly rock, and control of noise and vibrations from blasting. Storage, transportation and use of explosives shall comply with all requirements of Michigan Occupational Safety and Health Administration (MIOSHA).

3.3 ROCK REMOVAL BY MECHANICAL METHOD

Excavate and remove rock by mechanical method.

A. Drill holes and use expansive tools or wedges to fracture rock.

B. Cut away rock at bottom of excavation to form level bearing.

C. Remove shaled layers to provide sound and unshattered base for sewer pipe and structures.

D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Remove excavated materials from site.

F. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02302.

3.4 ROCK REMOVAL BY EXPLOSIVE METHODS

A. Techniques such as the use of proper hole diameter, hole depth, hole angle, burden and spacing distances, types and distribution of explosives, delay intervals and sequence, removal of muck piles between each shot, special handling techniques that may be required as necessary to achieve the desired elevations are the responsibility of the Contractor and should be included in the Blasting Plan. All aspects of blasting shall be specifically designed so that the end product is not damaged from the blasting technique and that the excavation is suitable for the intended purpose, and completely complies with these specifications.

B. When rock is uncovered requiring explosives method for rock disintegration, notify COR.

C. Provide seismographic monitoring during progress of blasting operations.

D. Drill blasting holes within 12 feet of finished slope.

E. The Contractor shall erect signboards of adequate size stating that blasting operations are taking place in the area and such signs shall be clearly visible at all points of the access to the area. The Contractor shall notify homeowners within 500 feet of the intent to use explosives in the vicinity of their house. Contact shall include door hangers/flyers placed in the mailbox a minimum of 72 hours prior to the intended use of explosives. Contractor shall notify the local municipality of the intent to use explosives a minimum of 48 hours prior to the use of the explosives. Use a reliable warning system incorporating MIOSHA, Standard Audible Signals established for the project, to ensure that all personnel in the area are forewarned of the impending detonation of explosives. Signals of danger shall be given and displayed before firing any blasts.

F. Disintegrate rock and remove from excavation. All loaded holes shall be exploded at the completion of drilling and loading during working hours. No explosives will be permitted to remain within a loaded hole overnight.

G. Remove rock at excavation bottom to form level bearing.

H. Remove shaled layers to provide sound and unshattered base for sewer pipe and structures.

I. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

J. Remove excavated material from site.

K. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02302.

3.5 SAFEGUARDS

A. Exercise extreme care in blasting in the work under this Contract.

B. Obey all rules and regulations for the protection of life and property that may be required by law relative to the transporting, storing and handling of explosives and the firing of blasts.

C. Limit the amount of the explosive charge for each to no larger than necessary to blast the rock it is intended to remove and so place the explosive to minimize the amount of rock breakage outside the lines of the finished work.

3.6 CONTROL OF FLY ROCK

A. Blasting mats, temporary covers or other suitable means shall be used to control fly rock and reduce blast noise. All blast holes shall be properly stemmed and detonating cord covered to control noise.

3.7 NOISE AND VIBRATION CONTROL DURING BLASTING

A. The first blasting operation at each location shall be considered as a test case, and the proper drilling pattern and amount of explosive to be used shall be determined from the vibration test. Further

testing and recording shall be made until the proper safe resulting vibration is established.

B. Furnish, install, calibrate, maintain and operate instrumentation for measuring and recording blasting vibrations and air blast over-pressures.

C. The recording instruments shall be a 4-component velocity seismograph, one component of which measures and records air blast over-pressures. Additional instruments shall be provided as necessary to evaluate propagation of blasting vibrations and air blast in different directions. At least one instrument shall be available at each site to record each blast event. All instruments shall be periodically checked for proper calibration and shall be maintained in first-class working order. Instruments shall be replaced, repaired or re-calibrated when needed and when directed by the COR.

D. The recording shall be taken under the supervision of the Vibration Monitoring consultant. In addition, the consultant shall interpret the readings and shall establish the vibration limitations at the various locations, but under no circumstances shall the limit exceed the value as discussed below, or such lesser limit as established by ordinance or regulation.

E. Provide trained personnel to operate the monitoring equipment and interpret the recordings. Provide names and resumes of personnel to the COR.

F. Conduct all blasting in such a manner as to reduce vibrations which reach adjacent structures and facilities to or below acceptable limits as established by the Contractor, but which shall not exceed the limits as specified below or limits as established by ordinance or regulation, whichever is lower.

1. 0.2 inch per second at a frequency 1 Hertz.

2. 0.5 inch per second at frequencies between 2.6 Hertz and 40 Hertz.

3. Velocities less than that defined by a straight line variation between 1 Hertz and 2.6 Hertz, per 1. and 2. above.

G. Air blast overpressures and impact or impulsive noise (noise of duration less than 1 second) shall not exceed 0.029 pounds per square inch or 140 dB measured with an impact noise meter or seismograph at the edge of the shafts, or limits as established by ordinance or regulation, whichever is lower.

H. Compliance with the vibration and noise levels specified herein shall not relieve the Contractor of his responsibilities with respect to structural or other property damages or his responsibilities under low, ordinance or regulation.

I. Suspend all blasting and submit a report to the COR immediately in the event any recordings indicate a caution or danger classification is being approached. Reduce the size of the loads, use millisecond delay detonators or otherwise cause appropriate measures to be taken to reduce the resulting vibrations to the safe limits.

J. Provide results and interpretation of all blasting records to the COR within 24 hours of blasting.

3.8 BLASTING RECORDS

A. Maintain a record of each blast detonated and make the record available to the COR or his designated representatives at all times. This record shall include the following:

1. Plan of the blast hole spacings, depths of blast holes, and the location of the blast point in relation to project stationing.

2. Drilling record showing any unusual joint or seam conditions encountered in the rock and/or concrete.

3. Type and strength of explosives, type of blasting caps, and distribution of delays used.

4. Total explosive loadings per round and per group of delays.
5. Comments by blaster in charge regarding any misfires, unusual results, or effects.

6. Prevailing weather conditions at the blast site, including direction and approximate velocity of wind, atmospheric temperature, relative humidity, and cloud conditions at the time of blast.

7. Date and exact firing time of blast.

8. Name of person in responsible charge of loading and firing and blaster permit number.

9. Signature and title of person making record entries.

3.9 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing and Inspection Services.

B. Request visual inspection of foundation bearing surfaces by inspection agency and COR before installing subsequent work.

C. Report all complaints to the COR within 24 hours of receipt thereof. Include the name, address, date, time received, date and time of blast complained about, and a brief description of the alleged damages or other circumstances upon which the complaint is predicated in each report.

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DIVISION 02 - SITE WORK

SECTION 02378A

GEOTEXTILES USED AS FILTERS

-- End of Section Table of Contents --

SECTION 02378A

GEOTEXTILES USED AS FILTERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 123	(1996a) Standard Terminology Relating to Textiles
ASTM D 4491	(1999) Water Permeability of Geotextiles By Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 1110-2-1601	(1991; Change 1-1994) Hydraulic Design of Flood Control Channels

STATE OF MICHIGAN, DEPARTMENT OF TRANSPORTATION (MDOT)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-04 Samples

Geotextile; G, AOF

If requested,submit geotextile samples for testing to determine compliance with the requirements in this specification. When required, submit samples a minimum of 60 days prior to the beginning of installation of the same textile. Upon delivery of the geotextile, submit duplicate copies of the written certificate of compliance signed by a legally authorized official of the manufacturer. The certificate shall state that the geotextile shipped to the site meets the chemical requirements and exceeds the minimum average roll value listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Upon request, supply quality control and quality assurance tests for the geotextile. All samples provided shall be from the same production lot as will be supplied for the contract, and shall be the full manufactured width of the geotextile by at least 10 feet long, except that samples for seam strength may be a full width sample folded over and the edges stitched for a length of at least 5 feet. Samples submitted for testing shall be identified by manufacturers lot designation. For needle punched geotextile, the manufacturer shall certify that the geotextile has been inspected using permanent on-line metal detectors and does not contain any needles.

SD-07 Certificates

Geotextile; G, AOF

Submit the manufacturer's certification of the geotextile material.

1.3 SHIPMENT, HANDLING, AND STORAGE

1.3.1 Shipment and Storage

Only approved geotextile rolls shall be delivered to the project site. All geotextile shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873. No hooks, tongs, or other sharp instruments shall be used for handling geotextile.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Geotextile

2.1.1.1 General

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall equal or exceed the minimum average roll values listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Strength values indicated in the table are for the weaker principal direction.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAP STRENGTH	lb	200	ASTM D 4632

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

PUNCTURE	lb	75	ASTM D 4833
TRAPEZOID TEAR	lb	75	ASTM D 4533
APPARENT OPENING SIZE	U.S. SIEVE	70	ASTM D 4751
PERMITTIVITY	sec -1	5	ASTM D 4491

2.1.1.2 Geotextile Fiber

Fibers used in the manufacturing of the geotextile shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, polyesters, or polamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

2.1.2 Securing Pins

The geotextile shall be secured to the embankment or foundation soil by pins to prevent movement prior to placement of revetment materials. Other appropriate means to prevent movement such as staples, sand bags, and stone could also be used. Securing pins shall be inserted through both strips of overlapped geotextile along the line passing through midpoints of the overlap. Securing pins shall be removed as placement of revetment materials are placed to prevent tearing of geotextile or enlarging holes maximum spacing between securing pins depends on the steepness of the embankment slope. The maximum pins spacing shall be equal to or less than the values listed in TABLE 2, MAXIMUM SPACING FOR SECURING PINS. When windy conditions prevail at the construction site, the number of pins should be increased upon the demand of the Contracting Officer. Terminal ends of the geotextile shall be anchored with key trench or apron at crest, toe of the slope and upstream and downstream limits of installation.

TABLE 2
MAXIMUM SPACING FOR SECURING PINS

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

2.2 INSPECTIONS, VERIFICATIONS, AND TESTING

2.2.1 Manufacturing and Sampling

Geotextiles and factory seams shall meet the requirements specified in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Conformance testing shall be performed in accordance with the manufacturers approved quality control manual.

2.2.2 Site Verification and Testing

Samples shall be collected at approved locations upon delivery to the site at the request of the Contracting Officer. Samples shall be tested to verify that the geotextile meets the requirements specified in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Samples shall be identified by manufacturers name, type of geotextile, lot number, roll number, and machine direction. Testing shall be performed at an approved laboratory. Test results from the lot under review shall be submitted and approved prior to deployment of that lot of geotextile. Rolls which are sampled shall be immediately rewrapped in their protective covering.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surface on which the geotextile will be placed shall be prepared to a relatively smooth surface condition, in accordance with the applicable portion of this specification and shall be free from obstruction, debris, depressions, erosion feature, or vegetation. Any irregularities will be removed so as to insure continuous, intimate contact of the geotextile with all the surface. Any loose material, soft or low density pockets of material, will be removed; erosion features such as rills, gullies etc. must be graded out of the surface before geotextile placement.

3.2 INSTALLATION OF THE GEOTEXTILE

3.2.1 General

The geotextile shall be placed in the manner and at the locations shown. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

3.2.2 Placement

The geotextile shall be placed with the long dimension perpendicular to the centerline of the channel and laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of 12 inches of overlap for each joint. The Contractor shall adjust the actual length of the geotextile used based on initial installation experience. Temporary pinning of the geotextile to help hold it in place until the riprap is placed shall be allowed. The temporary pins shall be removed as the riprap is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Design protection of riprap should be in compliance with EM 1110-2-1601. Trimming shall be performed in such a manner that the geotextile shall not be damaged in any way.

3.3 PROTECTION

The geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be

removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of riprap shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 7 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of riprap or other materials. This may be accomplished by limiting the height of drop to less than 1 foot, by placing a cushioning layer of sand or gravel on top of the geotextile before placing the material, or other methods deemed necessary. Care should be taken to ensure that the utilized cushioning materials shall not impede the flow of water. Before placement of riprap or other materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

3.4 PLACEMENT OF CUSHIONING MATERIAL

Placing of cushioning material shall be performed in a manner to insure intimate contact of the geotextile with the prepared surface and with the cushioning material. The placement shall also be performed in a manner that shall not damage the geotextile including tear, puncture, or abrasion. On sloping surfaces the cushioning material shall be placed from the bottom of the slopes upward. During placement, the height of the drop of riprap material shall not be greater than 12 inches. Any geotextile damaged beneath the cushioning material shall be uncovered as necessary and replaced at no cost to the Government.

3.5 OVERLAPPING AND SEAMING

3.5.1 Overlapping

The overlap of geotextile rolls shall be 12 inches. Appropriate measures will be taken to insure required overlap exists after cushion placement.

3.6 FIELD TESTING

Geotextile shall be field tested.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02510N

WATER DISTRIBUTION

-- End of Section Table of Contents --

SECTION 02510N

WATER DISTRIBUTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 536	(1984; R 1993) Ductile Iron Castings

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C104	(1990) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C105	(1993) Polyethylene Encasement for Ductile - Iron Pipe Systems
AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids
AWWA C111	(1990; Erratum 1991) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151	(1991) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C153	(1994) Ductile-Iron Compact Fittings, 3 in. Through 24 in. (76 mm Through 610 mm) and 54 in. Through 64 in. (1,000 mm Through 1,600 mm), for Water Service
AWWA C509	(1994) Resilient-Seated Gate Valves for Water and Sewerage Systems
AWWA C600	(1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C651	(1992) Disinfecting Water Mains
AWWA C800	(1989) Underground Service Line Valves and Fittings

1.2 DESIGN REQUIREMENTS

1.2.1 Water Distribution Mains

Provide water distribution mains indicated as 4 through 12 inch diameter pipe sizes of ductile-iron pipe. Provide ductile iron pipe for 12 inch diameter or larger pipe sizes. Also provide water main accessories, gate valves and check valves as specified and where indicated.

1.2.2 Water Service Lines

Provide water service lines indicated as less than 4 inch lines from water distribution main to building service at the points indicated. Water service lines shall be copper tubing. Provide water service line appurtenances as specified and where indicated.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Piping Materials; G, AOF

Water distribution main piping, fittings, joints, valves, and coupling; G, AOF

Water service line piping, fittings, joints, valves, and coupling; G, AOF

Hydrants; G, AOF

Indicator posts; G, AOF

Corporation stops; G, AOF

Valve boxes; G, AOF

Submit manufacturer's standard drawings or catalog cuts within 15 days following award of contract, except submit both drawings and cuts for push-on and rubber-gasketed bell-and-spigot joints. Include information concerning gaskets with submittal for joints and couplings.

SD-05 Design Data

Design calculations of water piping; G, AOF

Submit all design calculations of water piping within 14 days of notice to proceed.

SD-07 Certificates

Water distribution main piping, fittings, joints, valves, and coupling; G, AOF

Water service line piping, fittings, joints, valves, and coupling; G, AOF

Shop-applied lining and coating; G, AOF

Lining; G, AOF

Fire hydrants; G, AOF

Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

SD-08 Manufacturer's Instructions

Installation procedures for water piping shall be submitted a minimum of 10 days following award of contract.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves and hydrants free of dirt and debris.

1.4.2 Handling

Handle pipe, fittings, valves, hydrants, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench. Store jointing materials and rubber gaskets that are not to be installed immediately, under cover out of direct sunlight.

PART 2 PRODUCTS

2.1 WATER DISTRIBUTION MAIN MATERIALS

2.1.1 Piping Materials

Contractor shall submit design data including Design calculations of water piping in accordance with SUBMITTALS paragraph. Lining and coating certificates shall be submitted in accordance with SUBMITTALS paragraph.

2.1.1.1 Ductile-Iron Piping

a. Pipe and Fittings: Pipe in accordance with, AWWA C151, of the sizes and pipe class to match existing or as indicated on the plans. Fittings, AWWA C110 or AWWA C153; fittings with push-on joint ends conforming to the same requirements as fittings with mechanical-joint ends, except that the bell design shall be modified, as approved, for push-on joint. Fittings shall have pressure rating at least equivalent to that of the pipe. Ends of pipe and fittings shall be suitable for the specified joints.

Pipe and fittings shall have cement-mortar lining, AWWA C104, standard thickness.

b. Joints and Jointing Material:

(1) Joints: Joints for pipe and fittings shall be push-on joints or mechanical joints unless otherwise indicated. Provide mechanical joints where indicated.

(2) Push-On Joints: Shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly, AWWA C111.

(3) Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets, AWWA C111.

2.1.2 Valves, and Other Water Main Accessories

2.1.2.1 Gate Valves on Buried Piping

AWWA C500, AWWA C509, or UL 262. Unless otherwise specified, valves conforming to: (1) AWWA C500 shall be nonrising stem type with double-disc gates and mechanical-joint ends or push-on joint ends as appropriate for the adjoining pipe, (2) AWWA C509 shall be nonrising stem type with mechanical-joint ends. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have 0-ring stem seals , except for those valves for which gearing is specified, in which case use conventional packing in place of 0-ring seal. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. Valves shall be of one manufacturer.

2.1.2.2 Indicator Posts

UL 789. Provide for gate valves where indicated.

2.1.2.3 Valve Boxes

Provide a valve box for each gate valve on buried piping , except where indicator post is shown. Valve boxes shall be of cast iron or precast concrete of a size suitable for the valve on which it is to be used and shall be adjustable. Provide a round head. Cast the word "WATER" on the lid. The least diameter of the shaft of the box shall be 5 1/4 inches. Cast-iron box shall have a heavy coat of bituminous paint.

2.1.2.4 Sleeve-Type Mechanical Couplings

Couplings shall be designed to couple plain-end piping by compression of a ring gasket at each end of the adjoining pipe sections. The coupling shall consist of one middle ring flared or beveled at each end to provide a gasket seat; two follower rings; two resilient tapered rubber gaskets; and bolts and nuts to draw the follower rings toward each other to compress the gaskets. The middle ring and the follower rings shall be true circular sections free from irregularities, flat spots, and surface defects; the design shall provide for confinement and compression of the gaskets. For ductile iron pipe, the middle ring shall be of cast-iron or steel; and the follower rings shall be of malleable or ductile iron. Malleable and ductile iron shall, conform to ASTM A 47 and ASTM A 536, respectively. Gaskets shall be designed for resistance to set after installation and shall meet the applicable requirements specified for gaskets for mechanical joint in AWWA C111. Bolts shall be track-head type, ASTM A 307, Grade A,

with nuts, ASTM A 563, Grade A; or round-head square-neck type bolts, ANSI B18.5.2.1M and ASME B18.5.2.2M with hex nuts, ASME B18.2.2. Bolts shall be 5/8 inch in diameter. Bolt holes in follower rings shall be of a shape to hold fast the necks of the bolts used. Mechanically coupled joints using a sleeve-type mechanical coupling shall not be used as an optional method of jointing except where pipeline is adequately anchored to resist tension pull across the joint.

2.2 WATER SERVICE LINE MATERIALS

2.2.1 Piping Materials

2.2.1.1 Copper Tubing and Associated Fittings

Tubing, ASTM B 88, Type K. Fittings for solder-type joint, ANSI B16.18 or ASME B16.22; fittings for compression-type joint, ASME B16.26, flared tube type.

2.2.2 Water Service Line Appurtenances

2.2.2.1 Corporation Stops

Ground key type; bronze, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Ends shall be suitable for solder-joint, or flared tube compression type joint. Threaded ends for inlet and outlet of corporation stops, AWWA C800; coupling nut for connection to flared copper tubing, ASME B16.26.

2.2.2.2 Curb or Service Stops

Ground key, round way, inverted key type; made of bronze, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Ends shall be as appropriate for connection to the service piping. Arrow shall be cast into body of the curb or service stop indicating direction of flow.

2.2.2.3 Goosenecks

Type K copper tubing. Joint ends for goosenecks shall be appropriate for connecting to corporation stop and service line. Where multiple gooseneck connections are required for an individual service, goosenecks shall be connected to the service line through a suitable approved brass or bronze branch connection; the total clear area of the branches shall be at least equal to the clear area of the service line. Length of goosenecks shall be in accordance with standard practice.

2.2.2.4 Gate Valves on Buried Piping

Gate valves 3 inch size and larger on buried piping AWWA C500 or UL 262 and of one manufacturer. Valves, AWWA C500, nonrising stem type with double-disc gates. Valves, UL 262, inside-screw type with operating nut, split wedge or double disc type gate, and designed for a hydraulic working pressure of 175 psi. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have 0-ring stem seals and shall be bolted and constructed so as to permit easy removal of parts for repair. Valves shall have ends suitable for joining to the pipe used; push-on joint ends or mechanical-joint ends for joining to ductile-iron pipe.

2.2.2.5 Gate Valves on Buried Piping

Gate valves smaller than 3 inch size on Buried Piping MSS SP-80, Class 150, solid wedge, nonrising stem. Valves shall have flanged or threaded end connections, with a union on one side of the valve. Provide handwheel operators.

2.2.2.6 Gate Valve 3 Inch Size and Larger

Gate valves 3 inch size and larger in valve pits, AWWA C500 and of one make. Valves conforming to: (1) AWWA C500 shall be outside-screw-and-yoke rising-stem type with flanged ends and double-disc, shall have solid-wedge gates where indicated, and (2) UL 262 shall be outside-screw-and-yoke type, shall be designed for a hydraulic working pressure of 175 psi, and shall have flanged ends. Provide valves with handwheels that open by a counterclockwise rotation of the valve stem. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair.

2.2.2.7 Gate Valves Smaller Than 3 Inch Size in Valve Pits

MSS SP-80, Class 150, solid wedge, inside screw, rising stem. Valves shall have flanged or threaded end connections, with a union on one side of the valve and a handwheel operator.

2.2.2.8 Curb Boxes

Provide a curb box for each curb or service stop. Curb boxes shall be of cast iron of a size suitable for the stop on which it is to be used. Provide a round head. Cast the word "WATER" on the lid. Each box shall have a heavy coat of bituminous paint.

2.2.2.9 Valve Boxes

Provide a valve box for each gate valve on buried piping. Valve boxes shall be of cast iron of a size suitable for the valve on which it is to be used and shall be adjustable. Provide a round head. Cast the word "WATER" on the lid. The least diameter of the shaft of the box shall be 5 1/4 inches.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES

3.1.1 General Requirements for Installation of Pipelines

These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements." paragraphs.

3.1.1.1 Location of Water Lines

Where the location of the water line is not clearly defined by dimensions on the drawings, do not lay water line closer horizontally than 10 feet from any sewer line. Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing. Lay water lines which cross sewer force mains and inverted siphons at least 2 feet above these sewer lines; when joints in the sewer line are closer than 3 feet horizontally from the water line, encase these joints in concrete. Do not lay water lines in the same trench with gas lines fuel lines or electric wiring.

3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES.

3.1.1.3 Pipe Laying and Jointing

Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying. Grade the pipeline in straight lines; avoid the formation of dips and low points. Support pipe at proper elevation and grade. Secure firm, uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings. Provide anchors and supports where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Do not lay pipe when conditions of trench or weather prevent installation. Depth of cover over top of pipe shall not be less than 5 feet.

3.1.1.4 Connections to Existing Water Lines

Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.

3.1.2 Special Requirements for Installation of Water Mains

3.1.2.1 Installation of Ductile-Iron Piping

Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.

a. Jointing: Make push-on joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly. Make mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and the recommendations of Appendix A to AWWA C111. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer.

b. Pipe Anchorage: Provide concrete thrust blocks (reaction backing) metal harness for pipe anchorage, except where metal harness is

indicated. Thrust blocks shall be in accordance with the requirements of AWWA C600 for thrust restraint, except that size and positioning of thrust blocks shall be as indicated. Use concrete, ASTM C 94, having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength. Metal harness shall be in accordance with the requirements of AWWA C600 for thrust restraint, using tie rods and clamps as shown in NFPA 24 , except as otherwise indicated.

c. Exterior Protection: Completely encase buried ductile iron pipelines with polyethylene tube or sheet, using Class A, Class C polyethylene film, in accordance with AWWA C105.

3.1.2.2 Installation of Valves

a. Installation of Valves: Install gate valves, AWWA C500, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C500. Install gate valves, AWWA C509, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C509. Make and assemble joints to gate valves and check valves as specified for making and assembling the same type joints between pipe and fittings.

3.1.3 Installation of Water Service Piping

3.1.3.1 Location

Connect water service piping to the building service where the building service has been installed. Where building service has not been installed, terminate water service lines approximately 5 feet from the building line at a point directed by the Contracting Officer the points indicated; such water service lines shall be closed with plugs or caps.

3.1.3.2 Service Line Connections to Water Mains

Connect service lines to the main by a corporation stop and gooseneck and install a service stop below the frostline as indicated.

3.1.4 Disinfection

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 and 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit the results prior to the new water piping being placed into service. Disinfection of systems supplying nonpotable water is not required.

3.2 FIELD QUALITY CONTROL

3.2.1 Field Tests and Inspections

The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications. Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

3.2.2 Testing Procedure

Test water mains and water service lines in accordance with the applicable specified standard, except for the special testing requirements given in paragraph entitled "Special Testing Requirements." Test ductile-iron water mains and water service lines in accordance with the requirements of AWWA C600 for hydrostatic testing. The amount of leakage on ductile-iron pipelines with mechanical-joints or push-on joints shall not exceed the amounts given in AWWA C600; no leakage will be allowed at joints made by any other method. Test water service lines in accordance with applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be allowed at copper tubing joints (soldered, compression type).

3.2.3 Special Testing Requirements

For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system, except that for those portions of the system having pipe size larger than 2 inches in diameter, hydrostatic test pressure shall be not less than 200 psi. Hold this pressure for not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

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SANITARY SEWERS

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SECTION 02531A

SANITARY SEWERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2680	(1995a)Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
ASTM D 3212	(1996a) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 402	(1993; R 1999) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-6	(1990) Recommended Practice for the Low-Pressure Air Testing of Installed Sewer Pipe

1.2 GENERAL REQUIREMENTS

The construction required herein shall include appurtenant structures and building sewers to points of connection with the building drains 5 feet outside the building to which the sewer system is to be connected. The Contractor shall replace damaged material and redo unacceptable work at no additional cost to the Government. Excavation and backfilling is specified in Section 02316, EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install the plastic pipe shall be stored in accordance with the manufacturer's recommendation and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-07 Certificates

Portland Cement; G, AOF

Certificates of compliance stating the type of cement used in manufacture of concrete pipe, fittings and precast manholes.

Joints; G, AOF

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.2 REQUIREMENTS FOR FITTINGS

Fittings shall be compatible with the pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and other requirements specified below.

2.3 JOINTS

Joints installation shall comply with the manufacturer's instructions.

2.3.1 Plastic Pipe Jointing

Flexible plastic pipe (PVC or high density polyethylene pipe) gasketed joints shall conform to ASTM D 3212.

2.4 BRANCH CONNECTIONS

Branch connections shall be made by use of regular fittings or solvent cemented saddles as approved. Saddles for ABS and PVC composite pipe shall conform to Figure 2 of ASTM D 2680; saddles for ABS pipe shall comply with Table 3 of ASTM D 2751; and saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Adjacent Facilities

3.1.1.1 Water Lines

Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-supply main or service line, except that where the bottom of the

water pipe will be at least 18 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet. Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of 10 feet on each side of the crossing shall be fully encased in concrete or shall be acceptable pressure pipe with no joint closer horizontally than 3 feet to the crossing. The thickness of the concrete encasement including that at the pipe joints shall be not less than 4 inches.

3.1.1.2 Structural Foundations

Where sewer pipe is to be installed within 3 feet of an existing or proposed building or structural foundation such as a retaining wall, control tower footing, water tank footing, or any similar structure, the sewer pipe shall be sleeved as specified above. Contractor shall ensure there is no damage to these structures, and no settlement or movement of foundations or footing.

3.1.2 Pipe Laying

a. Pipe shall be protected during handling against impact shocks and free fall; the pipe interior shall be free of extraneous material.

b. Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Each pipe shall be laid accurately to the line and grade shown on the drawings. Pipe shall be laid and centered so that the sewer has a uniform invert. As the work progresses, the interior of the sewer shall be cleared of all superfluous materials.

c. Before making pipe joints, all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted, joined, and adjusted to obtain the degree of water tightness required.

d. Installations of solvent weld joint pipe, using PVC pipe and fittings shall be in accordance with ASTM F 402. The Contractor shall ensure adequate trench ventilation and protection for workers installing the pipe.

3.1.2.1 Trenches

Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for as long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings.

3.1.2.2 Backfill

As soon as possible after the joint is made, sufficient backfill material shall be placed along the pipe to prevent pipe movement off line or grade. Plastic pipe shall be completely covered to prevent damage from ultraviolet light.

3.1.2.3 Width of Trench

If the maximum width of the trench at the top of the pipe, as specified in

Section 02316, EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, is exceeded for any reason other than by direction, the Contractor shall install, at no additional cost to the Government, concrete cradling, pipe encasement, or other bedding required to support the added load of the backfill.

3.1.2.4 Jointing

Joints between different pipe materials shall be made as specified, using approved jointing materials.

3.1.2.5 Handling and Storage

Pipe, fittings and joint material shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities for plastic pipe, fittings, joint materials and solvents shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1.

3.1.3 Leakage Tests

Lines shall be tested for leakage by low pressure air testing, infiltration tests or exfiltration tests, as appropriate. Low pressure air testing for vitrified clay pipes shall be as prescribed in ASTM C 828. Low pressure air testing for concrete pipes shall be as prescribed in ASTM C 828. Low pressure air testing for PVC pipe shall be as prescribed in UBPPA UNI-B-6. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 and ASTM C 924, after consultation with the pipe manufacturer. Prior to infiltration or exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. When the Contracting Officer determines that infiltration cannot be properly tested, an exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be re-established. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by either the infiltration test or exfiltration test shall not exceed 25 gal per inch diameter per mile of pipeline per day. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction, and retesting shall be made at no additional cost to the Government.

3.1.4 Test for Deflection

When flexible pipe is used, a deflection test shall be made on the entire length of the installed pipeline not less than 30 days after the completion of all work including the leakage test, backfill, and placement of any fill, grading, paving, concrete, or superimposed loads. Deflection shall be determined by use of a deflection device or by use of a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a

common shaft. The ball, cylinder, or circular sections shall have a diameter, or minor diameter as applicable, of 92.5 percent of the inside diameter of the pipe, but 95 percent for RPMP and RTRP. A tolerance of plus 0.5 percent will be permitted. The ball, cylinder, or circular sections shall be of a homogeneous material throughout, shall have a density greater than 1.0 as related to water at 39.2 degrees F, and shall have a surface brinell hardness of not less than 150. The device shall be center bored and through bolted with a 1/4 inch minimum diameter steel shaft having a yield strength of 70,000 psi or more, with eyes at each end for attaching pulling cables. The eye shall be suitably backed with flange or heavy washer; a pull exerted on the opposite end of the shaft shall produce compression throughout the remote end of the ball, cylinder or circular section. Circular sections shall be spaced so that the distance from the external faces of the front and back sections shall equal or exceed the diameter of the circular section. Failure of the ball, cylinder, or circular section to pass freely through a pipe run, either by being pulled through or by being flushed through with water, shall be cause for rejection of that run. When a deflection device is used for the test in lieu of the ball, cylinder, or circular sections described, such device shall be approved prior to use. The device shall be sensitive to 1.0 percent of the diameter of the pipe being measured and shall be accurate to 1.0 percent of the indicated dimension. Installed pipe showing deflections greater than 7.5 percent of the normal diameter of the pipe, or 5 percent for RTRP and RPMP, shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.2 CONCRETE CRADLE AND ENCASEMENT

The pipe shall be supported on a concrete cradle, or encased in concrete where indicated or directed. Certificates for portland cement shall be submitted in accordance with SUBMITTALS paragraph.

3.3 INSTALLATION OF WYE BRANCHES

Wye branches shall be installed where sewer connections are indicated or where directed. Cutting into piping for connections shall not be done except in special approved cases. When the connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no additional cost to the Government. The installation of wye branches in an existing sewer shall be made by a method which does not damage the integrity of the existing sewer. One acceptable method consists of removing one pipe section, breaking off the upper half of the bell of the next lower section and half of the running bell of wye section. After placing the new section, it shall be rotated so that the broken half of the bell will be at the bottom. The two joints shall then be made with joint packing and cement mortar.

3.4 CONNECTING TO EXISTING MANHOLES

Pipe connections to existing manholes shall be made so that finish work will conform as nearly as practicable to the applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping. The connection shall be centered on the manhole. Holes for the new pipe shall be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the

diameter of the pipe. Cutting the manhole shall be done in a manner that will cause the least damage to the walls.

3.5 CLEANOUTS AND OTHER APPURTENANCES

Cleanouts and other appurtenances shall be installed where shown on the drawings or as directed by the Contracting Officer, and shall conform to the detail of the drawings.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02630A

STORM-DRAINAGE SYSTEM

SECTION 02630A

STORM-DRAINAGE SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 48	(1994a) Gray Iron Castings
ASTM A 536	(1999el) Ductile Iron Castings
ASTM C 32	(1999el) Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C 55	(1999) Concrete Brick
ASTM C 62	(1997a) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 139	(1999) Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 270	(1997) Mortar for Unit Masonry
ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 923	(1998) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Materials
ASTM D 1056	(1998) Flexible Cellular Materials -

	Sponge or Expanded Rubber
ASTM D 1171	(1994) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 1751	(1999) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984; R 1996el) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Placing Pipe; G, AOF

Submit a minimum of 15 days following award of contract printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-04 Samples

Pipe for Culverts and Storm Drains; G, AOF

SD-07 Certificates

Resin Certification; G, AOF
Pipeline Testing; G, AOF
Hydrostatic Test on Watertight Joints; G, AOF
Determination of Density; G, AOF
Frame and Cover for Gratings; G, AOF

Provide certified copies of test reports no later than 15 days

following award of contract demonstrating conformance to applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

1.4 QUALITY ASSURANCE

Contractor shall submit test report certificates for resin certification, pipeline testing, hydrostatic test on watertight joints, determination of density, and a certificate of loading for frame and cover for gratings.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

MDOT SEC 909, Class A, Class F, ASTM C76, Class I, Class II, or ASTM C 6550.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4000 psi concrete under Section 03307a, CAST-IN-PLACE STRUCTURAL CONCRETE. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C 231. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2

inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

2.2.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.2.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C 139, not more than 8 inches thick, not less than 8 inches long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

2.2.4 Brick

Brick shall conform to ASTM C 62, Grade SW; ASTM C 55, Grade S-I or S-II; or ASTM C 32, Grade MS. Mortar for jointing and plastering shall consist of one part portland cement and two parts fine sand. Lime may be added to the mortar in a quantity not more than 25 percent of the volume of cement. The joints shall be filled completely and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with 1/2 inch of mortar over the entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course. For round structures, brick shall be laid radially with every sixth course a stretcher course.

2.2.5 Precast Reinforced Concrete Manholes

Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete risers and tops shall be made with flexible watertight, rubber-type gaskets meeting the requirements of paragraph JOINTS.

2.2.6 Frame and Cover for Gratings

Frame and cover for gratings shall be cast gray iron, ASTM A 48, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12; or cast aluminum, ASTM B 26, Alloy 356.OT6. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans.

2.2.7 Joints

2.2.7.1 Flexible Watertight Joints

a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe and with factory-fabricated resilient materials for clay pipe. The design

of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

b. Test Requirements: Watertight joints shall be tested and shall meet test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C 443. Certified copies of test results shall be delivered to the Contracting Officer before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

2.2.7.2 Flexible Watertight, Gasketed Joints

a. Gaskets: When infiltration or exfiltration is a concern for pipe lines, the couplings may be required to have gaskets. The closed-cell expanded rubber gaskets shall be a continuous band approximately 7 inches wide and approximately 3/8 inch thick, meeting the requirements of ASTM D 1056, Type 2 A1, B3, and shall have a quality retention rating of not less than 70 percent when tested for weather resistance by ozone chamber exposure, Method B of ASTM D 1171. Rubber O-ring gaskets shall be 13/16 inch in diameter for pipe diameters of 36 inches or smaller and 7/8 inch in diameter for larger pipe having 1/2 inch deep end corrugation. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of AASHTO M 198 or ASTM C 443. Flexible plastic gaskets shall conform to requirements of AASHTO M 198, Type B.

b. Connecting Bands: Connecting bands shall be of the type, size and sheet thickness of band, and the size of angles, bolts, rods and lugs as indicated or where not indicated as specified in the applicable standards or specifications for the pipe. Exterior rivet heads in the longitudinal seam under the connecting band shall be countersunk or the rivets shall be omitted and the seam welded. Watertight joints shall be tested and shall meet the test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS.

2.3 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

2.4 HYDROSTATIC TEST ON WATERTIGHT JOINTS

2.4.1 Concrete Pipe

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced and nonreinforced concrete pipe shall conform to AASHTO M 198 or ASTM C 443.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02302N, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES and Section 02300, EARTHWORK and the requirements specified below.

3.1.1 Trenching

The width of trenches shall conform to MDOT R-85-B to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing, where required, shall be placed within the trench width as specified. Contractor shall not overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 02302n, EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or

damaged pipe shall not be used. If necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary.

3.3.1 Concrete Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established gradeline, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.1.2 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.5 DRAINAGE STRUCTURES

3.5 Manholes and Inlets

Construction shall be of reinforced concrete, plain concrete, brick, precast reinforced concrete, precast concrete segmental blocks, complete with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Pipe connections to concrete manholes and inlets shall be made with flexible, watertight connectors.

3.5.2 Walls and Headwalls

Construction shall be as indicated.

3.6 BACKFILLING

3.6.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 12 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.6.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 12 inches.

3.6.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.6.4 Compaction

3.6.4.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.6.4.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to

drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

a. Under paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

b. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.

c. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.6.5 Determination of Density

Testing shall be the responsibility of the Contractor and performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D 1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017 or ASTM D 2922. Test results shall be furnished the Contracting Officer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02721A

SUBBASE COURSES

-- End of Section Table of Contents --

SECTION 02721A

SUBBASE COURSES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(1997) Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in Drop

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29	(1997) Bulk Density ("Unit Weight") and Voids in Aggregates
ASTM C 117	(1995) Materials Finer Than No. 200 Sieve in Mineral Aggregates by Washing
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(1990; R 1996el) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1995) Wire-Cloth Sieves for Testing Purposes

STATE OF MICHIGAN, DEPARTMENT OF TRANSPORTATION (MDOT)

MSG	Material Source Guide; Dated 20003

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment; G, AOF

Within 15 days following the award of contract provide a list of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets; G, AOF

Within 15 days following the award of contract provide copies of waybills and delivery tickets during the progress of the work. Certified waybills and delivery tickets for all aggregates actually used.

SD-06 Test Reports

Sampling and Testing; G, AOF

Copies of initial and in-place test results.

1.3 DEGREE OF COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 and AASHTO T 180, Method D. In this specification, degree of compaction shall be a percentage of laboratory maximum density.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved testing laboratory in accordance with Section 01451, CONTRACTOR QUALITY CONTROL. Tests shall be performed at the specified frequency. No work requiring testing will be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified

requirements.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.4.2 Tests

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C 117 and ASTM C 136 and ASTM D 422. Sieves shall conform to ASTM E 11.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture shall be determined in accordance with ASTM D 1557 and AASHTO T 180, Method D.

1.4.2.4 Density Tests

Density shall be field measured in accordance with ASTM D 1556 and ASTM D 2922. The base plate, as shown in the drawing shall be used. The calibration curves shall be checked and adjusted, if necessary, using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D 2922 result in a wet unit weight of soil and, when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made by the prepared containers of material method, as described in paragraph Calibration, in ASTM D 2922, on each different type of material to be tested at the beginning of a job and at intervals as directed.

1.4.2.5 Wear Test

Wear tests shall be made on subbase course material in conformance with ASTM C 131.

1.4.2.6 Weight of Slag

Weight per cubic foot of slag shall be determined in accordance with ASTM C 29 on the subbase course material.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements prior to installation.

a. Sieve Analysis including 0.02 mm size material
b. Liquid limit and plasticity index moisture-density relationship

1.4.3.2 In-Place Tests

One of each of the following tests shall be performed on samples taken from the placed and compacted subbase course. Samples shall be taken in accordance with MSG.

a. Sieve Analysis including 0.02 mm size material
b. Field Density
c. Moisture liquid limit and plasticity index

1.4.4 Approval of Material

The source of the material shall be selected from an approved source or passing gradation received at least 1 week prior to incorporation. Approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and compacted subbase course. The Contractor shall submit all material waybills and delivery tickets in accordance with SUBMITTALS paragraph.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.6 EQUIPMENT

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Subbase Course

Aggregates shall consist of crushed stone or slag, gravel, shell, sand, or other sound, durable, approved materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Material retained on the No. 4 sieve shall have a percentage of wear not to exceed 50 percent after 500 revolutions when tested as specified in ASTM C 131. Aggregate shall be reasonably uniform in density and quality. Slag shall be an air-cooled, blast-furnace product having a dry weight of not less than 65 pcf. Aggregates shall have a maximum size of 1.5 inch and shall be within the limits specified in MDOT SEC 902.

The portion of any blended component and of the completed course passing the No. 40 sieve shall be either nonplastic or shall have a liquid limit not greater than 25 and a plasticity index not greater than 5 and shall be

within the limits specified in MDOT SEC 902.

PART 3 EXECUTION

3.1 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.2 PREPARATION OF UNDERLYING MATERIAL

Prior to constructing the subbase course, the underlying course or subgrade shall be cleaned of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. Ruts, or soft yielding spots, in the underlying courses, subgrade areas having inadequate compaction, and deviations of the surface from the specified requirements, shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the subbase course. Stabilization shall be accomplished by mixing subbase-course material into the underlying course, and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements for the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the subbase course is placed.

3.3 GRADE CONTROL

The finished and completed subbase course shall conform to the lines, grades, and cross sections shown. The lines, grades, and cross sections shown shall be maintained by means of line and grade stakes placed by the Contractor at the work site.

3.4 MIXING AND PLACING MATERIALS

The materials shall be mixed and placed to obtain uniformity of the subbase material at the water content specified. The Contractor shall make such adjustments in mixing or placing procedures or in equipment as may be directed to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to insure a satisfactory subbase course.

3.5 LAYER THICKNESS

The compacted thickness of the completed course shall be as indicated. When a compacted layer of 6 inches is specified, the material may be placed in a single layer; when a compacted thickness of more than 10 inches is required, no layer shall exceed 10 inches.

3.6 COMPACTION

Each layer of the subbase course shall be compacted as specified with approved compaction equipment. Water content shall be maintained during the compaction procedure at a moisture content less than saturation, as determined from laboratory tests, as specified in paragraph SAMPLING AND TESTING. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer is compacted through the full depth to at least 95 percent of laboratory maximum density. The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory subbase course. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.7 PROOF ROLLING

Areas designated on the drawings to be proof rolled shall receive an application of 30 coverages with a heavy pneumatic-tired roller having four or more tires abreast, each tire loaded to a minimum of 30,000 pounds and inflated to a minimum of 150 psi. A coverage is defined as the application of one tire print over the designated area. In the areas designated, proof rolling shall be applied to the top layer of the subbase course. Water content of the top layer of the subbase course shall be maintained at a moisture content less than saturation, as determined from laboratory tests, as specified in paragraph SAMPLING AND TESTING. Any material in the subbase courses or underlying materials indicated to be unsatisfactory by the proof rolling shall be removed, dried, and recompacted, or removed and replaced with satisfactory materials.

3.8 EDGES

Approved material shall be placed along the edges of the subbase course in such quantity as will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least a 1 foot width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the subbase course, as directed.

3.9 SMOOTHNESS TEST

The surface of each layer shall not show deviations in excess of 3/8 inch when tested with a 12 footstraightedge applied parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding this amount shall be corrected by removing material, replacing with new material, or reworking existing material and compacting, as directed.

3.10 THICKNESS CONTROL

The completed thickness of the subbase course shall be in accordance with the thickness and grade indicated on the drawings. The thickness of each course shall be measured at intervals providing at least one measurement for each 500 square yards or part thereof of subbase course. The thickness measurement shall be made by test holes, at least 3 inches in diameter through the course. The completed subbase course shall not be more than 1/2 inch deficient in thickness nor more than 1/2 inch above or below the established grade. Where any of these tolerances are exceeded, the Contractor shall correct such areas by scarifying, adding new material of proper gradation or removing material, and compacting, as directed. Where

the measured thickness is 1/2 inch or more thicker than shown, the course will be considered as conforming with the specified thickness requirements plus 1/2 inch. The average job thickness shall be the average of the job measurements as specified above but within 1/4 inch of the thickness shown.

3.11 MAINTENANCE

The subbase course shall be maintained in a satisfactory condition until accepted.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02722A

AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE

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SECTION 02722A

AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(1997) Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in Drop
AASHTO T 224	(1996) Correction for Coarse Particles in the Soil Compaction Test

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29	(1997) Bulk Density ("Unit Weight") and Voids in Aggregates
ASTM C 88	(1999a) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	(1995) Materials Finer Than No. 200 Sieve in Mineral Aggregates by Washing
ASTM C 127	(1988; R 1993el) Specific Gravity and Absorption of Course Aggregate
ASTM C 128	(1997) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991; R 1998) Laboratory Compaction

	Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft.)
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1995) Wire-Cloth Sieves for Testing Purposes

STATE OF MICHIGAN, DEPARTMENT OF TRANSPORTATION (MDOT)

MDOT SEC 902	Standard Specifications for Construction, "AGGREGATES"; Dated 2003

1.2 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.2.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.2 Graded-crushed Aggregate Base Course

Graded-crushed aggregate (GCA) base course is well graded, crushed, durable aggregate uniformly moistened and mechanically stabilized by compaction. GCA is similar to ABC, but it has more stringent requirements and it produces a base course with higher strength and stability.

1.2.3 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 and AASHTO T 180, Method D and corrected with AASHTO T 224.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools; G, AOF

Within 15 days of award of contract provide a list of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets; G, AOF

Provide copies of waybills and delivery tickets during the progress of the work. Before the final statement is allowed, the Contractor shall file certified waybills and certified delivery tickets for all aggregates actually used.

SD-06 Test Reports

Sampling and testing; G, AOF
Field Density Tests; G, AOF

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 30 days before material is required for the work.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451, CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests. Copies of test results shall be furnished to the Contracting Officer within 24 hours of completion of the tests.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.4.2 Tests

The following tests shall be performed in conformance with the applicable standards listed.

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11. Particle-size analysis of the soils shall also be completed in conformance with ASTM D 422.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 1557 and AASHTO T 180, Method D and corrected with AASHTO T 224. To maintain the same percentage of coarse material, the "remove and replace" procedure as described in the NOTE 8 in Paragraph 7.2 of AASHTO T 180 shall be used..

1.4.2.4 Field Density Tests

Density shall be field measured in accordance with ASTM D 1556 ASTM D 2922. For the method presented in ASTM D 1556 the base plate as shown in the drawing shall be used. For the method presented in ASTM D 2922 the calibration curves shall be checked and adjusted if necessary using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D 2922 result in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made by the prepared containers of material method, as described in paragraph Calibration of ASTM D 2922, on each different type of material being tested at the beginning of a job and at intervals as directed.

1.4.2.5 Wear Test

Wear tests shall be made on ABC and GCA course material in conformance with ASTM C 131.

1.4.2.6 Soundness

Soundness tests shall be made on GCA in accordance with ASTM C 88.

1.4.2.7 Weight of Slag

Weight per cubic foot of slag shall be determined in accordance with ASTM C 29 on the ABC and GCA course material.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

a. Sieve Analysis including No. 635 size material.

b. Liquid limit and plasticity index.

c. Moisture-density relationship.

1.4.3.2 In Place Tests

Each of the following tests shall be performed on samples taken from the placed and compacted ABC and GCA. Samples shall be taken and tested at the rates indicated.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area.

b. Sieve Analysis including No. 635 size material shall be performed for every 500 tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index tests shall be performed at the same frequency as the sieve analysis.

1.4.4 Approval of Material

The source of the material shall be selected from an approved source or possible gradation received at least 1 week prior to incorporation. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted ABC and GCA. The Contractor shall submit material waybills and delivery tickets in accordance with SUBMITTALS paragraph.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.6 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 AGGREGATES

The ABC and GCA shall consist of clean, sound, durable particles of crushed stone, crushed slag, crushed gravel, crushed recycled concrete, angular sand, or other approved material. ABC shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. GCA shall be free of silt and clay as defined by ASTM D 2487, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.

2.1.1 Coarse Aggregate

Coarse aggregates shall be angular particles of uniform density. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements and shall be stockpiled separately.

a. Crushed Gravel: Crushed gravel shall be manufactured by crushing

gravels, and shall meet all the requirements specified below.

b. Crushed Stone: Crushed stone shall consist of freshly mined quarry rock, and shall meet all the requirements specified below.

c. Crushed Recycled Concrete: Crushed recycled concrete shall consist of previously hardened portland cement concrete or other concrete containing pozzolanic binder material. The recycled material shall be free of all reinforcing steel, bituminous concrete surfacing, and any other foreign material and shall be crushed and processed to meet the required gradations for coarse aggregate. Crushed recycled concrete shall meet all other applicable requirements specified below.

d. Crushed Slag: Crushed slag shall be an air-cooled blast-furnace product having an air dry unit weight of not less than 65 pcf as determined by ASTM C 29, and shall meet all the requirements specified below.

2.1.1.1 Aggregate Base Course

ABC coarse aggregate shall not show more than 50 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in MDOT SEC 902.

2.1.1.2 Graded-Crushed Aggregate Base Course

GCA coarse aggregate shall not show more than 50 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. GCA coarse aggregate shall not exhibit a loss greater than 50 percent weighted average, at five cycles, when tested for soundness in magnesium sulfate in accordance with ASTM C 88. The amount of flat and elongated particles shall not exceed 20 percent for the fraction retained on the 1/2 inch sieve nor 20 percent for the fraction passing the 1/2 inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregate shall contain at least 90 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 90 percent of which by weight are retained on the maximum size sieve listed in TABLE 1.

2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

2.1.2.1 Aggregate Base Course

ABC fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.

2.1.2.2 Graded-Crushed Aggregate Base Course

GCA fine aggregate shall consist of angular particles produced by crushing stone, slag, recycled concrete, or gravel that meets the requirements for wear and soundness specified for GCA coarse aggregate. Fine aggregate shall be manufactured from gravel particles 95 percent of which by weight are retained on the 1/2 inch sieve.

2.1.3 Gradation Requirements

The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 1.5 inches and shall be continuously well graded within the limits specified in MDOT MDOT SEC 902. Sieves shall conform to ASTM E 11.

NOTE 1: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C 127 and ASTM C 128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Contracting Officer.

2.1.4 Liquid Limit and Plasticity Index

Liquid limit and plasticity index requirements shall apply to the completed course and shall also apply to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC or GCA is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Aggregates shall be obtained from offsite sources.

3.3 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material

available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the ABC and GCA, the underlying course or subgrade shall be cleaned of all foreign substances. At the time of construction of the ABC and GCA, the underlying course shall contain no frozen material. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. The underlying course shall conform to Section 02721a, SUBBASE COURSES. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the ABC and GCA. Stabilization shall be accomplished by mixing ABC or GCA into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the ABC and GCA is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

The coarse and fine aggregates shall be mixed in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. The Contractor shall make adjustments in mixing procedures or in equipment as directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory ABC and GCA meeting all requirements of this specification.

3.5.2 Placing

The mixed material shall be placed on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is required, the material shall be placed in layers of equal thickness. No layer shall exceed 6 inches. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the ABC and GCA is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable ABC and GCA.

3.5.3 Grade Control

The finished and completed ABC and GCA shall conform to the lines, grades,

and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required ABC and GCA thickness so that the finished ABC and GCA with the subsequent surface course will meet the designated grades.

3.5.4 Edges of Base Course

Approved fill material shall be placed along the outer edges of ABC and GCA in sufficient quantities to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple layer course, allowing in each operation at least a 2 foot width of this material to be rolled and compacted simultaneously with rolling and compacting of each layer of ABC and GCA. If this base course material is to be placed adjacent to another pavement section, then the layers for both of these sections shall be placed and compacted along this edge at the same time.

3.5.5 Compaction

Each layer of the ABC and GCA shall be compacted as specified with approved compaction equipment. Water content shall be maintained during the compaction procedure to within plus or minus 98 percent of the optimum water content determined from laboratory tests as specified in paragraph SAMPLING AND TESTING. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer has a degree of compaction that is at least 98 percent of laboratory maximum density through the full depth of the layer. The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory ABC and GCA. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.5.6 Thickness

Compacted thickness of the aggregate course shall be 6 inches. No individual layer shall exceed 6 inches in compacted thickness. The total compacted thickness of the ABC and GCA course shall be within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4 inch of the thickness indicated. The total thickness of the ABC and GCA course shall be measured at intervals in such a manner as to ensure one measurement for each square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

3.5.7 Proof Rolling

Proof rolling of the areas indicated shall be in addition to the compaction specified and shall consist of the application of 30 coverages with a heavy

pneumatic-tired roller having four or more tires, each loaded to a minimum of 30,000 pounds and inflated to a minimum of 150 psi. In areas designated, proof rolling shall be applied to the top of the underlying material on which ABC and GCA is laid and to each layer of ABC and GCA. Water content of the underlying material shall be maintained at optimum or at the percentage directed from start of compaction to completion of proof rolling of that layer. Water content of each layer of the ABC and GCA shall be maintained at the optimum percentage directed from start of compaction to completion of proof rolling. Any ABC and GCA materials or any underlying materials that produce unsatisfactory results by proof rolling shall be removed and replaced with satisfactory materials, recompacted and proof rolled to meet these specifications.

3.5.8 Finishing

The surface of the top layer of ABC and GCA shall be finished after final compaction and proof rolling by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of ABC and GCA is 1/2 inch or more below grade, then the top layer should be scarified to a depth of at least 3 inches and new material shall be blended in , compacted and proof rolled to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

3.5.9 Smoothness

The surface of the top layer shall show no deviations in excess of 3/8 inch when tested with a 10 foot straightedge. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 50 foot intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.6 TRAFFIC

Traffic shall not be allowed on the completed ABC and GCA course. Completed portions of the ABC and GCA course may be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Heavy equipment shall not be permitted except when necessary to construction, and then the area shall be protected against marring or damage to the completed work.

3.7 MAINTENANCE

The ABC and GCA shall be maintained in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any ABC and GCA that is not paved over prior to the onset of winter, shall be retested to verify that it still complies with the requirements of this specification. Any area of ABC and GCA that is damaged shall be reworked or replaced as necessary to comply with this specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of as directed. No additional payments will be made for materials that must be replaced.

-- End of Section --

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DIVISION 10 - SPECIALTIES

SECTION 10430A

EXTERIOR SIGNAGE

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SECTION 10430A

EXTERIOR SIGNAGE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45	(1997) Designation System for Aluminum Finishes

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(2000) Carbon Structural Steel
ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 570	(1998) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 653	(2000) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 26	(1999) Aluminum-Alloy Sand Castings
ASTM B 108	(1999) Aluminum-Alloy Permanent Mold Castings
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials

AMERICAN WELDING SOCIETY (AWS)

AWS C1.1	(2000) Recommended Practices for

	Resistance Welding
AWS D1.1	(2000) Structural Welding Code - Steel
AWS D1.2	(1997) Structural Welding Code - Aluminum

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 505	(1988) Metal Finishes Manual for Architectural and Metal Products

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

STATE OF MICHIGAN, DEPARTMENT OF TRANSPORTATION STANDARD (MDOT)

MMUTCD	Michigan Manual of Uniform Traffic Control Devices; Dated 1994

1.2 GENERAL

All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Recyclable materials shall conform to EPA requirements in accordance with Section 01670, "RECYCLED / RECOVERED MATERIALS".

1.3 CHARACTER PROPORTIONS AND HEIGHTS

Characters and numbers on indicated signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings; G, AOF

Drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message shall be included.

SD-03 Product Data

Modular Exterior Signage System; G, AOF

Manufacturer's descriptive data and catalog cuts.

Installation; G, AOF

Manufacturer's installation instructions and cleaning instructions.

Exterior Signs; G, AOF

Exterior signage schedule in electronic media with spread sheet format. Spread sheet shall include sign location, sign type, and message.

Wind Load Requirements; G, AOF

Design analysis and supporting calculations performed in support of specified signage.

SD-04 Samples

Exterior Signs; G, AOF

One sample of each type of sign. Each sample shall consist of a complete sign panel with letters and symbols. Samples may be installed in the work, provided each sample is identified and location recorded. Two samples of manufacturer's standard color chips for each material requiring color selection and 12 inch square sample of sign face color sample.

SD-10 Operation and Maintenance Data

Protection and Cleaning; G,AOF

Six copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include simplified diagrams for the equipment as installed.

1.5 QUALIFICATIONS

Signs, plaques, and dimensional letters shall be the standard product of a manufacturer regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.6 DELIVERY AND STORAGE

Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a two year period shall be provided.

1.8 QUALITY ASSURANCE

Exterior sign samples shall be submitted for review in accordance with SUBMITTALS paragraph.

PART 2 PRODUCTS

2.1 MODULAR EXTERIOR SIGNAGE SYSTEM

Exterior signage shall consist of a system of coordinated directional, identification, and regulatory type signs located where shown. Dimensions, details, materials, message content, and design of signage shall be as shown.

2.1.1 Panel And Post/Panel Type Signs

2.1.1.1 Posts

One-piece galvanized steel posts shall be provided in accordance with sign support typical plans. Posts shall be designed to accept panel framing system described. The post shall be designed to permit attachment of panel framing system without exposed fasteners. Caps shall be provided for each post.

2.1.1.2 Panels

Modular message panels shall be provided in sizes shown on drawings. Panels shall be fabricated a minimum of 0.125 inch aluminum. Panels shall be designed to be interchangeable. Panels with metal return sheeting shall have welded corners, ground smooth. Panels shall be designed in accordance with wind load requirements as identified in SUBMITTALS paragraph.

2.1.1.3 Finishes

Post and panel finishes shall be in accordance with MDOT SEC 919.

2.1.1.4 Mounting

Permanent mounting shall be provided by embedding posts in concrete foundation as shown.

2.2 ALUMINUM ALLOY PRODUCTS

Aluminum alloy products shall conform to ASTM B 209 for sheet or plate, ASTM B 221 for extrusions and ASTM B 26 or ASTM B 108 for castings. Aluminum extrusions shall be provided at least 1/8 inch thick and aluminum plate or sheet at least 16 gauge thick. Welding for aluminum products shall conform to AWS C1.1.

2.3 ANODIC COATING

Anodized finish shall conform to AA DAF-45 as follows:

Clear (natural) designation AA-M10-C22-A31, Architectural Class II 0.4 mil or thicker.

Integrated color anodized designation AA-M10-C22-A32, Architectural Class 0.4 to 0.7 mil.

Electrolytically deposited color - anodized designation AA-M10-C22-A34, Architectural Class II 0.4 to 0.7 mil.

2.4 ORGANIC COATING

Surfaces shall be cleaned, primed, and given a semi-gloss baked enamel or

two-component acrylic polyurethane finish in accordance with NAAMM AMP 505 with total dry film thickness not less than 1.2 mils.

2.5 STEEL PRODUCTS

Structural steel products shall conform to ASTM A 36. Sheet and strip steel products shall conform to ASTM A 570. Welding for steel products shall conform to AWS D1.2.

2.6 VINYL SHEETING FOR GRAPHICS

Vinyl sheeting shall be 5 to 7 year premium type and shall be in accordance with the flammability requirements of ASTM E 84 and shall be a minimum 0.003 inch film thickness. Film shall include a precoated pressure sensitive adhesive backing, Class 1, or positionable pressure sensitive adhesive backing, Class 3.

2.7 ANCHORS AND FASTENERS

Exposed anchor and fastener materials shall be compatible with metal to which applied and shall match in color and finish and shall be non-rusting, non-corroding, and non-staining. Exposed fasteners shall be tamper-proof.

2.8 SHOP FABRICATION AND MANUFACTURE

2.8.1 Factory Workmanship

Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical. Items specified to be galvanized shall be by hot-dip process after fabrication if practical. Galvanization shall be in accordance with ASTM A 123 and ASTM A 653, as applicable. Other metallic coatings of steel sheet shall be in accordance with ASTM A 924. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

2.8.2 Dissimilar Materials

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

2.8.3 Shop Painting

Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, shall be given one coat of zinc-molybdate primer or an approved rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice. Surfaces of items to be embedded in concrete shall not be painted. Upon completion of work, damaged surfaces shall be recoated.

2.9 COLOR, FINISH, AND CONTRAST

Color of products shall be in accordance with MMUTCD. Characters and symbols shall contrast with their background - either light characters on a dark background or dark characters on a light background in accordance with MMUTCD.

PART 3 EXECUTION

3.1 INSTALLATION

Exterior signs shall be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings. Signs shall be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces shall not be installed until finishes on such surfaces have been completed.

3.1.1 Anchorage

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction. Hardware shall be adjusted for proper operation. Frames, and other sign surfaces shall be cleaned in accordance with manufacturer's instructions. After signs are completed and inspected, the Contractor shall cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Signs shall be cleaned, as required, at time of cover removal.

3.2 FIELD PAINTED FINISH

Finish shall be free of scratches or other blemishes.

-- End of Section --