1.01 SCOPE

PART 1: GENERAL

A. Perform all work required for Testing Laboratory Services as indicated on the drawings and specified

B. Related information or work specified elsewhere in the Project Manual includes, but is not limited to, the

1. General and Supplementary Conditions of the Civil Drawings and Specifications
 Section 02200 - Earthwork 4. Section 02510 - Asphaltic Concrete Pavement

5. Section 02511 - Portland Cement Concrete Pymt. 6. Section 02525 - Concrete Curbs 1.02 REQUIREMENTS AND CODES

A. The following specifications are minimum

requirements and shall govern except all local, state and/or federal codes and ordinances shall govern when their requiring are in excess of those specified

B. Comply with provisions of standards referenced in

this section or other sections of the Project Manual.

1.03 LABORATORY SELECTION An independent testing laboratory and related Engineers shall be retained by the Owner to inspect and test the materials and methods of construction as hereinafter specified or otherwise directed by the Engineers or Owner for compliance with the requirements of the

Contract Documents and to perform such other specialized technical services as may be required by the Engineers or Owner. 1.04 QUALITY ASSURANCE A. The testing laboratory shall meet the basic requirements of ATSM E-329 "Standard of Recommended

Practice for Inspection and Testing Agencies for

Concrete and Steel as Used in Construction".

1. The testing laboratory is only required to have testing facilities for work included in this

2. Testing machines shall have been calibrated a intervals not exceeding 12 months by devices of accuracy traceable to the National Bureau of

B. Failure of any tested area to meet specifications requirements shall be cause for rejection. All deficiencies shall be corrected and retested for

1.05 SUBMITTALS

One (1) copy of all laboratory and field test reports. inspections and/or certifications shall be issued directly from the laboratory to the each the Contractor, Engineer and Owner.

1.06 JOB CONDITIONS

A The testing laboratory and/or Engineers are not authorized to revoke, after, relax, enlarge, or release any requirement of the Contract Documents or Subsurface Investigation Report nor to approve or accept any portion of the work.

B. When it appears that the material furnished or work performed by the Contractor fails to fulfill Contract Document requirements, the laboratory and/or Engineer shall promptly direct the attention of the Owner and Contractor to such deficiencies.

1.07 CONTRACTOR'S RESPONSIBILITIE

A. The use of laboratory services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the

B. To facilitate testing services, the Contractor shall coordinate all testing and inspection activities with the laboratory and:

1. Advise the laboratory, Engineers and inspectors, sufficiently in advance of the operations to allow for completion of tests and for the assignment of 2. Provide and maintain for the sole use of the

laboratory an area and adequate facilities for safe storage & proper curing of such test specimens which must remain on the project site prior to testing.

3. Furnish copies of mill test reports for such materials as may be required in the Project Manual.

PART 2: REQUIRED TESTING AND INSPECTIONS 2.01 SITE AND BUILDING EXCAVATION AND BACKFILLING

A. The Soils Laboratory shall analyze all native or imported fill and backfill material and top soil proposed for use to determine the suitability for use and compliance with the Contract Documents.

1. Fill and backfill material shall be examined as to soil classification and tested to determine the Plasticity Index, optimum moisture content and dry

B. The number of tests performed shall be at the discretion of the Soils Engineer, except that the number of field tests performed shall not be less than the minimum described below.

1. Within trench excavations provide one (1) test for every 500 cubic yards of fill or backfill or for every 100 lineal feet of trench.

C. Submit one (1) copy of all soils analyses and test results to Contractor, Engineer and Owner.

2.02 PAVING

A. An independent testing laboratory and Field Engineer meeting the requirements, sampling and testing and Transportation Officials (AASHTO) and American Society for Testing Materials (ASTM) shall observe the paving installation and test for compliance with the

requirements of the Contract Documents.

B. Aggregate base course shall be tested for compliance with specified physical requirements and sieve analysis. Installation shall be observed for compacted thickness, cross section and grade. Field density tests shall be conducted to determine optimum moisture content and percent of compaction.

1. Aggregate shall be tested in accordance with test requirements of ASTM D-1241.

2. Field density tests, as per ASTM D-698, shall be performed at the discretion of the Engineer, except that a minimum of one (1) test per 40,000 square feet shall be performed.

C. Asphaltic concrete mix shall be tested for asphalt cement content, gradation, Marshall stability, air voids and physical requirements. Engineer shall observe asphaltic concrete placement for number of lifts. procedure employed and compliance with indicated cross section and grade. Field density and extraction tests shall be conducted to determine percent of compaction,

1. Asphaltic mixture shall be tested in accordance with ASTM D-2172 or AASHTO T-164 & AASHTO T-30.

2. Optimum asphalt cement shall be tested in accordance by the Marshall Method (or other AASHTO approved methods)

D. Testing laboratory and Engineer shall certify in writing that the aggregate base and asphaltic surface course have been installed in conformance with the Contract Documents.

1. Certification shall be accompanied by copies of aggregate and asphaltic concrete tests and analysis

E. Portland Cement Concrete pavement shall be tested

and inspected in accordance to Section 01410, 2.03

F. Obtain a minimum of two (2) cores from the complete pavement section (either asphaltic concrete or Portland Cement Concrete), including aggregate base course, for laboratory verification of the completed pavement construction. Core test report shall indicate depth of aggregate base course, Portland Cement Concrete, asphaltic concrete surface course, density of the aggregate base course, asphaltic concrete surface course, and asphaltic concrete extraction tests and Portland Cement Concrete strength tests. Location of pavement cores shall be selected by the Engineer and

G. Submit one (1) copy of certification and test results to each the Contractor, Engineer and Owner. 2.03 CONCRETE

the independent testing laboratory

A. An independent testing laboratory meeting the requirements of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as used in Construction ASTM E-329 shall determine the quality of all aggregate and concrete for compliance with the

B. The testing laboratory shall test all Portland Cement Concrete payement. The laboratory personnel shall take the samples and adequately protect all samples during storage and transporting

1. The testing laboratory shall perform the following:

plants or stockpiles during the course of the work & test for compliance with the Contract Documents.

a. Secure production samples of materials at

b. Check batching and mixing operation for compliance with the Contract Documents.

c. Review the manufacturer's certificate or mill test for each shipment of cement and reinforcing steel and/or conduct laboratory tests or spot checks of these materials as received.

d. Mold and test concrete field cylinders as

C. Concrete materials shall be tested as follows: 1. Aggregate shall be tested in accordance with test

requirements ASTM C-33. 2. Cement shall be tested in accordance with ASTM C-150. All cement used on the job shall be accompanied by a certificate, by testing agency, indicating compliance of cement to all tests.

D. Concrete shall be tested for slump and strength as

1. Secure composite samples in accordance with ASTM

2. Samples shall be taken from each mix design placed in any one (1) day or from each 50 cubic vards or fraction thereof of concrete placed in continuous pours, whichever is the lesser.

3. Cast three (3) cylinder specimens from each sample. Cure two (2) cylinders in the laboratory and one (1) cylinder in the field. The field cured cylinder shall be tested for 7-day strength and the two (2) laboratory cured cylinders shall be tested for 28-day strength. Make and cure cylinders in accordance with ASTM C-31; test in accordance with ASTM C-39. Test reports shall include temperature of air and concrete at site, mix proportions and other data as necessary to determine compliance with

4. Determine slump of the concrete for each sample and whenever consistency of concrete appears to vary, test in accordance with ASTM C-143. Visually monitor concrete during pour and recheck slump when variation is observed.

5. A portion of the air-entrained concrete samples taken, shall be tested to determine the amount of entrained air. Determination shall be made in accordance with either ASTM C-231 or ASTM C-173

a. Should these tests indicate at any time that the concrete being produced does not have an air content within the specified limits, the Contractor shall modify the materials as may be necessary for compliance.

E. If the average strength of the test cylinders for any portion of the structures constitutes a failure as defined in ACI 318, or if the slump is beyond tolerances the Engineer or Owner may, at the Contractor's expense, require changes in the concrete mix proportions; require additional tests in accordance with ASTM C-42; or may declare all concrete work, or which the above mentioned cylinders are representative samples, in violation of the Contract Documents.

F. Should the work be in violation of the Contract Documents or should there be a likelihood of the concrete having been frozen, the Contractor, if so directed by the Engineer or Owner shall, at his own expense, make loading tests. If the unit area or member under consideration fails to pass the loading test or shows signs of failure; it shall either be removed and rebuilt by the Contractor, or additional construction as directed by the Engineer or Owner as necessary to make the structure sound, shall be performed by the Contractor.

1. Conduct loading tests in the presence of representatives of the Engineer and Owner in accordance with Chapter 20 of ACI 318.

G. Submit one (1) copy of all reports, certificates and test results to the Engineer, Owner and Contractor. 1. Concrete Test Reports must include the following

a. Store name and Number and Location b. Specified Mix Design and Strength in PSI

minimum information:

e. Air Temperature at time of Placement

f. Concrete Temperature at time of Placement

g. Who cast cylinders, conducted Slump Test, etc.

(such as testing agency employee) h. Date Cylinders cast

i. Size of Cylinder (such as 6" x 12") i. Cylinder area (such as 28.26 sq. in.)

c. Location of Concrete Supplier

d. Name of Concrete Supplier

k. Slump in inches I. Water added on-site in gallon

m. Percent of Air-Entrainment n. Age of Test Cylinder (7-day, 28-day, etc.)

o. Total Load at Failure

p. Strength in PSI

q. Type of Failure (kind of Cylinder break: shear, split, etc.)

2.04 MORTAR TEST (if applicable)

A. An independent testing laboratory meeting the requirements of ASTM C-91 Compressive Strength and Water Retention of Mortars shall determine the quality of materials and strength of all mortar.

B. Three (3) mortar cylinders shall be taken for each 2.000 square feet of concrete unit masonry walls. One (1) cylinder shall be tested at seven (7) days and two (2) cylinders shall be tested at twenty-eight (28) days meeting the specified strength.

C. Three (3) grout cubes shall be taken for each 50 cubit yards of grout, or part thereof. One (1) cube shall be tested at seven (7) days and two (2) cubes shall be tested at eight (8) days with an average strength of the two meeting the specified strength.

D. Submit one (1) copy of the test reports each to the Engineer, Owner and Contractor, END OF SECTION 01410

SECTION 02100 - SITE PREPARATION

PART 1: GENERAL 1.01 SCOPE

A. Perform all work required for the complete and satisfactory execution of all site preparation indicated on the drawings and specified becein.

B. Related information or work specified elsewhere in the Project Manuals includes, but is not limited to, the following:

1. General and Supplementary Conditions of the Contract
2. Division 1 — As applicable 3. Section 01410 - Testing Laboratory Service

1.02 PROTECTION OF EXISTING FEATURES

4. Section 02200 - Earthwork

A. Do not interfere with use of public right-of-way. Maintain free and safe passage to and from.

B. Cease operations immediately and notify Engineer and Owner if safety of adjacent structures appears to be endangered. Take precautions to properly support structures. Do not resume operations until safety is

C. Prevent movement, settlement or collapse of all adjacent services, sidewalks, etc. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.

1.03 MAINTAINING ACCESS

A. Do not close or obstruct public or private roadways without permits. Conduct operations with minimum interference to public or private roadways.

PART 2: PRODUCTS

NONE

PART 3: EXECUTION

3.01 CLEARING AND GRUBBING

A. The site shall be cleared of all vegetation, trees, stumps, roots, boulders, grasses, organic matter, debris and deleterious materials not designated by the Owner or indicated on the Plans to be preserved. All cleared and grubbed material shall be disposed of off-site by the Contractor. It is the intent of this specification to provide for the removal and disposal of all obstructions and objectionable materials not specifically provided for elsewhere on the Plans and in

B. Areas where organic fill is exposed due to cleaning and grubbing shall be reported to insure the organic fill is propertly exhumed, if necessary. All exhumed organic fill shall be legally disposed offsite in a manner as required by local and state authorities.

3.02 TOPSOIL

A. Natural surface soil is very limited on this site, however, where existent in grassed areas shall be removed from the limits of the work and stockpiled in an area approved by the Owner and Engineer. The topsoil stockpiles shall be maintained in a confined area and protected from excessive erosion. Upon completion of all utilities and paving, replace topsoil on all unpaved areas within the limits of the work. Fine grade topsoil to final grade within a tolerance of 60.1 foot.

3.03 DISPOSAL OF MATERIALS

A. Material resulting from the site preparation work and not scheduled to be salvaged and which is unsuitable for reuse on the project, shall become the property of the Contractor and shall be legally disposed of off-site in an approved disposal facility.

B. Debris, rubbish and other material shall be disposed of promptly and shall not be left until final cleanup END OF SECTION 02100

SECTION 02200 - EARTHWORK

PART 1: GENERAL

1.01 SCOPE

A. Perform all work required for the complete and satisfactory execution of all site preparation

indicated on the drawings and specified herein. B. Related information or work specified elsewhere in the Project Manuals includes, but is not limited to.

the following: 1. General and Supplementary Conditions of the Contract

 Division 1 — As applicable Section 01410 - Testing Laboratory Service . Section 02100 - Site Preparation 5. Section 02510 - Asphaltic Concrete Payement 6. Section 02511 - Portland Cement Concrete Pavement

1.02 DESCRIPTION OF WORK

A. Unclassified Excavation: All required excavation within the construction limits, including grading, parking areas, and drives; the removal, prope utilization or disposal of all excavated material and the shaping and finishing of all site earthwork in onformity to the lines and grades as shown in the Plans and specified elsewhere.

1.03 EXISTING UTILITIES

A. The Plans show the approximate location of all known underground utility lines and structures. Where pipes. ducts and other structures are encountered in the excavation but are not shown on the Plans, immediately notify the Engineer and Owner.

1.04 INFORMATION NOT GUARANTEED

A. Information on the Drawings and in the Specifications relating to subsurface conditions, natural phenomena, and existing utilities and structures is from the best sources presently available. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not augranteed.

B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be current. The Contractor shall report any discrepancies found in the field or with the plans and specifications to the Owner prior to commencing with work. No additional compensation will be made for work performed after a discrepancy has been discovered but prior to its resolution.

1.05 REQUIREMENTS AND CODES

A. The following Specifications are minimum requirements and shall govern except all local, county. state, and/or federal codes and ordinances shall govern when their requirements are in excess of those specified herein.

1.06 SITE CONDITIONS

A. No improvements shall be installed until required testing has been done on all fill or backfill 1.07 TESTING AND INSPECTION

A. The Contractor shall be responsible for coordinating and scheduling all testing activities required by other sections of the Project Drawings and Specifications

1.08 SUBMITTALS A. Submit the following samples to the Testing

> 1. Fill and Backfill for proposed storm sewer improvements.

B. Submit all Testing Lab results to Engineer, Owner,

PART 2: PRODUCTS

Laboratory:

2.01 EQUIPMENT

A. Use only equipment that has been approved for this B. Grading Equipment: Furnish, operate and maintain such equipment as is necessary to produce uniform

layers, section and smoothness of grade for compaction and drainage. C. Compaction Equipment: Use sheepfoot type rollers either tractor drawn or self propelled, rubber tired rollers, or other equipment capable of obtaining the

D. Dynamic Compaction: If desired by the Owner, perform Dynamic Compaction in accordance with the procedures and recommendations specified in the Geotechnical Report (when applicable).

E. Sprinkling Equipment: Use tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable surface widths.

F. Miscellaneous Equipment: Scarifiers, disks, spike tooth or spike tooth harrows, earth hauling equipment. and other equipment must be suitable for construction

2.02 MATERIALS

placed.

A. Imported fill material used under pavements, shall consist of low plasticity material having a plasticity index (PI) between 5 and 15, a liquid limit less than 40, and containing a minimum of 15% fines (material passing the 200 sieve).

PART 3: EXECUTION

3.02 UNCLASSIFIED EXCAVATION

A. After knocking off tops of existing ridges in site to form uniform sections, excavate to lines, grades, and elevations indicated on the Plans for subsequent construction of slopes or pavement. Notify Engineer i unsatisfactory materials are encountered.

and uncut areas to receive fill shall be tested by the Soils Engineer prior to placing fill or improvements. C. Adequate grades shall be maintained during construction to allow proper drainage and to prevent

interference or delay of the work.

B. Inspect the subgrade for soft spots, and proof-roll

as necessary to provide firm surface. All areas of cut

D. All exposed subgrade beneath proposed pavement (not existing) shall be scarified to a depth of eight (8) inches and moisture conditioned and compacted to 95% density per standard proctor at or above optimum moisture content. E. When wet excavation is encountered, the excavated

area shall be de-watered and kept free of water. All

saturated material shall be removed, filled with new

material and tested before fill or improvements are

3.03 PLACEMENT OF EARTH FILL UNDER PAVEMENT

A. After unclassified excavation is executed, inspected, proof-rolled, scarified, compacted, and approved per Paragraphs 3.02 A. through 3.02 E (above), earth fill meeting the requirements of Paragraph 2.02 A. of this section, shall be placed in loose eight (8)-inch horizontal lifts on the prepared subgrade. Each lift must be moisture conditioned and compacted per Paragraph 3.02 D. and then tested and approved by the Soils Engineer in accordance with

3.04 PLACEMENT OF EARTH FILL UNDER LANDSCAPED AREAS

A. Earth fill under areas to be landscaped or seeded/sodded shall be placed on prepared unclassified excavation identical to Paragraph 3.03 A; of this section except that loose horizontal lifts placed can be as thick as twelve (12) inches. Each lift must be moisture conditioned & compacted per Paragraph 3.02 D. 3.05 MOISTURE CONTROL

A. If the moisture content is too high, adjust to within the specified limits by spreading the material and permitting it to dry. Assist the drying process by discing or harrowing if necessary. When the material too dry, sprinkle each layer with water. Work the moisture into the soil by harrowing or other method approved by Soils Engineer.

Section 01410.

A. Where any portion of the surface becomes eroded or otherwise damaged, repair the affected area to establish proper condition and grade prior to topsoil

3.07 MATERIAL DISPOSAL A. Excess excavated material shall be placed in designated embankment areas, berms, or designated stockpile areas.

> B. Dispose of unsuitable material legally without causing expense or damage to Owner.

> described in Section 01410 - "Testing Laboratory

A. The Contractor will appoint an independent commercial testing laboratory to perform tests as

Services".

END OF SECTION 02200

SECTION 02221 — EXCAVATION, TRENCHING

EMBEDMENT, AND BACKFILLING FOR UTILITIES

PART 1: GENERAL

1.01 SCOPE A. Perform all work and furnish all supplementary items required for the excavation, trenching, embedment, and

5. Section 02400 - Storm Drainage

structures and of existing utilities and their

backfilling for installation of storm sewers. B. Related information or work specified elsewhere in the Project Manuals includes, but is not limited to the

1. General and Supplementary Conditions of the 2. Division 1 - As applicable 3. Section 01410 - Testing Laboratory Services Section 02200 — Earthwork

A. All storm sewers shall be trenched, bedded, and backfilled in accordance with the applicable City of

1.02 REQUIREMENTS AND CODES

Dallas and the North Central Texas Council of Governments Standard Details and Specifications. 1.03 EXISTING CONDITIONS A. The Contractor shall become thoroughly familiar with the site, consult records and drawings of adjacent

connections, and note all conditions which may influence the work of this Section. B. By submitting a bid, the Contractor affirms that he has carefully reviewed the soils report and any observable above ground conditions affecting work under this section. The Contractor shall report any discrepancies found in the field or with the soils report to the Owner prior to commencing with work. No additional compensation will be made for work performed after a discrepancy has been discovered but prior to

C. The Contractor may, at his own expense, conduct additional subsurface testing as required for his own

1.04 INFORMATION NOT GUARANTEED

A. Information on the Drawings and in the Specifications relating to subsurface conditions natural phenomena, and existing utilities & structures is from the best sources presently available. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not guarantee

B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period, as no additional compensation will be made for errors and inaccuracies that may be found therein.

1.05 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The work shall be executed in such manner as to prevent any damage to adjacent property and any other property and existing improvements such as, but not limited to: streets, curbs, paving, utility lines and structures, monuments, bench marks and other public and private property. Protect existing structures and foundations from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to the Owner. Existing roads, sidewalks, and curbs damaged during the project work shall be repaired or replaced to their original condition at the completion of operations. The Contractor shall replace, at his own cost, existing bench marks, monuments, and other reference points which are disturbed or destroyed. C. Buried structures, utility lines, etc., including

those which project less than 18 inches above grade.

which are subject to damage from construction equipment

shall be clearly marked to indicate the hazard. Markers

shall indicate limits of danger areas, by means which

other construction equipment, and shall be maintained

will be clearly visible to operators of trucks and

at all times until completion of Project.

required by state law.

required by local, state and/or federal law.

A. The Contractor shall be responsible for coordinating

and scheduling all testing and inspection required by

B. All excavation, embedment, backfill and compaction

operations shall be observed and tested by the Soils

A. All backfill material shall be a clean material and

B. Native, on-site material can be used if it meets the

requirements stated above and in Section 01400. All

A. Embedment for storm sewer lines shall be crushed

(a) Retained on 1-1/4 in, sieve: 0%

(b) Retained on No. 10 sieve: 95-100%

2. Deleterious Substances. Crushed stone embedment

and shall contain not more than five (5%) percent by

shall contain not more than one (1%) percent by

weight of organic matter, clays, loam, or pebbles

weight of any one or combination of slate, shale,

schist, or soft particles of sandstone.

A. During excavation, pile material suitable for

materials not required or suitable for backfill,

using pumping or other approved means.

backfilling in an orderly manner for enough from the

bank of the trench to avoid overloading, slides or

cave-ins. Remove as indicated or directed all excavated

B. Grade as necessary to prevent surface water from

water accumulating in trenches or other excavations,

flowing into trenches or other excavations. Remove any

C. Excavate by open cut with trenching machine or back

hae. Where machines other than ladder or wheel type

trenching machines are used, do not use excavated

material composed of large chunks or clods for

backfill, but dispose of such material and provide

other suitable material for backfill without additional

D. Dig the trench the proper width for laying pipe, as

vertical as practical. Remove stones as necessary to

avoid point-bearing. Overexcovate wet or unstable soil

E. Be careful not to overexcavate. Accurately grade the

trench bottom to provide uniform bearing and support

for each section of the pipe on undisturbed soil at

every point along its entire length, except where

necessary to excavate for bell holes and for proper

sealing of pipe joints. Dig bell holes and depressions

for joints after the trench bottom has been graded,

Make bell holes and depressions for joints no deeper,

F. Install sheeting and bracing in trenches and other

A. After trench is cut to the correct dimensions and

grades, as shown on the Plans, the trench shall be

nspected to verify the trench bottom and walls are

to the depth shown on the Plans and compact in

C. After the pipe is placed, fill the trench to the

D. Reference Plans for Special Embedment Details in

A Storm - Limit clear space on either side of the pipe

accurately in line and grade, with the spigot end downstream, entering the bell to full depth and in sucl

manner as not to drag earth into the annular space for

the joints. Pipes shall be fitted together and matched

A. All trenches shall have clean material per Paragraph

2.01 A. of this section, placed in loose eight (8)-inch

lifts, moisture conditioned and compacted per Section 02220, Paragraph 3.02 D.

B. Backfill lifts shall be tested per Section 01410.

A. Existing utility lines, shown on Drawings or known

protected and satisfactorily repaired if damaged. Any

lamage to lines not shown will be reported immediately.

encountered, notify the Engineer so that measures can

be retained, as well as utility lines constructed

during excavation operations, must be carefully

When utility lines that are to be removed are

be taken to avoid interruption of service.

to the Contractor prior to excavation and that are to

3.05 PROTECTION OR REMOVAL OF UTILITY LINES

as shown on the Plans. The pipe shall be laid

so they will form a smooth and uniform invert.

areas where organic fill is existent.

B. Spread embedment material in the base of the trench

depth shown on the Plans in maximum six (6)-inch lifts,

and compact to minimum 95 percent of medium density per

accordance with Section 01410, and shaped to receive

excavations with vertical slides, as necessary to

support the sides. Sheeting may be pulled after excavation has been backfilled, but not without

shown on the Plans. Cut banks of pipe trench as nearly

from the trench bottom to permit construction of a more

material must be free of large clods, rocks, roots,

meet the requirements as stated on the Plans.

organic matter, or other deleterious material.

other sections of the Project Manual and governing

regulatory agencies having jurisdiction over certain

1.06 SHORING AND SHEETING

1.07 TESTING AND INSPECTION

PART 2: PRODUCTS

2.01 BACKFILL MATERIAL

2.02 PIPE EMBEDMENT MATERIAL

rock or like material.

PART 3: EXECUTION

3.01 EXCAVATION

3.02 EMBEDMENT

free of water.

3.03 PIPE INSTALLATION

3.04 BACKFILLING

END OF SECTION 02221

the pipe to be laid.

1. Gradation Requirements

Engineer per Section 01410.

B. Comply with OSHA Standards, other applicable federal, state and local regulations, or in the absence thereof, with the provisions of the AGC Manual.

A. Provide shoring, sheeting and/or bracing at

excavations, as required, to prevent collapse of earth

and/or organic fill material at side of excevations as

as necessary to protect persons, other improvements and excavation against loss of ground, caving embankments or structural movement in accordance C. Remove sheeting and shoring and the like, as with current OSHA standards. backfilling operations progress, taking all necessary precautions to prevent collapse of excavation sides D. Contractor shall provide trench safety system as

2. Submission of a detailed plan of a trench safety system prepared and sealed by a Professional Engineer registered in the State of Texas and knowledgeable and experienced in this field for inclusion in the Contract.

A. Extent of shoring and bracing work includes, but is

1. Design and construction of shoring and bracing

for all trench excavation exceeding five feet deep

3. Development and submission of a safety program consistent with current OSHA standards which shall govern the presence and activities of individuals

4. Provision for daily inspections to ensure that trench safety requirements are being met.

5. Obtaining of soil borings and soil analysis

working in and ground the trench excavation.

necessary to design the plan. 6. Maintenance of shoring and bracing

7. Protection for permanent burial of sacrificial

and Backfilling for Utilities

8. Removal of bracing as required

B. Related information or work specified elsewhere in the Project Manuals includes, but is not limited to the

1. General and Supplementary Condtions of the 2. Division 1 - As applicable 3. Section 01410 - Testing Laboratory Services L Section 02200 - Earthwork

5. Section 02221 - Excation, Trenching, Embedment,

1.02 QUALITY ASSURANCE

PART 1: GENERAL

not limited to, the following.

1.01 SCOPE

A. Supervision. Engage and assign design and supervision of shoring and bracing work to a qualified foundation consultant. Submit name of engaged consultant and qualifying technical experience.

B. Regulations. Trench safety systems shall be accomplished in accordance with the detailed specifications set out in the provisions of Excavation Trenching and Shoring, OSHA Standards 29 CFR, Part 1926. Subpart P. as amended, including Proposed Rules published in the Federal Register (Vol. 52, No. 72) on Wednesday, April 15, 1987. The sections that are incorporated into these specifications by reference include Section 1926-650 through 1926-653. Legislation that has been enacted by the Texas Legislature (H-B No. 1569) with regard to Trench Safety Systems, is hereby incorporated, by reference, into these specifications.

C. Inspection, The Contractor shall make daily inspections of the trench safety system to ensure that the systems meet OSHA requirements. Daily inspection is to be made by a "competent person" provided by the Contractor. If evidence of possible cave-ins or slides is apparent, all work in the trench shall cease until the necessary precautions have been taken by the Contractor to safeguard personnel entering the trench. It is the sole duty, responsibility and prerogative of the Contractor, not the Board or the CM, to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project. The Contractor shall maintain a permanent record of daily inspections.

1.04 SUBMITTALS A. Layout Drawings. Before starting trench excavation or related work, provide design and calculations and layout drawings for trench safety systems, shoring and bracing systems and other data prepared and sealed by a END OF SECTION 02222 registered Professional Engineer licensed in the State of Texas. System design calculations must be acceptable

to the City of Dallas.

1.05 JOB CONDITIONS A. Before starting any excavation or related work, the

1. Check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior settlement or cracking of structures, pavements and other improvements. Prepare a list of such damages. verified by dated photographs and signed by Contractor and the Construction Manager.

to be affected by movement resulting from excavation 3. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor licensed in the State of Texas. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify the Construction Manager if changes

in elevation occur or if cracks, sags or other

2. Survey adjacent improvements, establishing exact elevations at fixed points to act as benchmarks.

Clearly identify benchmarks and record existing

elevations. Locate datum level used to establish

benchmark elevations sufficiently distant so as not

1.06 EXISTING UTILITIES

damage is evident.

A. Protect existing active sewer, electricity and other utility services and structures.

3930 Meredith Avenue

Dallas, Texas 75211

CANALINA consulting engineers, inc.

Structural, Civil, & Construction Engineering

SECTION 02222 - TRENCH SAFETY SYSTEMS

PART 2: PRODUCTS 2.01 MATERIALS

> A. General. Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new. but should be in serviceable condition.

B. If wood is part of shoring system,

remove before placement of backfill, and do not allow to be placed in concrete.

C. Permanent (sacrificial) shoring shall be of a non-decomposing metal (gaivanized, coated or grouted) composition. No wood forms will be allowed as permanent shoring.

PART 3: EXECUTION

3.01 SHORING

A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostotic pressures, and level loads as necessary

B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

A. Locate bracing to clear existing features and other permanent work. If necessary to move a brace, install new bracing prior to removal of original

cast into or included in permanent pavement. C. Install internal bracing, if required to prevent spreading or distortion to

B. Do not place bracing where it will be

D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic

E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities and

PART 4: METHOD OF MEASUREMENT

ndicated in the scope of this project. PART 5: BASIS OF PAYMENT A. Payrnent for all trench safety systems

A. All work to be completed in this

bid for the several bid items as

Section shall be included in the lump sum

the system and backfill.

31 JAN 2005

EXPIRATION DATE:

up,

A

F. Repair or replace, as acceptable to the Construction Manager, adjacent work damaged or displaced through the installation or removal of shoring and bracina work.

shall be made in a lump sum per base bid. safety system design, labor, tools, materials, equipment and incidentals to complete the work, including removal of

Date

SPECIFICATIONS

Sheet No.

Date 131 2005

AFFIXATION DATE:

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Job No. 00018 Plan No.

Drawn By

0 0

Ccei Revisions

> Sheet Title SITEWORK

of 15

LUIS D. CARRERA 55182 FOISTERED

Signed:

Tel: (214) 330-4771

Fax: (214) 330-2167