

City of Alexandria  
Standard Specifications  
For  
Street, Drainage and Utility  
Construction



2013  
Edition

City Engineer's Office  
625 Murray Street  
Alexandria, LA 71301

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City of Alexandria Engineering Department  
625 Murray Street  
Customer Service Building, Second Floor  
Alexandria, LA 71301  
318-473-1170

**MAIL ORDERS SHOULD BE SENT TO:**

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# STANDARD SPECIFICATIONS

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DIVISION 1

General Provisions

Section 1

Definition of Terms

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Wherever used in these SPECIFICATIONS or CONTRACT DOCUMENTS, the following terms shall have the meaning indicated and shall be applicable to both the singular and plural thereof.

- 1.1 STATE: State of Louisiana.

1.2 PARISH: The Parish of Rapides.

1.3 CITY: The City of Alexandria, Louisiana, domiciled in Rapides Parish and governed by a Mayor-Council form of government represented by the MAYOR.

1.4 COUNCIL: The elected COUNCIL and governing body of CITY.

1.5 MAYOR: The MAYOR of the CITY.

1.6 DIRECTOR OF PUBLIC WORKS: The DIRECTOR OF PUBLIC WORKS of the CITY or his authorized representative.

1.7 ENGINEER: The person, firm, or corporation named as such in the AGREEMENT.

1.8 ADDENDA: Written or graphic instruments issued prior to the BID opening that modify or interpret the CONTRACT DOCUMENTS, PLANS, and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.9 AGREEMENT: The written Contract between the CITY and the CONTRACTOR concerning the work to be performed; other CONTRACT DOCUMENTS are attached to the AGREEMENT and made a part thereof as provided therein.

1.10 APPLICATION FOR PAYMENT: The form approved by the CITY to be used by the CONTRACTOR in requesting progress or final payments. The application may require supporting documentation as required in the CONTRACT DOCUMENTS or additionally by the CITY.

1.11 ASBESTOS: Any material that contains more than one percent ASBESTOS and is friable or is releasing ASBESTOS fibers into the air above current action levels established by the United State Occupational Safety and Health Administration.

1.12 BID: The written offer of the BIDDER to perform the contemplated WORK and furnish the necessary materials on the prescribed form, properly signed in accordance with Louisiana law.

1.13 BIDDER: Any individual, firm or corporation submitting a BID for the WORK contemplated, acting directly or through a duly authorized representative.

1.14 BIDDING DOCUMENTS: The Advertisement or Invitation to BID, Instruction(s) to BIDDERS, the BID form(s), and the proposed CONTRACT DOCUMENTS including ADDENDA or acknowledgement of ADDENDA issued prior to receipt of BID.

1.15 BIDDING REQUIREMENTS: The Advertisement or Invitation to BID, Instruction(s) to BIDDERS and the BID form(s), and applicable Louisiana law.

1.16 BONDS: BID, Performance and Payment BONDS and other instruments of security, furnished by the CONTRACTOR and the CONTRACTOR'S SURETY, in accordance with the BIDDING REQUIREMENTS and CONTRACT DOCUMENTS.

1.17 CERTIFICATE OF ACCEPTANCE: Document recommended by ENGINEER, executed by MAYOR at the direction of CITY COUNCIL indicating that all WORK has been completed in accordance with the CONTRACT DOCUMENTS.

1.18 CHANGE ORDER: A document recommended by the ENGINEER on an approved form signed by the CONTRACTOR and CITY and authorizing an addition, deletion or revision in the WORK or an adjustment in the CONTRACT PRICE or the CONTRACT TIME issued on or after the effective date of the AGREEMENT.

1.19 CONTRACT DOCUMENTS: The AGREEMENT, ADDENDA, CONTRACTOR'S BID, NOTICE OF AWARD, NOTICE TO PROCEED, the BONDS, these General Provisions, the SPECIAL PROVISIONS, the SPECIFICATIONS and PLANS, WRITTEN AMENDMENTS, CHANGE ORDERS, FIELD ORDERS and the ENGINEER'S written interpretations and clarifications issued on or after the EFFECTIVE DATE OF THE AGREEMENT.

1.20 CONTRACT PRICE: The total moneys payable by the CITY to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.21 CONTRACT TIME: The number of WORKING DAYS allowed for the completion of the CONTRACT, including authorized time extensions.

1.22 CONTRACTOR: The individual, firm or corporation who enters into an AGREEMENT awarded him by the CITY. The CONTRACTOR may act directly or through a lawfully authorized agent or employee.

1.23 CONTROLLING ITEMS OF WORK: Items of construction that should be in progress at the time, as essential to the orderly completion of the WORK within the time limit specified, in accordance with the CONTRACTOR's approved progress schedule.

1.24 DEFECTIVE: An item of work that is unsatisfactory, faulty or deficient in that it does not conform to the CONTRACT DOCUMENTS, or does not meet the requirement of any inspection, reference standard, test or required approvals.

1.25 DRAWINGS: Individual sheets of the Construction PLANS which contain graphic information concerning the Proposed WORK which have been prepared or approved by ENGINEER and are referred to in the CONTRACT DOCUMENTS. Shop drawings are not drawings as defined herein.

1.26 EFFECTIVE DATE OF THE AGREEMENT: The date indicated in the AGREEMENT on which it becomes effective, but if no such date is indicated, it means the date on

which the AGREEMENT is signed by the Mayor.

1.27 FIELD ORDER: A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.28 HAZARDOUS WASTE: The term HAZARDOUS WASTE shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.29 LAWS AND REGULATIONS: Any and all applicable laws, rules, regulations, ordinances, codes and orders of governmental bodies, agencies, authorities and courts having jurisdiction.

1.30 LABORATORY: The testing laboratories employed by the CITY to make required tests.

1.31 LIENS: Liens, charges, security interests or encumbrances upon real property or personal property.

1.32 NOTICE OF AWARD: A written notice given by the CITY or ENGINEER to the apparent successful BIDDER. The notice may enumerate conditions precedent to the award which require compliance activity from the apparent low BIDDER, such as, submission of BONDS, construction scheduling, etc. Where no formal written notice is provided, the AGREEMENT shall constitute NOTICE OF AWARD.

1.33 NOTICE TO PROCEED: A written notice from the CITY or ENGINEER notifying the CONTRACTOR to begin the prosecution of the WORK.

1.34 PARTIAL UTILIZATION: Use by the CITY of a part of the WORK for the purpose for which it is intended, prior to completion of all of the WORK.

1.35 PLANS: The set of DRAWINGS, consisting of profiles, typical cross sections, general cross sections, working DRAWINGS and supplemental DRAWINGS, or exact reproductions thereof, which show the location, character, dimension and details of WORK to be done and which are to be considered as part of the CONTRACT, supplementary to the SPECIFICATIONS.

1.36 PROJECT: The total of the WORK to be provided as specified by the CONTRACT DOCUMENTS.

1.37 PROJECT REPRESENTATIVE: The authorized representative of the ENGINEER or CITY who may be assigned to the site or any part thereof.

1.38 SAMPLES: Physical examples of material, equipment, or workmanship that are representative of some portion of the work and which establish the standard by which such portion of the WORK will be judged.

1.39 SHOP DRAWINGS: All drawings, diagrams, illustration, schedules, and other data or information which are submitted by the CONTRACTOR to illustrate some portion of the WORK.

1.40 SPECIAL PROVISIONS: The specific clauses or provisions setting forth conditions or requirements, peculiar to the PROJECT under consideration and covering WORK or materials involved in the proposal but not thoroughly or satisfactorily stipulated or set forth by the General Provisions.

1.41 SPECIFICATIONS: Those portions of the CONTRACT DOCUMENTS consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the WORK.

1.42 SUBCONTRACTOR: Any individual, firm, partnership, or corporation who contracts with the CONTRACTOR to perform any part of the PROJECT covered by the CONTRACT.

1.43 SUPPLIER: A manufacturer, fabricator, supplier, distributor, material man or vendor having a direct contract with the CONTRACTOR or with any SUBCONTRACTOR to furnish materials or equipment to be incorporated into the WORK.

1.44 UNDERGROUND FACILITIES: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments along with any encasements containing such facilities which have been installed underground to furnish: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

1.45 UNIT PRICE WORK: Work to be paid on the basis of unit prices.

1.46 WORK: All labor, materials, equipment and/or services required to be incorporated into the construction necessary to produce the PROJECT specified by the CONTRACT DOCUMENTS.

1.47 WORKING DAY: A calendar day, with exceptions stated herein, on which weather and other conditions not under control of CONTRACTOR will permit construction operations to proceed for at least five (5) continuous hours of the day with a normal working force engaged in performing the CONTROLLING ITEMS OF WORK.

No WORKING DAYS will be charged for the following days:

1. Saturdays and Sundays.
2. CITY recognized holidays:

- a. New Year's Day
  - b. Martin Luther King's birthday
  - c. Good Friday
  - d. Fourth of July
  - e. Labor Day
  - f. Veterans' Day
  - g. Thanksgiving Day
  - h. Friday following Thanksgiving Day
  - i. Christmas Day
  - j. Any other holiday declared by the CITY COUNCIL
3. Days on which delays, attributable solely to the CITY or other governmental agencies prevent CONTRACTOR from proceeding with the CONTROLLING ITEMS OF WORK at time of delay.
4. Days on which delays are attributable to the direct effect of strikes, riots or civil commotions.

1.48 WRITTEN AMENDMENT: A WRITTEN AMENDMENT of the CONTRACT DOCUMENTS, signed by the CITY and CONTRACTOR on or after the EFFECTIVE DATE of the AGREEMENT and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the CONTRACT DOCUMENTS.

1.49 DEFINITION OF ALPHABETICAL TERMS:

- A.A.S.H.O. : American Association of State Highway Officials
- A.S.T.M. : American Society for Testing Materials
- A.S.A. : American Standards Association
- A.W.W.A. : American Water Works Association
- A.W.P.A. : American Wood Preservers Association
- La. DOTD : Louisiana Department of Transportation and Development
- C.O.A. : City of Alexandria

1.50 OR EQUAL: Whenever in these CONTRACT DOCUMENTS a particular brand, make of material, device or equipment is specified, followed by the words "or EQUAL", such brand, make of material, device, or equipment should be regarded merely as establishing a standard or quality. If two or more brands, makes of material, devices, or equipment are shown or specified, each should be regarded as the EQUAL of the other. Any other brand, make of material, device, or equipment, which, in the opinion of the ENGINEER, is the recognized EQUAL of that specified, considering quality, workmanship, and economy of operation, and is suitable for the purpose intended, may be accepted by the ENGINEER as a substitute, provided that all materials and workmanship shall in every respect be in accordance with what, in the opinion of the ENGINEER, is the best modern practice.

# DIVISION 1

## General Provisions

### Section 2

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| 2.7 BID Guaranty   | 2.14 Interpretations and ADDENDA                           |
|  | 2.15 Substitute Materials or<br>Products - Prior Approvals |

2.1 ADVERTISEMENT FOR BIDS: In conformity with STATE Law, the CITY will publish a "Notice to CONTRACTORS" requesting BIDS for the WORK. The advertisement for BIDS will contain a description of the WORK; a statement of the place where BIDS will be received and the time for opening same; and Instructions to BIDDERS as how to access DRAWINGS, SPECIFICATIONS and proposals.

2.2 CONTENTS OF BID FORMS: BIDDERS will be furnished with Bid forms, in duplicate, which will state the locations and description of the contemplated construction and will show the preliminary estimate of the various quantities and kinds of work to be performed, or materials to be furnished, with a schedule of items for which unit prices are asked. The PLANS and SPECIFICATIONS, in force at the time of receipt of BIDS, and the SPECIAL PROVISIONS and other CONTRACT DOCUMENTS will be considered a part of the BID whether attached or not. The BID shall be submitted to the Office of the City Clerk and one copy shall be retained by the BIDDER.

2.3 INTERPRETATION OF ESTIMATES: The quantities listed in the BID form are to be considered as approximate and are to be used only for the comparison of BIDS. Payment to the CONTRACTOR will be made only for the actual quantities of WORK performed and materials furnished in accordance with the AGREEMENT, and if, upon completion of the construction, the actual quantities shall show either an increase or decrease from the quantities given in the approximate estimate, the unit prices mentioned in the BID will prevail, except as otherwise herein provided.

2.4 EXAMINATION OF DRAWINGS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK: The BIDDER is required to examine carefully the site of the proposed PROJECT, BID FORMS, DRAWINGS, SPECIFICATIONS, SPECIAL PROVISIONS, AGREEMENT and BOND forms, for the WORK contemplated and it will be assumed that the CONTRACTOR has investigated and satisfied himself as to the conditions to be encountered as to the character, quality and quantities of WORK to be performed and materials to be furnished, as to the requirements of these SPECIFICATIONS, SPECIAL PROVISIONS and AGREEMENT. BIDDERS are assumed to have made themselves familiar with all Federal and STATE Laws, Local Laws, ordinances and regulations which in any manner shall affect the work or its prosecution. The filing of a BID shall be presumptive evidence that the BIDDER has complied with these requirements.

2.5 PREPARATION OF BID: Unless otherwise specified, only BIDS submitted on the forms furnished by the ENGINEER will be considered. Except in the case of alternate items, the BIDDER must correctly fill in the spaces for each and every item, (written in ink, both in words and numerals), the unit prices for which he proposes to do the WORK contemplated or to furnish materials. Should the BIDDER fail to correctly submit a unit price for each item as prescribed above, his BID will be classed as irregular.

2.6 REJECTION OF BIDS: BIDS may be rejected in the case of any omission, alterations of forms, additions, or conditions not called for, unauthorized alternate BIDS, incomplete BIDS, erasures, or irregularities of any kind. BIDS received, conditioning their consideration or rejection upon BIDS for other work submitted by the same BIDDER may be classed as irregular, unless the SPECIAL PROVISIONS specifically invite or permit conditional or combination BIDS. BIDS not accompanied by a BID guaranty, or if the BID is not signed by the BIDDER, the BID shall be rejected.

2.7 BID GUARANTY: Each BID must be accompanied by a BID guaranty equal to five percent (5%) of the total amount of the highest combination for which a BID is submitted. Only Certified Checks or BID BONDS will be accepted as the BIDDER's guaranty with his proposal; any deviation from this requirement will be considered cause for rejection of the BID. The Certified Check shall be issued by a State or National Bank in good standing and shall be made payable to the CITY for not less than the amount specified above. Cashier's Checks or currency will not be accepted as a substitute for Certified Checks or BID BONDS. If Cashier's Check, uncertified check or currency is enclosed with the BID, the BID will be considered informal and the Cashier's Check, uncertified check or currency and all other enclosures, will be returned to the BIDDER without having been read.

2.8 DELIVERY OF BIDS: Each BID shall be submitted together with the BID guaranty, in a sealed envelope addressed to the City of Alexandria, Alexandria City Hall, 915 Third Street, Alexandria, Louisiana 71301. Each sealed envelope containing a BID must be plainly marked on the outside with the "Name of the PROJECT being bid" and the envelope shall bear on the outside the BIDDER's name, address and License Number. If

forwarded by mail, the sealed envelope, containing the BID, must be enclosed in another envelope addressed to the CITY at the address provided above. BIDS shall be received up to the time stated in the Advertisement for bids and must be delivered to the CITY COUNCIL Meeting Chambers at the designated place before the expiration of the time stipulated in the Advertisement for bids. BIDS received after the stipulated time will be returned to the BIDDER, unopened.

2.9 WITHDRAWAL OF BIDS: A BIDDER may withdraw his BID up to the time set for opening BIDS. The withdrawal of a BID shall not prejudice the right of a BIDDER to file a new BID.

2.10 OPENING OF BIDS: BIDS will be opened and read publicly at the time and place indicated in the Advertisement for bids. BIDDERS or their authorized agents are invited to be present.

2.11 DISQUALIFICATION OF BIDDERS: If more than one BID is submitted by an individual, a firm or partnership, a corporation or association, under the same or different names, all BIDS so submitted shall be rejected. The BID will be rejected if there is any reason for believing that collusion exists among the BIDDERS and all participants in such collusion, will not be considered in future BIDS for the same WORK. No CONTRACT will be awarded except to responsible BIDDERS capable of performing the class of WORK contemplated, and having sufficient equipment, financial resources and experience to properly perform the WORK.

2.12 COMPETENCY OF BIDDERS: BIDDERS must be capable of performing the various items of WORK bid upon. The low BIDDER may be required to submit the following information to the CITY COUNCIL if requested:

- (a) A statement of his experience in similar work.
- (b) A financial statement as of the date of the end of the last full quarter immediately preceding the date of opening of BIDS.
- (c) A certification that he has not failed to carry out any previous CONTRACTS with the CITY.
- (d) A list of the principal items of equipment and machinery which he proposes to use on the WORK, giving the make, model, capacity, size, age and general condition of all such equipment and machinery.
- (e) A list giving the names and years of experience of the key personnel he expects to assign to the WORK.
- (f) A certification that no liens are outstanding on any other contracts.

2.13 JOINT BIDS: When two or more persons, firms, or corporations tender a joint BID, each of said persons, firms, or corporations shall have complied with the requirements for prequalification when required in the SPECIAL PROVISIONS before a BID will be issued to them. Joint BIDS shall be fully executed by all interested parties by and for each of the

persons, firms, or corporations interested in said joint BID, by the individual or officers authorized to enter into CONTRACTS for such firms or corporations. In the event of award of a Joint BID, each person, firm, or corporation shall assume the full obligation under the CONTRACT and Performance BOND.

2.14 INTERPRETATIONS AND ADDENDA All questions about the meaning or intent of the CONTRACT DOCUMENTS are to be directed to the ENGINEER. Interpretations or clarifications considered necessary by ENGINEER and response to such questions will be issued by ADDENDA mailed or delivered to all parties recorded by ENGINEER as having received the BIDDING DOCUMENTS. Questions received less than ten (10) days prior to the date for opening of BIDS may not be answered. Only questions answered by formal written ADDENDA will be binding. Oral and other interpretations or clarifications will be without legal affect.

2.14.1 ADDENDA May also be issued to modify the BIDDING DOCUMENTS as deemed advisable by CITY and ENGINEER.

2.15 SUBSTITUTE MATERIALS OR PRODUCTS - PRIOR APPROVALS In unusual cases where a closed specification has been justified for prior acceptance by the CITY in conformance with Louisiana Revised Statutes RS 38:2291 and 38:2292, the naming of that product in the DRAWINGS and SPECIFICATIONS will be followed by wording indicating that no SUBSTITUTION is permitted.

2.15.1 OTHERWISE where the DRAWINGS and SPECIFICATIONS identify a product by a specific brand, make, manufacture, or definite specification, it is to establish the required quality standard for the product regarding style, type, character, materials of construction, function, accessories, dimensions, appearance and durability. Products which are determined to be equivalent by the ENGINEER will be acceptable. Products which are specified by specific brand, make or manufacturers name may also be specified by its applicable model or catalog number or other product designation.

2.15.2 SELECTED MATERIALS AND EQUIPMENT Several alternative suppliers or manufacturers have been identified. If the BIDDER desires to obtain approval of materials or equipment from other alternative suppliers or manufacturers to those identified in the SPECIFICATIONS, a written request for a SUBSTITUTION shall be submitted to the ENGINEER at least fifteen (15) days prior to the BID opening date. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data and other information necessary for an evaluation.

A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitution is upon the BIDDER. The ENGINEER'S decision of approval or disapproval of a proposed substitution shall be final. If ENGINEER approves any

proposed substitution, such approval will be set forth in an ADDENDA issued to all prospective BIDDERS. BIDDERS shall not rely upon approvals made in any other manner.

2.15.3 AFTER RECEIPT OF BIDS The CONTRACT, if awarded, will be on the basis of material and product described in the DRAWINGS or specified in the SPECIFICATIONS without consideration of possible substitute of or "EQUAL" items except as specified in 2.15.2 above.

# DIVISION 1

## General Provisions

### Section 3

#### Award and Execution of Contract

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| 3.3 Return of BID BONDS                     | 3.9 Commencement of Contract Time;<br>NOTICE TO PROCEED |
| 3.4 Execution of AGREEMENT                  | 3.10 Preconstruction Conference                         |
| 3.5 Performance, Payment and<br>Other BONDS | 3.11 Starting the Work                                  |
| 3.6 Personnel Employment                    | 3.12 Before Starting Construction                       |
|   | 3.13 Preliminary Schedules                              |

3.1 CONSIDERATION OF BIDS: After the BIDS are opened and publicly read, the BID prices will be checked and tabulated as soon as possible. Comparison of acceptable BIDS will be based on the corrected summation of the extensions for each item at the unit prices BID. Prior to announcement of an award of the AGREEMENT, the CITY reserves the right to reject any or all BIDS in accordance with Louisiana Law.

3.2 AWARD OF AGREEMENT: The award of the AGREEMENT, if it be awarded, will be made to the lowest responsible BIDDER whose BID shall comply with all requirements necessary to render it formal. The award, if made, will be within thirty (30) days after the opening of the BIDS. The successful BIDDER will be notified, by letter mailed to the address shown on the BID, that the BID has been accepted and that he has been awarded the AGREEMENT.

3.3 RETURN OF BID BONDS: All BID BONDS will be returned to the unsuccessful BIDDER(s) after the execution of the AGREEMENT with the lowest responsible BIDDER. Should the BIDDER to whom the work be awarded fail to enter into an AGREEMENT within the allotted time or fail to provide a Payment and Performance BOND, the amount of the BID BOND submitted by him will ipso facto, be forfeited to the CITY. Should no award be made within thirty (30) days, all BIDS will be rejected and all guaranties returned, unless the successful BIDDER agrees to a longer delay.

3.4 EXECUTION OF AGREEMENT: The successful BIDDER shall be required to execute the AGREEMENT, CONTRACTOR's Affidavit, furnish Performance and Payment BONDS satisfactory to the CITY, along with his Certificate of Insurance, within ten (10) days after receipt of the Notice of Award.

3.5 PERFORMANCE, PAYMENT AND OTHER BONDS: CONTRACTOR shall furnish Performance and Payment BONDS, each in an amount at least equal to the CONTRACT PRICE as security for the faithful performance and payment of all CONTRACTOR's obligations under the CONTRACT DOCUMENTS. These BONDS shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the CONTRACT DOCUMENTS. CONTRACTOR shall also furnish such other BONDS as are required by the SPECIAL PROVISIONS. All BONDS shall be on the forms prescribed by the CONTRACT DOCUMENTS except as provided otherwise by Laws or Regulations, and shall be executed by such SURETIES as are named in the current list of "Companies Holding Certificates of Authority as Acceptable SURETIES on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department and registered to do business in the STATE. All BONDS signed by an agent must be accompanied by a certified copy of such agent's authority to act. All BONDS shall be furnished on CITY forms.

3.5.1 FAILURE OF SURETY: If the SURETY on any BOND furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in the STATE, CONTRACTOR shall within ten days thereafter substitute another BOND and SURETY, both of which must be acceptable to CITY.

3.6 PERSONNEL EMPLOYMENT: As a condition of awarding the CONTRACT, the successful BIDDER for Public Works Projects, administered by or paid for in whole or in part by public funds of the City of Alexandria shall comply with LSA R.S. 38:2225.1, which requires that no less than 80% of the total work force required to complete the PROJECT be residents of the State of Louisiana.

3.7 COPIES OF CONTRACT DOCUMENTS: The CITY shall furnish to CONTRACTOR up to three (3) copies (unless otherwise specified in the SPECIAL PROVISIONS) of the CONTRACT DOCUMENTS as are reasonably necessary for the execution of the WORK. Additional copies will be furnished, upon request, at the cost of reproduction.

3.8 FAILURE TO EXECUTE AGREEMENT: In the event of failure or refusal on the part of the BIDDER to whom the award is made to execute the AGREEMENT and furnish satisfactory BONDS within ten (10) days after receipt of the Notice of Award the amount of the BID BOND accompanying his BID shall be forfeited to the CITY. The CITY, within ten (10) days of receipt of an acceptable AGREEMENT, Performance BOND, Payment BOND, CONTRACTOR's Affidavit, and Certificate of Insurance, executed by the party to whom the CONTRACT was awarded, will sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. Should the CITY not execute the AGREEMENT within such period, the BIDDER may by written notice withdraw the signed AGREEMENT. Such notice of withdrawal shall be effective upon receipt of the notice by the CITY.

3.9 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED: The CONTRACT TIME will commence to run on the thirtieth day after the EFFECTIVE DATE OF THE AGREEMENT, or, if the NOTICE TO PROCEED is given, on the day indicated in the NOTICE TO PROCEED. A NOTICE TO PROCEED may be given at any time within thirty days after the EFFECTIVE DATE OF THE AGREEMENT. Should there be any reason why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the CITY and CONTRACTOR.

3.10 PRECONSTRUCTION CONFERENCE: Prior to beginning construction, a preconstruction conference will be held between the CONTRACTOR and the ENGINEER to reach agreements relating to responsibilities and procedures of each interested party to see that the PROJECT is built according to the approved PLANS and SPECIFICATIONS and the conditions under which disbursements for construction cost are authorized and will be paid. This meeting will be prearranged by the ENGINEER.

3.11 BEFORE STARTING CONSTRUCTION: Before undertaking each part of the WORK, CONTRACTOR shall carefully study and compare the CONTRACT DOCUMENTS and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any work affected thereby; however, CONTRACTOR shall not be liable to CITY or ENGINEER for failure to report any conflict, error, ambiguity or discrepancy in the CONTRACT DOCUMENTS, unless CONTRACTOR knew or reasonably should have known thereof.

3.12 STARTING THE WORK: CONTRACTOR shall start to perform the WORK on the date when the CONTRACT TIME commences to run, but no work shall be done at the site prior to the issuance of a NOTICE TO PROCEED.

3.13 PRELIMINARY SCHEDULES: Within ten (10) days after the receipt of the NOTICE OF AWARD (unless otherwise specified in the SPECIAL PROVISIONS), CONTRACTOR shall submit to ENGINEER along with the executed AGREEMENT, the following for review:

- A. A preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various CONTROLLING ITEMS OF WORK;
- B. A preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal;
- C. A preliminary schedule of values for lump sum items which will include quantities and prices of items aggregating the CONTRACT PRICE and will subdivide the WORK into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an

appropriate amount of overhead and profit applicable to each item of work;

- D. Before any work at the site is started, CONTRACTOR shall deliver with copies to each additional insured identified in the SPECIAL PROVISIONS, Certificates of Insurance (and other evidence of insurance) which CONTRACTOR is required to purchase and maintain.

# DIVISION 1

## General Provisions

### Section 4

#### Contract Documents, Intent, Amending, Reuse

- |     |  |     |                                  |
|-----|--|-----|----------------------------------|
| 4.1 | Intent   | 4.5 | Supplementing CONTRACT DOCUMENTS |
| 4.2 | Reference to Standards, Resolving Discrepancies, | 4.6 | Reuse of Documents               |
| 4.3 | Amending CONTRACT DOCUMENTS                      | 4.7 | SPECIAL PROVISIONS               |
| 4.4 | Notice to SURETY                                 |     |                                  |

4.1 INTENT: The CONTRACT DOCUMENTS comprise the entire AGREEMENT between the CITY and the CONTRACTOR concerning the WORK. The intent of the CONTRACT DOCUMENTS is to prescribe a complete WORK or improvement which the CONTRACTOR shall undertake to do in full compliance with the DRAWINGS and SPECIFICATIONS and in conformity with the General and SPECIAL PROVISIONS and the terms and conditions of the CONTRACT. The CONTRACTOR shall do all work including such incidental work as may be reasonably implied as being necessary to complete the WORK in a satisfactory and acceptable manner. He shall furnish, unless otherwise provided for in the AGREEMENT, all materials, supplies, equipment, tools, labor and incidentals necessary to prosecute and complete the WORK. Any work, materials or equipment that may reasonably be inferred from the CONTRACT DOCUMENTS or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the CONTRACT DOCUMENTS shall be issued by ENGINEER.

4.1.1 ORDER OF PRECEDENCE: Should a conflict exist between the requirements of the Advertisement for BIDS, BID Proposal Form, Instruction to BIDDERS, SPECIAL PROVISIONS, Supplemental GENERAL PROVISIONS, PLANS or Technical SPECIFICATIONS, the former shall take precedence.

4.2 REFERENCE TO STANDARDS, RESOLVING DISCREPANCIES: Reference to standards, SPECIFICATIONS, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, SPECIFICATION, manual, code or Laws or Regulations in effect at the time of opening of BIDS except as may be

otherwise specifically stated in the CONTRACT DOCUMENTS. If during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the CONTRACT DOCUMENTS or between the CONTRACT DOCUMENTS and any provision of any such Law or Regulation applicable to the performance of the work or of any such standard, SPECIFICATION, manual or code or of any instruction to any SUPPLIER, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the work affected thereby until a FIELD CHANGE, amendment, or supplement to the CONTRACT DOCUMENTS has been issued. The provisions of the CONTRACT DOCUMENTS shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the CONTRACT DOCUMENTS and:

4.2.1 The provisions of any such standard, SPECIFICATION, manual, code or instruction (whether or not specifically incorporated by reference in the CONTRACT DOCUMENTS); or

4.2.2 The Provision of any such Laws or Regulations applicable to the performance of the WORK (unless such an interpretation of the provisions of the CONTRACT DOCUMENTS would result in violation of such Law or Regulation). No provision of any such standard, SPECIFICATION, manual, code or instruction shall be effective to change the duties and responsibilities of the CITY CONTRACTOR, ENGINEER, or any of their SUBCONTRACTORS, consultants, agents or employees from those set forth in the CONTRACT DOCUMENTS.

4.3 AMENDING CONTRACT DOCUMENTS: The CONTRACT DOCUMENTS may be amended to provide for additions, deletions and revisions in the WORK or to modify the terms and conditions by formal WRITTEN AMENDMENT or by CHANGE ORDER.

4.3.1 WRITTEN AMENDMENTS (sometimes called supplemental agreements) authorize additions, deletions or revisions in the WORK and shall be used as the method to amend the AGREEMENTS when the addition, deletion or revision of quantities of pay items in the AGREEMENT exceed twenty-five percent (25%) of the total amount of the AGREEMENT.

4.3.2 CHANGE ORDERS: Changes in the WORK through additions, deletions or revisions or changes which modify the WORK shall be authorized by CHANGE ORDER. The CITY and the CONTRACTOR shall execute appropriate CHANGE ORDERS recommended by the ENGINEER covering the following changes in the AGREEMENT.

4.3.2.1 Changes in the WORK which are ordered by the CITY.

4.3.2.2 Changes required for acceptance of DEFECTIVE WORK.

4.3.2.3 Changes required for correction of DEFECTIVE WORK.

4.3.2.4 Changes in the CONTRACT PRICE.

#### 4.3.2.5 Changes in the CONTRACT TIME.

4.4 NOTICE TO SURETY: If notice of any change affecting the general scope of the WORK or the CONTRACT DOCUMENTS is required by the provisions of the BOND to be given to SURETY, the giving of such notice shall be the CONTRACTOR's responsibility.

4.5 SUPPLEMENTING CONTRACT DOCUMENTS: The requirements of the CONTRACT DOCUMENTS may be supplemented and minor variations and deviations in the WORK, may be authorized by FIELD ORDERS, ENGINEER's approval of SHOP DRAWINGS or SAMPLES and by the ENGINEER's written interpretation or clarifications.

4.5.1 FIELD ORDER: The ENGINEER may issue a FIELD ORDER which authorizes minor variations in the WORK from the requirements of the CONTRACT DOCUMENTS and which does not involve an adjustment to the CONTRACT PRICE or the CONTRACT TIME. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE or TIME, or both, in which event the CONTRACTOR shall give the ENGINEER written notice thereof within seven (7) days after the receipt of the order to change. Within thirty (30) days after providing written notice to the ENGINEER, the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME.

4.5.2 ENGINEER Approval of SHOP DRAWINGS: The ENGINEER will review and approve SHOP DRAWINGS and SAMPLES in accordance with the schedule defined in the SPECIFICATIONS, SPECIAL PROVISIONS or WORK scheduling requirements of the CONTRACT DOCUMENTS. ENGINEER's review and approval will be only to determine if the items in the submittal will conform to and be compatible with the design concept of the completed PROJECT. ENGINEER's review and approval will not extend to means, methods, techniques, sequence or procedure of construction or to safety precautions or programs incident thereto. The review and approval of a separate item will not constitute approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of SHOP DRAWINGS and submit as required new SAMPLES for review and approval. ENGINEER's review and approval of SHOP DRAWINGS or SAMPLES shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the CONTRACT DOCUMENTS unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the SHOP DRAWING or SAMPLE approval.

4.5.3 Where a SHOP DRAWING or SAMPLE is required by the CONTRACT DOCUMENTS or the schedule of SHOP DRAWINGS and SAMPLE submissions accepted by ENGINEER as required by the CONTRACT DOCUMENTS, any related work performed prior to ENGINEER'S review and approval of the pertinent submittal will be at the sole expense and the responsibility of the CONTRACTOR.

4.5.4 Clarifications and Interpretations: ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the CONTRACT DOCUMENTS (in the form of DRAWINGS or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of the CONTRACT DOCUMENTS. Such written clarifications and interpretations will be binding on the CITY and CONTRACTOR. If the CITY or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the CONTRACT PRICE or the CONTRACT TIME and the parties are unable to agree to the amount or extent thereof, if any, the CITY or CONTRACTOR may make a written claim as provided in Sections 11 and 12 of these general conditions.

4.6 REUSE OF DOCUMENTS: CONTRACTOR, and any SUBCONTRACTOR or SUPPLIER or other person or organization performing or furnishing any of the WORK under a direct or indirect CONTRACT with the CITY (i) shall not have or acquire any title to or ownership rights in any of the PLANS, SPECIFICATIONS or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER, and (ii) shall not reuse any of such PLANS, SPECIFICATIONS, other documents or copies on extensions of the PROJECT or any other PROJECT without written consent of the CITY and the ENGINEER.

4.7 SPECIAL PROVISIONS: Construction Procedures or conditions that have not been anticipated in these General Provisions will be covered by SPECIAL PROVISIONS that will be considered a part of the AGREEMENT.

DIVISION 1

General Provision

Section 5

Lands: Rights-of-way, Physical Conditions, Subsurface Conditions

- |     |   |     |   |
|-----|---|-----|---|
| 5.1 | Lands and Rights-of-way                         | 5.5 | Construction Stakes   |
| 5.2 | Subsurface and Physical<br>Conditions           | 5.6 | Engineer's Level  |
| 5.3 | Limited Reliance on Technical<br>Data           | 5.7 | ASBESTOS, PCB's, Petroleum,<br>HAZARDOUS WASTE or<br>Radioactive Material |
| 5.4 | Physical Conditions -<br>Underground Facilities | 5.8 | Indemnity and Hold Harmless   |

5.1 LAND AND RIGHTS-OF-WAY: Prior to the issuance of the NOTICE TO PROCEED, the CITY shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

The CITY shall provide to the CONTRACTOR information that delineates and describes the lands owned and rights-of-way required and shall identify any encumbrances or restrictions related to use of the land. The CONTRACTOR shall provide at his own expense and without liability to the CITY any additional land and access thereto that the CONTRACTOR may desire for construction facilities or for storage of materials.

5.2 SUBSURFACE AND PHYSICAL CONDITIONS: The SPECIAL PROVISIONS may include data, reports and DRAWINGS that contain point of test or measurement of Subsurface and Physical Conditions.

5.2.1 Subsurface Conditions: Those reports of explorations and tests of Subsurface Conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the CONTRACT DOCUMENTS; and

5.2.2 Physical Conditions: Those DRAWINGS of Physical Conditions in or relating to existing surface or subsurface structures at or contiguous to the site that have been utilized by ENGINEER in preparing the CONTRACT DOCUMENTS.

5.3 LIMITED RELIANCE ON TECHNICAL DATA: The CONTRACTOR may rely upon the general accuracy of the Technical Data contained in reports and DRAWINGS of Subsurface Conditions and Physical Conditions but such reports and DRAWINGS are not CONTRACT

## DOCUMENTS.

The CONTRACTOR shall adjudge the Technical Data as Technical Data and may not rely upon said data for the purpose of making claims against the CITY or ENGINEER with respect to the completeness of the reports and/or DRAWINGS as such might affect the means, methods, techniques, sequence or procedures of construction.

If the CONTRACTOR believes that any Subsurface or Physical Condition exists or that is uncovered is of such a nature that the Technical Data is inaccurate, differs materially from that shown in the CONTRACT DOCUMENTS or is of an unusual nature differing from conditions normally encountered, and will require a change in the CONTRACT DOCUMENTS; the CONTRACTOR will promptly notify the ENGINEER in writing of such conditions. CONTRACTOR will not further disturb such conditions or perform any WORK until receipt of a written order.

The ENGINEER will promptly review the pertinent conditions, determine if additional testing may be required or if CHANGE ORDERS reflecting CONTRACT TIME and CONTRACT PRICE should be recommended to the DIRECTOR OF PUBLIC WORKS.

If the CITY and the CONTRACTOR are unable to agree on entitlement regarding CONTRACT PRICE or CONTRACT TIME, the CONTRACTOR may reserve the option to make a claim in accordance with Sections 11 and 12 of these General Provisions.

5.4 PHYSICAL CONDITIONS - UNDERGROUND FACILITIES: Various PROJECTS may involve Underground Facilities not in the ownership of the CITY. Where information and data provided by others is incomplete or inaccurate, the ENGINEER and the CITY shall not be held liable for damage to the facility during the course of construction. It shall be the responsibility of the CONTRACTOR to accurately locate and coordinate the WORK around these facilities with the owner of such Underground Facilities.

5.4.1 Underground Facilities - Not Shown: If an Underground Facility is uncovered or revealed which is not shown or indicated by the CONTRACT DOCUMENTS, CONTRACTOR will promptly notify the ENGINEER. If the owner of the Underground Facility is known or can be identified, the CONTRACTOR will notify said owner and document the consequences of the existence of the facilities as they may affect the WORK. If the ENGINEER concludes that a change in the CONTRACT DOCUMENTS is needed, ENGINEER shall recommend said change to the CITY as set forth in these General Provisions.

5.5 CONSTRUCTION STAKES: The ENGINEER will furnish and set the necessary construction stakes on original layouts, marking the general locations, alignments, elevations, and grade of the work. The CONTRACTOR, however, will be required to check all leading dimensions and clearances measured from such stakes and thereafter become responsible for the alignment, elevations, and dimensions of all parts of the work and their mutual agreement.

The CONTRACTOR shall furnish, at his own expense, all batterboards, templates, and other material for marking, referencing, and maintaining points, lines and grades and shall furnish the ENGINEER with such incidental labor as he may require in establishing points, lines, and grades necessary to the prosecution of the WORK.

The CONTRACTOR shall be held responsible for the preservation of all takes, transit points, bench marks, hubs and guard stakes. If, in the opinion of the ENGINEER, any of the original construction stakes or markers have been carelessly or willfully destroyed or disturbed by the CONTRACTOR, the cost of replacing them shall be deducted from any money due the CONTRACTOR.

5.6 ENGINEER'S LEVEL: The CONTRACTOR shall have an Engineer's Level in working condition and acceptable to the ENGINEER on the PROJECT at all times for his use and the use of the PROJECT REPRESENTATIVE in checking forms and stakes that appear to be disturbed and in transferring grades.

5.7 ASBESTOS, PCB'S, PETROLEUM, HAZARDOUS WASTE, HAZARDOUS MATERIAL OR RADIOACTIVE MATERIAL: The CITY shall be responsible for any ASBESTOS, PCB's, Petroleum, HAZARDOUS WASTE, HAZARDOUS MATERIAL or Radioactive Material uncovered or revealed at the site which was not shown or indicated in DRAWINGS or SPECIFICATIONS or identified in the CONTACT DOCUMENTS to be within the scope of WORK and which may present a substantial danger to persons or property in connection with WORK at the site. The CITY will not be responsible for any such material brought to the site by CONTRACTOR, SUBCONTRACTOR, SUPPLIER or anyone else for whom the CONTRACTOR is responsible. In the event of such incident, the CONTRACTOR will promptly notify the ENGINEER.

CONTRACTOR will not be required to work at the site until it has been rendered safe. CONTRACTOR may be entitled to changes in the CONTRACT DOCUMENTS due to WORK stoppage. If the CITY and CONTRACTOR are unable to agree on CONTRACT PRICE or CONTRACT TIME due to the stoppage, either may make a claim as provided in these General Provisions. The CITY further reserves the right to redirect the CONTRACTOR to other work within the PROJECT and within the scope of the CONTRACT DOCUMENTS, if available and reasonable with minor mobilization reimbursement.

5.8 INDEMNITY AND HOLD HARMLESS: To the fullest extent permitted by laws and regulations the CITY shall indemnify and hold harmless CONTRACTOR, SUBCONTRACTORS, ENGINEER, ENGINEER CONSULTANTS, and the Officers, Directors, Employees, Agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property (other than WORK itself) including the loss of use resulting therefrom and (ii) nothing in this paragraph 5.8 shall obligate CITY to indemnify any person or entity from and against the consequences of that persons or entities on negligence.

# DIVISION 1

## General Provisions

### Section 6

#### Insurance, Partial Utilization, Preservation and Restoration

- |                         |                                   |
|-------------------------|-----------------------------------|
| 6.1 Insurance           | 6.5 Preservations and Restoration |
| 6.2 Types of Insurance  | of Property, Trees, Monuments     |
| 6.3 Builder's Risk      |                                   |
| 6.4 Partial Utilization |                                   |

6.1 INSURANCE: All Insurance required by the these GENERAL PROVISIONS are to be purchased by the CONTRACTOR shall be obtained from Insurance companies that are licensed or authorized in the STATE.

The Insurance Carriers shall have a current A.M. Best Guide rating of A-V or better, unless otherwise authorized by the CITY in writing. This shall include "Self Insured Retention" Plans. CONTRACTOR shall deliver to the CITY with copies of each additional insured identified in the SPECIAL PROVISIONS, Certificates of Insurance which are required by these and the SPECIAL PROVISIONS.

6.2 TYPES OF INSURANCE: The CONTRACTOR, shall purchase and maintain such liability and other insurance as is appropriate for the WORK being performed and furnished, as well as provide protection from claims set forth below which may arise out of, or result from, CONTRACTORS performance and furnishing of the WORK and CONTRACTORS other obligations under the CONTRACT DOCUMENTS, whether it is to be performed or furnished by CONTRACTOR, any sub-contractor or supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the WORK, or by anyone for whose acts any of them may be liable:

6.2.1 Claims under Workers Compensation, disability benefits and other similar employee benefit acts;

6.2.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTORS EMPLOYEES;

6.2.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTORS EMPLOYEES;

6.2.4 Claims for damages insured by customary personal injury liability coverage which are

sustained (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR or (ii) by any other person for any other reason;

6.2.5 Claims for damages, other than to the WORK itself, because of injury to or destruction of tangible property where ever located, including loss of use resulting therefrom; and

6.2.6 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The policies of insurance so required by this paragraph 6.2 to be purchased and maintained shall:

6.2.7 With respect to insurance required by paragraphs 6.2.3 through 6.2.5 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability.)

CITY, ENGINEER, and any other persons or entities identified in the special provisions, all of whom shall be listed as additional insureds, and include coverage for the respective officers and employees of all such additional insureds;

6.2.8 Include the specific coverages and be written for not less than the limits of liability provided in the special provisions, or required by laws or regulations, which ever is greater;

6.2.9 Include completed operations insurance;

6.2.10 Contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to CITY and CONTRACTOR and to each other additional insured identified in the special provisions to whom a certificate of insurance has been issued.

6.2.11 Remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing DEFECTIVE work;

6.2.12 With respect to completed operations insurance, and any insurance coverage written on a claims made basis, remain in effect for at least 2 years after final payment.

6.3 BUILDER'S RISK: Builder's Risk Insurance is not required; however, if this Insurance is not secured, the CONTRACTOR cannot request payment per invoice cost for materials stored on the PROJECT site. The CONTRACTOR may secure broad form "All Risk" type Builder's Risk Insurance for the WORK to be performed which is insurable under this type of coverage. The policy shall cover not less than the losses due to fire, explosion, theft, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the CITY. The materials and equipment for those work items which are not insurable once installed

(e.g., facilities to be installed beneath the ground surface) must be insured for all named perils during the CONTRACT TIME, and until the WORK is accepted by the CITY, regardless of the intended service of these items, and whether installed or not.

6.4 PARTIAL UTILIZATION - PROPERTY INSURANCE: If the CITY finds it necessary to occupy or use a portion or portions of the WORK prior to COMPLETION of all the WORK, such use or occupancy may be accomplished provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or permitted to lapse on account of any such partial use or occupancy.

6.5 PRESERVATION AND RESTORATION OF PROPERTY, TREES, MONUMENTS: The CONTRACTOR shall be responsible for the preservation of all public and private property, trees and monuments, along and adjacent to the PROJECT and shall use every precaution necessary to prevent damage or injury thereto. He shall use suitable precaution necessary to prevent damage to pipes, conduits, and other underground structures and shall protect carefully from disturbance or damage all land monuments, CITY, STATE and United States benchmarks, Geodetic and Geological Survey Monuments and property markers until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. Any utility lines injured by the CONTRACTOR shall be repaired at once at his own expense in accordance with requirements of the General Provisions. The CONTRACTOR shall not injure or destroy trees or shrubs nor remove or cut them without proper authority. The CONTRACTOR shall be responsible for any damage done to public or private property by or on account of any act of omission, neglect, or misconduct in the execution of the WORK, or on account of DEFECTIVE WORK or material. He shall restore at his own expense such property to a condition similar or equal to that existing before such damage was done, by repairing, rebuilding or otherwise restoring same, or he shall make good such damage or injury in an acceptable manner. In case of failure on the part of a CONTRACTOR to restore such property or make good such damages or injury, the ENGINEER may, after forty-eight (48) hours written notice, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary and the cost therefor will be deducted from any monies due or which may become due the CONTRACTOR under this AGREEMENT. In case no money is due or to become due, his SURETY shall be held responsible until such time as all suits, claims or damages shall have been settled and suitable evidence to that effect furnished the ENGINEER.

DIVISION 1

General Provisions

Section 7

Contractor's Responsibilities and Prosecution of the Work

- |      |   |      |  |
|------|---|------|--|
| 7.1  | Supervision                             | 7.11 | Permits and Licenses                       |
| 7.2  | Subletting or Assignment                | 7.12 | LAWS AND REGULATIONS                       |
| 7.3  | Character of Workmen and Equipment      | 7.13 | Taxes                                      |
| 7.4  | Source of Supply - Quality of Materials | 7.14 | Use of Premises                            |
| 7.5  | Materials Furnished by CONTRACTOR       | 7.15 | Sanitary Provisions                        |
| 7.6  | Storage of Materials                    | 7.16 | Record Documents                           |
| 7.7  | DEFECTIVE Material                      | 7.17 | Safety and Protection                      |
| 7.8  | SAMPLES and Tests                       | 7.18 | Traffic Safety Precautions                 |
| 7.9  | Substitutes and "Or EQUAL Items"        | 7.19 | SHOP DRAWINGS and SAMPLES                  |
| 7.10 | SUBCONTRACTORS, SUPPLIERS and Others    | 7.20 | Indemnification                            |
|      |   | 7.21 | Cooperation With Public Utilities          |
|      |   | 7.22 | CONTRACTORS General Warranty and Guarantee |

7.1 SUPERVISION: CONTRACTOR shall supervise, inspect and direct the WORK competently and efficiently devoting such attention and applying such skills and expertise as may be necessary to perform the WORK in accordance with the CONTRACT DOCUMENTS. CONTRACTOR shall be solely responsible for the means, methods, techniques, consequences and procedures of construction. CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence or procedure of construction which has been expressly required in the CONTRACT DOCUMENTS. CONTRACTOR shall be responsible to see that the completed WORK complies with the CONTRACT DOCUMENTS. CONTRACTOR shall keep on the PROJECT, at all times, during its progress a competent resident superintendent, who shall not be replaced without written notice to the CITY and the ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

7.2 SUBLETTING OR ASSIGNMENT: The CONTRACTOR shall not assign, sell, transfer or otherwise dispose of the AGREEMENT, or any portion thereof, or his rights, title or

interest therein, without previous written approval of the CITY. The CONTRACTOR will not be permitted to sublet any portion of the AGREEMENT except for the delivery of materials, without the written approval of the ENGINEER.

7.2.1 The purchase of sand, gravel, crushed stones, crushed slag, batched concrete aggregates, ready mixed concrete and/or materials produced at and furnished from established and recognized commercial plants, together with the delivery of such materials to the site of the WORK by means of vehicles owned or operated by such plants or by recognized commercial hauling companies, shall not be considered as subcontracting under these provisions.

7.2.2 No Subcontract will in any case relieve the CONTRACTOR of his responsibility under the AGREEMENT and BOND.

7.3 CHARACTER OF WORKMEN AND EQUIPMENT: The CONTRACTOR shall, at all times, employ sufficient labor and equipment for prosecuting the several classes of WORK to full completion in the manner and time specified. Failure by the CONTRACTOR to provide adequate equipment or labor may result in the annulment of the AGREEMENT.

7.3.1 All workmen must have sufficient skill and experience to perform properly the WORK assigned them. All workmen engaged on special WORK or skilled WORK, such as bituminous courses or mixtures, concrete base courses, pavements or structures, or in any trade, shall have sufficient experience in such WORK to properly and satisfactorily perform it and operate the equipment involved and shall make due and proper effort to execute the WORK in the manner prescribed in these SPECIFICATIONS.

7.3.2 All machinery and equipment owned or controlled by the CONTRACTOR, which is proposed to be employed by him on the WORK, shall be of sufficient size to meet the requirements of the WORK and shall be such as to produce a satisfactory quality of WORK.

7.4 SOURCE OF SUPPLY AND QUALITY OF MATERIALS: The source of supply of each of the materials shall be approved by the ENGINEER before the delivery is started. Representative preliminary SAMPLES of the character and quantity shall be submitted by the CONTRACTOR or produced for examination and testing in accordance with the methods referred to under tests of SAMPLES of materials. Only materials tested and found to conform to the requirements of the SPECIFICATIONS and approved by the ENGINEER shall be used in the WORK. All materials proposed to be used may be inspected or tested at any time during their preparation and use. If after trial, it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the CONTRACTOR shall furnish approved materials from other approved sources. No material which, after approval, has in any way become unfit for use shall be used in the WORK. Stored material, even though approved before being stored, shall be inspected prior to use in the WORK and shall meet the requirements of the SPECIFICATIONS at the time of its use.

7.5 MATERIALS FURNISHED BY THE CONTRACTOR: Unless otherwise specifically stated in the CONTRACT, all materials needed in the WORK will be furnished by the CONTRACTOR. The CONTRACTOR will assume full responsibility in ordering materials of the quantity specified and required in the CONTRACT DOCUMENTS. The CONTRACTOR will assume full responsibility for the payment of all materials ordered by him in accordance with the CONTRACT, and this shall include the payment of all freight and demurrage charges incurred in the shipment. The CONTRACTOR will be responsible for the proper storage and handling of the material to insure the required quality before and during incorporation into the WORK.

7.6 STORAGE OF MATERIALS: Materials shall be stored so as to insure the preservation of their quality and fitness for the WORK, and in a manner that leaves the material accessible to inspection. With the approval of the ENGINEER, material may be stored on the right-of-way provided such storage does not interfere with the prosecution of the WORK or with public travel.

7.7 DEFECTIVE MATERIALS: All materials not conforming to the requirements of these SPECIFICATIONS shall be considered as DEFECTIVE and all such materials whether in place or not, shall be rejected and shall be removed immediately from the site of the WORK unless otherwise permitted in writing by the ENGINEER. Upon failure on the part of the CONTRACTOR to comply forthwith with any order by the ENGINEER made under the provisions of this article, the ENGINEER shall have the authority to remove and replace DEFECTIVE material and to deduct the cost of removal and replacement from any monies due or to become due the CONTRACTOR.

7.8 SAMPLES AND TESTS: The CONTRACTOR shall give sufficient notification of the placing of orders for materials to permit testing; shall afford such facilities as the ENGINEER may require for collecting and forwarding SAMPLES; shall not make use of or incorporate in the WORK the materials represented by the SAMPLES until the tests have been made and the materials found to be in accordance with the requirements of the SPECIFICATIONS; and shall furnish, without charge, all the SAMPLES required.

7.8.1 When required by the ENGINEER, representative preliminary SAMPLES of the character and quantity prescribed shall be submitted by the CONTRACTOR or produced for examination and shall be tested in accordance with the methods referred to herein. The acceptance of a preliminary SAMPLE shall not be construed as acceptance of materials from the same source delivered later. Only the materials actually delivered for the WORK will be considered and their acceptance or rejection will be based solely on the results of the tests prescribed in the SPECIFICATIONS.

7.8.2 For the verification of weights or proportions and character of materials, and determinations of temperatures used in the preparation of the materials and mixtures, the ENGINEER shall have access at all times to all parts of any plants connected with the WORK. The CONTRACTOR shall facilitate and assist the verification of all scales, measures and other

devices that he operates.

7.8.3 Unless otherwise specifically provided, all sampling and testing and laboratory methods required under this CONTRACT shall be in accordance with the latest revision of the standard Specifications of the American Society for Testing Materials, as amended to date of CONTRACT, and, when not covered therein, shall be sampled and tested in accordance with the Standard Specifications for Highway Materials and Methods of Sampling and Testing of the American Association of State Highway Officials, with subsequent revisions to date of CONTRACT. All tests not covered by the above shall be performed as specified by the ENGINEER.

7.9 SUBSTITUTES AND "OR EQUAL ITEMS": Whenever materials or equipment are specified or described in the CONTRACT DOCUMENTS by using the name of a proprietary item or the name of a particular SUPPLIER, the naming of the item is intended to establish the type, function and quality required. Unless the name, if followed by words indicating that no substitution is permitted, materials or equipment of other SUPPLIER may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or EQUAL to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Provisions. Requests for review of substitute items of material and equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the CONTRACTOR's achievement of SUBSTANTIAL COMPLETION on time, whether or not acceptance of the substitute for use in the WORK will require a change in any of the CONTRACT DOCUMENTS (or in the provisions of any other direct CONTRACT with CITY for WORK on the PROJECT) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified and the service will be indicated. The application will also contain an itemized estimate of costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

7.9.1 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the CONTRACT DOCUMENTS, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the CONTRACT DOCUMENTS.

7.9.2 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance that will be evidenced by either a CHANGE ORDER or an approved SHOP DRAWING. The CITY may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other Surety with respect to any substitute. ENGINEER will record the time required by ENGINEER in evaluating substitutions proposed by CONTRACTOR and in making changes in the CONTRACT DOCUMENTS occasioned thereby. CONTRACTOR shall reimburse the CITY for the charges of ENGINEER for evaluating each proposed substitute.

7.10 SUBCONTRACTORS, SUPPLIERS AND OTHERS: CONTRACTOR shall not employ any SUBCONTRACTOR, SUPPLIER or other person against whom the ENGINEER or the CITY may have a reasonable objection. CONTRACTOR shall not be required to employ any SUBCONTRACTOR, SUPPLIER or other person against whom the CONTRACTOR has a reasonable objection.

7.10.1 CONTRACTOR shall be fully responsible to CITY and ENGINEER for all acts and omissions of the SUBCONTRACTORS, SUPPLIERS and other persons and organizations performing or furnishing any of the work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTORS on acts and omissions. Nothing in the CONTRACT DOCUMENTS shall create for the benefit of any such SUBCONTRACTOR, SUPPLIER, or other person or organization in any contractual relationship between CITY or ENGINEER and any such SUBCONTRACTOR, SUPPLIER or other person or organization, nor shall it create any obligation on the part of the CITY or ENGINEER to pay or to see to the payment of any monies due any such SUBCONTRACTOR, SUPPLIER or other person or organization except as may otherwise be required by laws and regulations.

7.10.2 CONTRACTOR shall be solely responsible for scheduling and coordinating the work of SUBCONTRACTORS, SUPPLIERS and other persons and organizations performing or furnishing any of the work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all SUBCONTRACTORS, SUPPLIER and other such persons or organizations performing or furnishing any of the work to communicate with ENGINEER through CONTRACTOR.

7.11 PERMITS AND LICENSES: The CONTRACTOR shall procure all permits and licenses, pay all charges and fees and give all notices incident to the lawful prosecution of the WORK.

7.12 LAWS AND REGULATIONS: The CONTRACTOR is presumed to have made himself familiar with, and at all time shall observe and comply with all Federal, STATE and Local laws and bylaws, ordinances and regulations in any manner affecting the conduct of the WORK, and shall indemnify and save harmless the CITY and its representatives against any claim or liability arising from or based on the violation of any such law, bylaw, ordinance or regulation, whether by himself or by his employees or SUBCONTRACTORS.

7.12.1 CONTRACTOR shall give all notices and comply with all laws and regulations applicable to furnishing and performance of the WORK. Except for otherwise expressly required by applicable laws and regulations, neither CITY nor ENGINEER shall be responsible for monitoring CONTRACTORS compliance with any laws or regulations.

7.12.2 If CONTRACTOR performs any work knowing or having reason to know that it is contrary to laws or regulations, CONTRACTOR shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom; however, it shall not be CONTRACTORS primary responsibility to make certain that the specifications and drawings are in accordance with laws and regulations, but this shall not relieve CONTRACTOR of CONTRACTORS obligations under the CONTRACT DOCUMENTS.

7.13 TAXES: CONTRACTOR shall pay all sales, consumer, use or other similar taxes required to be paid by the CONTRACTOR under LAWS AND REGULATIONS.

7.14 USE OF PREMISES: The CONTRACTOR shall, at all times, conduct his WORK in such a manner and in such sequence as will insure the least practicable interference with traffic. He shall not open up WORK to the prejudice of WORK already started and this feature of the prosecution shall be governed by the order of the ENGINEER.

7.14.1 The CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the contract documents and other land and areas permitted by laws and regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the WORK.

Should any claim be made by any such owner or occupant because of the performance of the WORK, CONTRACTOR shall promptly settle with each other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by laws and regulations, indemnify and hold harmless CITY,

ENGINEER, ENGINEERS' CONSULTANT and anyone directly or indirectly employed by any of them from and against all claims, cause, losses and damages arising out of or resulting from any claim or action, legal or equitable, brought by such owner or occupant against CITY, ENGINEER, or any other party indemnify here-under to the extent caused by or based upon CONTRACTORS performance of the work.

7.14.2 During the progress of the WORK, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the WORK. At the completion of the WORK, CONTRACTOR shall remove all waste materials, rubbish and

debris from and about the premise as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by CITY at completion of the WORK. CONTRACTOR shall restore to original condition all property not designated for alteration by the CONTRACT DOCUMENTS.

7.14.3 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the WORK or adjacent property to stresses or pressures that will endanger it.

7.15 SANITARY PROVISIONS: The CONTRACTOR shall observe all rules and regulations of the STATE Board of Health, or any bodies having jurisdiction, and of all local health officials and must take such precautions as are necessary to avoid unhealthful conditions.

7.16 RECORD DOCUMENTS: CONTRACTOR shall maintain in a safe place at the site one record copy of all DRAWINGS, SPECIFICATIONS, ADDENDA, WRITTEN AMENDMENTS, CHANGE ORDERS, FIELD ORDERS and written interpretations and clarifications in good order annotated to reflect changes during construction. These records along with approved SAMPLES and SHOP DRAWINGS will be available to the ENGINEER for reference. Upon completion of the WORK, these record documents, SAMPLES and SHOP DRAWINGS will be delivered to ENGINEER for CITY.

7.17 SAFETY AND PROTECTION: CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. CONTRACTOR shall take all necessary precautions for the safety of, and provide the necessary protection to prevent damage, entry or loss to:

7.17.1 All persons on the WORK site or who may be affected by the WORK;

7.17.2 All the WORK and material and equipment to be incorporated therein, whether in storage on or off the site; and

7.17.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, road ways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of underground facilities and utility owners when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss of any property referred to in this paragraph caused directly or indirectly, in all or in part by CONTRACTOR, any SUBCONTRACTOR, SUPPLIER, or any other person or organization directly or indirectly employed by any of them

to perform or furnish any of the work of anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR "except damage or loss attributable to the fault of DRAWINGS or SPECIFICATIONS or to the acts or omissions of CITY, or ENGINEER, or anyone employed by them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any SUBCONTRACTOR, SUPPLIER or any other person or organization directly or indirectly employed by any of them". CONTRACTORS duties and responsibilities for safety and for protection of the work shall continue until such time as all the work is completed and ENGINEER is issued a notice to CITY and CONTRACTOR in accordance with the contract documents that the WORK is acceptable.

7.18 TRAFFIC SAFETY PRECAUTIONS: The CONTRACTOR shall at all times so conduct his WORK as to insure the least practicable obstruction to traffic. The convenience of the general public, the residents along and adjacent to the PROJECT, and the protection of persons and property are of prime importance and shall be adequately provided for by the CONTRACTOR. Fire hydrants on or adjacent to the PROJECT shall be kept accessible to the Fire Department at all times and no material or obstructions shall be placed within ten feet of any such hydrant.

Materials stored upon the street shall be placed so as to cause no unnecessary obstruction to the traveling public. When a street under CONTRACT is already open to the traveling public, the CONTRACTOR shall maintain the existing road, the subgrade and the new pavement in such condition that the public can travel over same safely. In dry weather, he shall be responsible for wetting the roadway at frequent intervals to settle the dust. The CONTRACTOR shall cooperate with the ENGINEER in the regulation of traffic.

7.18.1 Satisfactory provisions for local traffic must be made by the CONTRACTOR at all times during construction, seeking at all times to inconvenience the public as little as possible.

7.18.2 The CONTRACTOR will not be allowed to obstruct private driveways or approaches, or to dig up or occupy the streets with materials more than is absolutely necessary for the prosecution of the WORK. Barricades shall be erected and maintained as provided in Section 7.17.3.

7.18.3 The CONTRACTOR shall provide, erect and maintain all necessary barricades, danger signals, signs, sufficient number of watchmen and take all necessary precautions for the protection of the WORK and workmen and the safety of the public. All traffic and pedestrian warning signs, devices and procedures shall be in accordance with the "Manual on Uniform Traffic Control Devices, (MUTCD), for Streets and Highway". The CONTRACTOR will be held responsible for all damage to the PROJECT due to failure of the signs and/or barricades to properly protect the WORK from traffic, pedestrians, animals and from all other sources and whenever evidence of any such traffic is found damaging the unaccepted WORK, the ENGINEER will order that WORK be immediately removed and replaced by the CONTRACTOR without cost to the CITY. The CONTRACTOR's responsibility for the maintenance of

barricades, signs and lights shall not cease until the PROJECT shall have been completed and accepted. The CONTRACTOR shall notify the chief of the Fire and Police Departments whenever a section of street is closed to traffic and again when it is opened to public travel.

7.19 SHOP DRAWINGS AND SAMPLES: CONTRACTOR shall submit four (4) copies of SHOP DRAWINGS to ENGINEER for review and approval in accordance with the accepted schedule of SHOP DRAWINGS and SAMPLES. All submittals will be identified as ENGINEER may require. The data shown on the SHOP DRAWINGS will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the purposes intended.

7.19.1 CONTRACTOR shall also submit SAMPLES to ENGINEER for review and approval in accordance with said accepted schedule of SHOP DRAWINGS and SAMPLE submittals. Each SAMPLE will be identified clearly as to material, SUPPLIER, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes intended. The numbers of each SAMPLE to be submitted will be as specified in the SPECIFICATIONS.

7.19.2 Submittal Procedures: Before submitting each SHOP DRAWING or SAMPLE, CONTRACTOR shall have determined and verified:

7.19.2.1 All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto,

7.19.2.2 All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the WORK, and

7.19.2.3 All information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

7.19.3 CONTRACTOR shall also have reviewed and coordinated each SHOP DRAWING or SAMPLE with other SHOP DRAWINGS and SAMPLES and with the requirements of the WORK, the CONTRACT DOCUMENTS, and in accordance with Section 4.5.2 of these general provisions.

7.19.3.1 Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the CONTRACT DOCUMENTS with respect to CONTRACTOR's review and approval of that submittal.

7.19.3.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific

written notice of such variations, if any, that the SHOP DRAWINGS or SAMPLE submitted may have from the requirements of the CONTRACT DOCUMENTS, such notice to be written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each SHOP DRAWING and SAMPLE submitted to ENGINEER for review and approval of each such variation.

**7.20 INDEMNIFICATION:** To the fullest extent permitted by LAWS AND REGULATIONS, CONTRACTOR shall indemnify and hold harmless the CITY, ENGINEER, and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the WORK, provided that any such claim, cost, loss or damage: (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the WORK itself), including the loss of use resulting therefrom, and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, or SUBCONTRACTOR, any SUPPLIER, any person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by LAWS AND REGULATIONS regardless of the negligence of any such person or entity.

**7.20.1** In any and all claims against CITY or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any SUBCONTRACTOR, any SUPPLIER, any person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK, or anyone for whose acts any of them may be liable, the indemnification obligation under Section 7.20 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such SUBCONTRACTOR, SUPPLIER, or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

**7.21 COOPERATION WITH PUBLIC UTILITIES:** It shall be the CONTRACTOR's responsibility to notify all public utilities or other parties interested to make all necessary adjustments of public utility fixtures and appurtenances within or adjacent to the limits of construction. Unless otherwise specified, these adjustments are to be made by the CITY. The location of utilities on the plan is incomplete and general and the CITY will not be responsible for any delay or extra cost due to errors in location, omission or unforeseen utilities.

**7.21.1** The CONTRACTOR will be responsible for any damage done by him to any telephone, telegraph, power pole or lines, fire hydrant, gas, water, storm water or sanitary sewer line and service line, conduit and other accessories and appurtenances of a similar nature that are

fixed or controlled by the CITY, a public utility company or a corporation. He shall perform and carry on his WORK in such a manner as not to interfere with or damage fixtures mentioned herein, or as shown on the DRAWINGS, or discovered during construction, which are to be left within the limits of the PROJECT. The CITY will not be responsible for any delay or damage incurred by the CONTRACTOR due to working around or joining his WORK to fixtures left in place.

7.21.2 The CITY will not be responsible for any delays or inconveniences to the CONTRACTOR in carrying on his WORK in the above mentioned manner and/or while the public utilities companies or the CITY are making necessary adjustments of their fixtures or appurtenances. Any additional cost incurred shall be at the expense of the CONTRACTOR and shall be considered as completely covered by the UNIT PRICES for the various pay items provided for in the proposal and AGREEMENT.

7.21.3 The CONTRACTOR shall contact the Water Department before using any water from any fire hydrants. A deposit must be paid and a hydrant meter obtained. Damage to fire hydrants due to improper use by the CONTRACTOR shall be paid for by the CONTRACTOR.

7.22 CONTRACTORS GENERAL WARRANTY AND GUARANTEE: CONTRACTOR warrants and guarantees to owner, and ENGINEER that all WORK will be in accordance with the CONTRACT DOCUMENTS and will not be defective. CONTRACTORS warranty and guarantee here-under excludes defects or damage caused by (i) abuse, modification or improper maintenance or operations by persons other than CONTRACTOR, SUBCONTRACTOR or SUPPLIERS; or (ii) normal wear and tear under normal usage.

7.22.1 CONTRACTORS obligation to perform and complete the WORK in accordance with the CONTRACT DOCUMENTS shall be absolute. None of the following will constitute an acceptance of WORK that is not in accordance with the CONTRACT DOCUMENTS or a release of CONTRACTORS obligation to perform the work in accordance with the CONTRACT DOCUMENTS:

7.22.1.1 Observations by ENGINEER;

7.22.1.2 Recommendation of any progress or final payment by ENGINEER;

7.22.1.3 Issuance of a certificate of completion or any payment by CITY to CONTRACTOR under the CONTRACT DOCUMENTS;

7.22.1.4 Use or occupancy of the WORK or any part thereof by CITY;

7.22.1.5 Any acceptance by CITY of any failure to do so;

7.22.1.6 Any review and approval of a SHOP DRAWING or SAMPLE submittal or the issuance of a notice of acceptability by ENGINEER;

7.22.1.7 Any inspection, test or approval by other; or

7.22.1.8 Any correction of defective WORK by CITY.

DIVISION 1

General Provisions

Section 8

ENGINEER'S Status During Construction

8.1	CITY'S Representative	8.6	Rejecting DEFECTIVE WORK
8.2	Visits to SITE	8.7	Determination for Unit Price
8.3	PROJECT REPRESENTATIVE	8.8	Decisions on Disputes
8.4	Clarifications & Interpretations	8.9	Impartiality
8.5	Authorized Variations In WORK	8.10	Limitations on ENGINEER'S Authority and Responsibilities

8.1 CITY'S REPRESENTATIVE: ENGINEER will be CITY'S representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as CITY'S representative during construction are set forth in the CONTRACT DOCUMENTS and shall not be extended without written consent of CITY and ENGINEER.

8.2 VISITS TO SITE: ENGINEER will make visits to the site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR'S executed work. Based on information obtained during such visits and observations, ENGINEER will endeavor for the benefit of CITY to determine, in general, if the WORK is proceeding in accordance with CONTRACT DOCUMENTS. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality of quantity of the WORK. ENGINEER'S efforts will be directed toward providing for CITY at a greater degree of confidence that the completed WORK will conform generally to CONTRACT DOCUMENTS. On the basis of such visits and on-site observations, ENGINEER will keep CITY informed of the progress of the WORK and will endeavor to guard CITY against DEFECTIVE WORK. ENGINEER'S visits and on-site observations are subject to all the limitations on ENGINEER'S authority and responsibility set forth in paragraph . And particularly, without limitation, during or as a result of ENGINEER'S on-site visits or observations of CONTRACTORS work, ENGINEER will not supervise, direct, control or have authority over or be responsible for CONTRACTORS means, methods, techniques, sequences, or procedures of construction, of the safety precautions and programs incidental thereto, or for any failure of CONTRACTOR to comply with laws and regulations applicable to the furnishing or performance of the work.

8.3 PROJECT REPRESENTATIVE: If CITY and ENGINEER agree, ENGINEER will furnish a resident project representative to assist ENGINEER in providing more continuous observation of the WORK. The responsibilities and authorities and limitations thereon of any such resident project representative and assistance will be provided in this Section 8 and in SPECIAL PROVISIONS. If CITY designates another representative or agent to represent CITY at the site, who is not ENGINEER'S CONSULTANT, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided in the SPECIAL PROVISIONS.

8.3.1 PROJECT REPRESENTATIVE shall be authorized to inspect all WORK done and all materials furnished. Such inspection may extend to all or any parts of the WORK and to the preparation or manufacture of the materials to be used. A PROJECT REPRESENTATIVE shall be stationed on the construction SITE to report to the ENGINEER as to the progress of the WORK and the manner in which it is being performed; also to report whenever it appears that the material furnished and the WORK performed by the CONTRACTOR fails to fulfill the requirements of the CONTRACT, and to call to the attention of the CONTRACTOR any such failure or other infringement, but such inspection shall not relieve the CONTRACTOR from any obligations to perform all the WORK in accordance with the requirements of the CONTRACT DOCUMENTS. In case of any dispute arising between the CONTRACTOR and the PROJECT REPRESENTATIVE as to materials furnished or the manner of performing the WORK, the PROJECT REPRESENTATIVE shall have the authority to reject the material or suspend the WORK until the question at issue can be referred to the ENGINEER. The PROJECT REPRESENTATIVE shall not, however, be authorized to revoke, alter, enlarge, relax or release any requirements of the DOCUMENTS, nor to approve or accept any portion of the WORK, nor to issue instructions contrary to the DRAWINGS and SPECIFICATIONS. He shall in no case act as foreman or perform other duties for the CONTRACTOR, nor interfere with the management of the WORK. Any advice that the PROJECT REPRESENTATIVE may give the CONTRACTOR shall in no way be construed as binding on the ENGINEER or the CITY in any way, or as releasing the CONTRACTOR from the fulfillment of the terms of the AGREEMENT.

8.3.2 INSPECTION: The ENGINEER and PROJECT REPRESENTATIVE shall have free access at all times to all parts of the WORK, and to materials intended for use in the WORK. The CONTRACTOR shall furnish the ENGINEER with every reasonable facility for ascertaining whether or not the WORK performed is in accordance with the requirements and intent of the CONTRACT DOCUMENT. The WORK will be inspected as it progresses, but failure to reject or condemn DEFECTIVE WORK or materials at the time it is done will in no way prevent its rejection whenever it is discovered. If the ENGINEER requests, the CONTRACTOR shall at any time before the acceptance of WORK, remove or uncover such portions of the finished WORK as may be directed. After examination, the CONTRACTOR shall restore said portions of the finished WORK

to the standard required by the SPECIFICATIONS. Should the WORK thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed, shall be paid for as Extra Work, but should the WORK so exposed or examined prove unacceptable, the uncovering or removing, and the replacing of the covering or making good of the parts removed shall be at the CONTRACTOR's expense.

8.3.3 The CONTRACTOR shall notify the ENGINEER at least forty-eight (48) hours in advance of his intention to begin construction to assure the presence of a PROJECT REPRESENTATIVE on the SITE.

8.4 CLARIFICATIONS AND INTERPRETATIONS: ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the CONTRACT DOCUMENTS (in the form of DRAWINGS or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the CONTRACT DOCUMENTS. Such written clarifications and interpretations will be binding on CITY and CONTRACTOR. If CITY or CONTRACTOR believes that a written clarification or interpretation justifies and adjustment in the CONTRACT PRICE or the CONTRACT TIME and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefor as provided in Article 11.

8.5 AUTHORIZED VARIATIONS IN WORK: ENGINEER may authorize minor variations in the WORK from the requirements of the CONTRACT DOCUMENTS which do not involve an adjustment in the CONTRACT PRICE or the CONTRACT TIME and are compatible with the design concept of the completed PROJECT as a functioning whole as indicated by the CONTRACT DOCUMENTS. These may be accomplished by a field order and will be binding on CITY and also on CONTRACTOR who shall perform the WORK involved. If CITY or CONTRACTOR believes that a FIELD ORDER justifies an adjustment in the CONTRACT PRICE or the CONTRACT TIME and the parties are unable to agree on the amount or extent thereof, CITY or CONTRACTOR may make a written claim therefor as provided in Article 11.

8.6 REJECTING DEFECTIVE WORK: ENGINEER will have authority to disapprove or reject WORK which ENGINEER believes to be DEFECTIVE, or that ENGINEER believes will not produce a completed PROJECT that conforms to the CONTRACT DOCUMENTS or that will prejudice the integrity of the design concept of the completed PROJECT as a functioning whole as indicated by the CONTRACT DOCUMENTS. ENGINEER will also have authority to require special inspection or testing of the WORK as provided in these general provisions whether or not the WORK is fabricated, installed, or completed.

8.7 DETERMINATIONS FOR UNIT PRICES: ENGINEER will determine the actual quantities and classifications of unit price WORK performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER'S preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an application for payment or otherwise). ENGINEER'S written decision thereon will be final and binding upon CITY and CONTRACTOR, unless, within ten days after the date of any such decision, either CITY or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER'S decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER'S decision, unless otherwise agreed in writing by CITY and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 8.8.

8.8 DECISIONS ON DISPUTES: ENGINEER will be the initial interpreter of the requirements of the CONTRACT DOCUMENTS and judge of the acceptability of the WORK thereunder. Claims, disputes and other matters relating to the acceptability of the WORK or the interpretations of the requirements of the CONTRACT DOCUMENTS pertaining to the performance and furnishing of the WORK and claims under Article 11 in respect of changes in the CONTRACT PRICE or CONTRACT TIMES will be referred initially to ENGINEER in writing with a request for formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to ENGINEER and the other party to the AGREEMENT promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days of the last submittal (unless ENGINEER allow an additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER'S written decision on such claim, dispute or other matter will be final and binding upon CITY and CONTRACTOR unless a written notice of intention to appeal from ENGINEER'S written decision is delivered by CITY or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect of such claim, dispute or other matter in accordance with applicable laws and regulations within sixty days of the date of such decision, unless otherwise agreed in writing by CITY and CONTRACTOR.

8.9 IMPARTIALITY: When functioning as interpreter and judge under paragraphs 8.7 and 8.8, ENGINEER will not show partiality to CITY or CONTRACTOR and will

not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 8.7 and 8.8 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment) will be a condition precedent to any exercise by CITY or CONTRACTOR of such rights or remedies as either may otherwise have under the CONTRACT DOCUMENTS or by laws or regulations in respect of any such claim, dispute or other matter.

**8.10 LIMITATIONS ON ENGINEER'S AUTHORITY AND RESPONSIBILITIES:** Neither ENGINEER'S authority or responsibility under this Section 8 or under any other provision of the CONTRACT DOCUMENTS nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise or performance of any authority or responsibility by ENGINEER shall create, impose or give rise to any duty owed by ENGINEER to CONTRACTOR, any SUBCONTRACTOR, any SUPPLIER, any other person or organization, or to any surety for or employee or agent of any of them.

8.10.1 ENGINEER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR'S means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incidental thereto, or for any failure of CONTRACTOR to comply with law and regulations applicable to the furnishing or performance of the WORK. ENGINEER will not be responsible for CONTRACTOR'S failure to perform or furnish the WORK in accordance with the CONTRACT DOCUMENTS.

8.10.2 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any SUBCONTRACTOR, and SUPPLIER, or of any other person or organization performing or furnishing any of the WORK.

8.10.3 ENGINEER'S review of the final application for payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by these CONTRACT DOCUMENTS will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with the CONTRACT DOCUMENTS.

8.10.4 The limitations upon authority and responsibility set forth in this Section 8 shall also apply to ENGINEER'S, Resident Project Representative, assistants and professional consultants.

DIVISION 1

General Provisions

Section 9

City's Responsibility

9.1	Method of Communications	9.6	SAMPLES and Tests
9.2	Termination of ENGINEER	9.7	Stop WORK, Suspend WORK, Terminate Services
9.3	Processing Payments	9.8	Prosecution of the WORK
9.4	Lands, Rights-of-way, Easements		
9.5	CHANGE ORDERS		

9.1 METHOD OF COMMUNICATIONS: Except as otherwise provided in these General Provisions, the CITY shall issue all communications to the CONTRACTOR through the ENGINEER.

9.2 TERMINATION: In the case of termination of the employment of the ENGINEER, the CITY shall appoint an ENGINEER against whom CONTRACTOR makes no reasonable objection, whose status under the CONTRACT DOCUMENTS shall be that of the former ENGINEER.

9.3 PROCESSING PAYMENTS: The CITY shall make payments to the CONTRACTOR in accordance with Section 12.1 and 12.1.1.

9.4 LANDS, RIGHTS-OF-WAY, EASEMENTS: The CITY shall make available to the CONTRACTOR such lands and rights-of-way or easements, as specified in Section 5.1 and exploratory reports set forth in Section 5.2. In addition, the CITY, through the ENGINEER, will provide reference points and construction stakes as provided in Section 5.5.

9.5 CHANGE ORDERS: When the ENGINEER and the CONTRACTOR agree that a CHANGE ORDER is required due to changes in CONTRACT PRICE or CONTRACT TIME, the ENGINEER shall process such documents as may be required to process the CHANGE ORDER promptly as provided in Section 4.3 of these General Provisions.

9.6 SAMPLES AND TESTS: The CITY'S responsibility in respect to certain Tests and SAMPLES is set forth in Section 7.8 of these General Provisions.

9.7 STOP WORK, SUSPEND WORK, TERMINATE SERVICES: The CITY reserves the right to Stop WORK, Suspend WORK or Terminate Services under certain

circumstances as provided by these General Provisions.

9.8 PROSECUTION OF THE WORK: The CITY shall not supervise, direct, control nor have authority over the CONTRACTOR's means, method, techniques, sequences or procedures of construction.

# DIVISION 1

## General Provisions

### Section 10

#### Change in Contract Time

10.1 Change in CONTRACT TIME

10.2 Delays

10.3 Temporary Supervision of  
WORK

10.4 Extension of CONTRACT TIME

10.5 Failure to Complete WORK on  
Time

10.1 CHANGE IN CONTRACT TIME: The CONTRACT TIME may be changed only by CHANGE ORDER or WRITTEN AMENDMENT within the guidelines of the CITY COUNCIL Policy. Any claim for an adjustment of CONTRACT TIME shall be based on a written notice by the CONTRACTOR to the ENGINEER not later than thirty (30) days after the occurrence of the event giving rise to the claim. Written justification of the extent of the claim shall be delivered to the ENGINEER within sixty (60) days of such occurrence. All claims for adjustments to CONTRACT TIME shall be determined in accordance with Sections 1.51, 3.11, 4.2, 4.4, 4.8, 8.1, 9.5, 9.7 and 11.4.

10.2 DELAYS: Where the CONTRACTOR is prevented from completing any part of the WORK within the CONTRACT TIME due to delay beyond the control of the CONTRACTOR, the CONTRACT TIME will be extended in an amount equal to the time lost due to such delay. Delays beyond the control of the CONTRACTOR shall include, but not be limited to, acts or neglect by the CITY, acts or neglect of utility owners, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a SUBCONTRACTOR or SUPPLIER shall be deemed to be delays within the control of the CONTRACTOR.

10.3 TEMPORARY SUSPENSION OF WORK: The ENGINEER shall have the authority to suspend the WORK wholly or in part. The order to suspend the WORK for periods exceeding one (1) day shall be in writing and shall include the specific reasons for suspension.

10.3.1 If the WORK is suspended by the ENGINEER because of the failure or refusal of the CONTRACTOR to comply with the order of the ENGINEER or with the DRAWINGS and SPECIFICATIONS, the time elapsed during such suspension shall remain charged against the CONTRACTOR.

10.3.2 When the WORK is suspended, the CONTRACTOR shall store all materials in such manner that they will not obstruct or impede the traveling public unnecessarily nor become damaged in any way and he shall take every precaution to prevent damage or deterioration of the WORK performed. The WORK shall be resumed when conditions are favorable and methods are corrected as ordered or approved in writing by the ENGINEER. Liquidated damages shall not accrue during the period in which WORK is suspended unless suspension is due to the failure of the CONTRACTOR to perform any of the provisions of the CONTRACT.

10.3.3 If the WORK is suspended by the CITY in order to remove or replace unknown subsurface hazards or utilities or to correct funding deficiencies caused by said conditions, the time elapsed during such suspension shall not be charged against the CONTRACTOR. In addition, the CONTRACTOR may claim partial remobilization cost if the suspension exceeds five (5) working days as defined elsewhere in these General Provisions.

10.4 EXTENSION OF CONTRACT TIME: The date of beginning and the time of completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on the date specified in the NOTICE TO PROCEED.

10.4.1 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the CITY, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

10.4.2 In the event there is an overrun in the contractual amount, the CONTRACT TIME shall automatically be extended by a period proportional to the positive difference in dollars obtained by subtracting the CONTRACT amount from the total amount of the final estimate.

10.5 FAILURE TO COMPLETE WORK ON TIME: Should the CONTRACTOR fail to complete the WORK within the CONTRACT TIME or extension of time granted by the CITY, the CONTRACTOR will pay to the CITY the amount for liquidated damages as specified in the BID for each WORKING DAY that the CONTRACTOR shall be delinquent after the time stipulated in the CONTRACT DOCUMENTS.

10.5.1 An amount of \$240.00 per WORKING DAY, for each day after the expiration of the CONTRACT TIME or extended CONTRACT TIME, will be deducted as liquidated damages from any money due the CONTRACTOR under this CONTRACT. The CONTRACTOR and his SURETY shall be liable for any liquidated damages in excess of the amount due the CONTRACTOR. Liquidated damages will be deducted from the

CONTRACTOR's partial estimate when CONTRACT TIME expires and funds deducted may only be paid to the CONTRACTOR for liquidated damages upon approval of additional WORKING DAYS to his CONTRACT TIME and payment made for only those additional WORKING DAYS approved.

10.5.2 Permitting the CONTRACTOR to continue and finish the WORK or any part of it after the time affixed for its completion, or after the date to which the time of completion may have been extended, shall in no way be considered as a waiver on the part of the CITY of any of its rights under this AGREEMENT.

DIVISION 1

General Provisions

Section 11

Changes in Contract Price

11.1 CONTRACT PRICE

11.2 Changes in CONTRACT  
PRICE

11.3 Value of WORK

11.4 Increased or Decreased  
Quantities

11.1 CONTRACT PRICE: The CONTRACT PRICE constitutes the total compensation (subject to authorized adjustments) payable to the CONTRACTOR for performing the WORK. All duties, responsibilities and obligations assigned to or undertaken by the CONTRACTOR shall be at the CONTRACTOR's expense without change in the CONTRACT PRICE.

11.2 CHANGES IN CONTRACT PRICE: The CONTRACT PRICE may be changed only by a CHANGE ORDER or by a WRITTEN AMENDMENT. Any claim for an adjustment in the CONTRACT PRICE shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than thirty (30) days) after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty (60) days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the CONTRACT PRICE shall be determined by ENGINEER but final approval shall not be formally constituted until final action of approval by the CITY COUNCIL.

11.3 VALUE OF WORK: The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

Method (A) - By agreed unit prices; or

Method (B) - By agreed lump sum; or

Method (C) - If neither Method (A) nor Method (B) can be agreed upon before the Extra WORK is commenced, then the CONTRACTOR shall be

paid the "Actual Field Cost" of the WORK plus twenty percent (20%).

11.3.1 When the CITY requires the CONTRACTOR to do such work on a force account basis, the CONTRACTOR will be compensated as follows:

(a) LABOR: For labor and working foremen in direct charge of operations, the CONTRACTOR shall receive the wage rates agreed upon in writing before beginning WORK for each hour that said labor and foremen are engaged in such WORK. The CONTRACTOR shall receive the actual costs paid to, or in behalf of, workmen for subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the WORK, but limited to a maximum daily rate for subsistence and travel allowances, which maximum will be agreed upon prior to incurring such charges. An amount equal to twenty percent (20%) of the sum of the above items will also be paid the CONTRACTOR.

(b) BOND, INSURANCE AND TAX: For property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and social security taxes on force account work, the CONTRACTOR shall receive the actual cost thereof, to which six percent (6%) will be added. The CONTRACTOR shall furnish satisfactory evidence of the rates paid for such BOND, insurance and tax.

(c) MATERIALS: For materials accepted by the ENGINEER and used, the CONTRACTOR shall receive the actual cost of such materials delivered on the WORK including transportation charges paid by him (exclusive of machinery rentals), to which fifteen percent (15%) will be added.

(d) EQUIPMENT: For machinery or special equipment (other than small tools) including fuel, lubricants and transportation costs, the use of which has been authorized by the ENGINEER, the CONTRACTOR shall receive the rental rates agreed upon in writing before such WORK is begun for the actual time such equipment is in operation on the WORK.

(e) MISCELLANEOUS: No additional allowance will be made for General Superintendence, the use of small tools or other costs for which no specific allowance is herein provided.

(f) COMPENSATION: The PROJECT REPRESENTATIVE and the ENGINEER shall compare records of the cost of WORK done as ordered on a force account basis. Such comparison shall be made daily if required by the ENGINEER. Should any work be performed by an approved SUBCONTRACTOR, the CONTRACTOR will be paid the actual and reasonable cost of such subcontracted work computed as outlined above,

plus an additional allowance of ten percent (10%) for materials cost and for direct labor cost to cover the CONTRACTOR's profit, superintendent, administration, insurance and overhead.

(g) STATEMENTS: No payment will be made for WORK performed on a force account basis until the CONTRACTOR has furnished the ENGINEER with duplicate itemized statements of the cost of such force account work detailed as follows:

- (1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman.
- (2) Designations, dates, daily hours, total hours, rental rate and extension for each unit of machinery and equipment.
- (3) Quantities of materials, prices and extensions.
- (4) Transportation of materials.
- (5) Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and social security tax.

Statements shall be accompanied and supported by invoices for all materials used and all transportation charges. If materials used on force account work are not purchased for such work but are taken from the CONTRACTOR's stock, in lieu of invoices, the CONTRACTOR shall furnish an itemized list of such materials showing that the quantity claimed was actually used, and that the price and transportation costs claimed represent the actual cost to the CONTRACTOR. All invoices submitted shall be accompanied by the CONTRACTOR's notarized statement that payment in full has been made for the materials.

11.4 INCREASED OR DECREASED QUANTITIES: When alterations in DRAWINGS or quantities of WORK not requiring SUPPLEMENTAL AGREEMENTS, as hereinabove provided, are ordered and performed and when such alterations result in increase or decrease of the quantity of WORK performed, the CONTRACTOR shall accept payment in full at the CONTRACT Unit Price for the actual quantities of WORK done and no allowance will be made for anticipated profits. Increased or decreased quantities of WORK involving CONTRACT PRICE changes, as set forth in Sections 8 and 11 of the General Provisions shall be paid for as stipulated in such agreements.

DIVISION 1

General Provisions

Section 12

Payments and Completion

- |                        |                                   |
|------------------------|-----------------------------------|
| 12.1 Progress Payments | 12.5 Acceptance and Final Payment |
| 12.2 Scope of Payments | 12.6 Waiver of Claims             |
| 12.3 Final Cleaning Up | 12.7 CONTRACTOR'S Guarantee       |
| 12.4 Final Inspection  |                                   |

12.1 PROGRESS PAYMENTS: On or before the last day of each month, the CONTRACTOR shall prepare and submit to the ENGINEER for approval or modification, a monthly statement or estimate showing as completely as practical the total value of the WORK done by the CONTRACTOR up to the last day of the month; said estimate shall also include the value of all stockpiled materials delivered on the SITE and accepted by the ENGINEER.

12.1.1 The CITY shall then pay the CONTRACTOR within thirty (30) days the total amount of the approved estimate, less retainage as required per LA Revised Statutes 38:2248, and further less all previous payments and further sums that may be retained by the CITY under the terms of the CONTRACT.

12.2 SCOPE OF PAYMENT: The CONTRACTOR shall receive and accept the compensation provided for in the CONTRACT as full payment for furnishing all materials, labor, tools and equipment and for performing all WORK contemplated and embraced under the CONTRACT in a complete and acceptable manner in accordance with the CONTRACT, for all loss or damage arising out of the nature of the WORK as herein specified, or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the WORK and for all risks of every description connected with the prosecution of the WORK until final acceptance by the ENGINEER. The payment of any Progress Payment or the acceptance of any portion of the WORK as provided in the CONTRACT shall in no way affect the obligation of the CONTRACTOR, who, at his own cost and expense, shall repair, correct, renew or replace any defects or imperfections in the construction, strength, or quality of materials used in or about the construction of the WORK under the CONTRACT and this payment shall in no way affect his responsibility for all damages due or attributable to such defects or imperfections which may be discovered before the final acceptance of the whole WORK and the ENGINEER shall be the judge of such defects or imperfections. No monies under the CONTRACT shall

become due, if the ENGINEER so elects, until the CONTRACTOR has satisfied the ENGINEER that he has fully settled for materials, equipment and other services in or upon the WORK and labor done in connection therewith.

12.2.1 All WORK indicated on the DRAWINGS as necessary to the completion of the improvement shall be performed by the CONTRACTOR, unless otherwise provided. All fences, buildings, bridges and structures of any character not necessary to the construction of the PROJECT or other encumbrances upon or within the limits of the construction, where indicated on the DRAWINGS to be removed, unless otherwise provided, shall be removed by the CONTRACTOR and disposed of as directed. All unsightly material removed shall be disposed of in such a manner that meets the approval of the ENGINEER. This WORK will be paid for as specifically provided for in the various pay items appearing in the proposal and CONTRACT but should no specific provisions be made for the payment of this WORK, it will be considered subsidiary WORK and as such shall be included by the CONTRACTOR in the BID prices for pay items appearing in the proposal and CONTRACT.

12.3 FINAL CLEANING UP: Upon completion of the WORK and before acceptance and final payment is made, the CONTRACTOR shall clean and remove from the roadway, neutral ground and adjacent property all surplus and discarded materials, weeds, bushes, rubbish, forms and temporary structures. He shall restore in an acceptable manner all property, both public and private, which has been damaged during the prosecution of the WORK, and shall leave the site of the WORK in a neat and presentable condition throughout.

12.3.1 Upon completion, and unless otherwise instructed, structures, all superfluous material, cofferdams, construction buildings and other temporary structures and debris resulting from construction shall be removed. False work timbers and piles shall be removed to the ground level. Upon completion of WORK in connection with drainage structures, the CONTRACTOR will be required to remove all debris, such as drifts, weeds, dirt, scraps of building material, or any other obstruction whether old or new.

12.3.2 All drainage culverts within the limits of the PROJECT shall be cleaned and flushed whether it is new culverts installed in the PROJECT or culverts found in place and/or designated by the ENGINEER to remain.

12.3.3 All materials shall be disposed of as directed by the ENGINEER and stream channels, structures and roadway shall be left in a neat and presentable condition. Obstructions to the end of drainage structures shall be removed unless the CONTRACTOR is otherwise directed by the ENGINEER.

12.3.4 No special payment will be made for this work; its cost being included in the prices paid for the construction work.

12.4 FINAL INSPECTION: Whenever the WORK provided for and contemplated by the CONTRACT shall have been satisfactorily completed and the final cleaning up performed, the CONTRACTOR shall notify the ENGINEER, requesting Final Inspection.

12.5 ACCEPTANCE AND FINAL PAYMENT: Within ten (10) days after the CONTRACTOR has given notice to the ENGINEER that the WORK has been completed, the ENGINEER and the PROJECT REPRESENTATIVE shall inspect the WORK and within said time, if the WORK is found to be completed in accordance with the CONTRACT DOCUMENTS, the ENGINEER shall provide to the CITY a CERTIFICATE OF ACCEPTANCE. Upon completion of all WORK, and upon certification by the CITY that the WORK has been accepted, the CITY will record the CERTIFICATE OF ACCEPTANCE of the WORK in the office of the Clerk of Court of Rapides Parish, Louisiana. If, upon or after the expiration of forty-five (45) days after the recordation of acceptance, the CONTRACTOR submits to the CITY a Certificate from the Clerk of Court of the Parish of Rapides to the effect that there are no claims or liens recorded against the CONTRACT or the CONTRACTOR, then Final Payment of all amounts due the CONTRACTOR shall be made by the CITY. Final Payment will be made within thirty (30) days of receipt of the Clear Lien Certificate from the CONTRACTOR through the ENGINEER. Neither the CERTIFICATE OF ACCEPTANCE nor the Final Payment, nor any provision in the CONTRACT DOCUMENTS shall relieve the CONTRACTOR of the obligations for fulfillment of any warranty that may be required in these General Provisions, the SPECIAL PROVISIONS or the SPECIFICATIONS.

12.6 WAIVER OF CLAIMS: The acceptance by the CONTRACTOR of Final Payment shall be and shall operate as a release to the CITY of all claims and all liability to the CONTRACTOR, other than claims in stated amount as may be specifically accepted by the CONTRACTOR, for all things done or furnished in connection with this WORK and for every act and neglect of the CITY and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its SURETIES from any obligations under the CONTRACT DOCUMENTS or the Performance and Payment BONDS.

12.7 CONTRACTOR'S GUARANTEE: The CONTRACTOR shall guarantee all materials and equipment furnished and WORK for a period of one (1) year from the date of recordation of the CERTIFICATE OF ACCEPTANCE. The CONTRACTOR warrants that the completed WORK is free from all defects due to faulty materials and workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of the damage of other parts of the system resulting from such defects. The CITY will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the CITY may do so and charge the

CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guaranty period.

DIVISION 1

General Provisions

Section 13

Termination and Default

13.1 Termination

13.2 CONTRACTOR May Terminate

13.3 Default of CONTRACT

13.4 Termination of CONTRACTOR's  
Responsibility

13.1 TERMINATION: The CITY may elect to terminate an AGREEMENT with a CONTRACTOR when the CONTRACTOR persistently fails to perform the WORK in accordance with the CONTRACT DOCUMENTS. Such failure shall include, but not be limited to failure to supply sufficient skilled workers or suitable material or equipment or failure to adhere to progress schedules; failure to obey LAWS AND REGULATIONS; failure to regard the authority of the ENGINEER; or failure to comply in a substantial way with the provisions of the CONTRACT DOCUMENTS.

13.1.1 The CITY may, after giving CONTRACTOR and the SURETY, seven (7) days' written notice and to the extent permitted by LAWS AND REGULATIONS, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site and take possession of the WORK and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the Site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the WORK all materials and equipment stored at the Site or for which the CITY has paid CONTRACTOR but which are stored elsewhere, and finish the WORK as the CITY may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds all claims, costs, losses and damages sustained by the CITY arising out of or resulting from completing the WORK such excess will be paid to CONTRACTOR. If such claims, costs, losses and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to the CITY. Such claims, costs, losses and damages incurred by the CITY will be reviewed by ENGINEER as to their reasonableness and when so approved by ENGINEER incorporated in a CHANGE ORDER, provided that when exercising any rights or remedies under this paragraph the CITY shall not be required to obtain the lowest price for the WORK performed.

13.1.2 Where CONTRACTOR's services have been so terminated by the CITY, the termination will not affect any rights or remedies of the CITY against CONTRACTOR

then existing or which may thereafter accrue. Any retention or payment of monies due CONTRACTOR by the CITY will not release CONTRACTOR from liability.

13.1.3 Upon seven (7) days' written notice to CONTRACTOR the CITY may, without cause and without prejudice to any other right or remedy of the CITY, elect to terminate the AGREEMENT. In such case, CONTRACTOR shall be paid (without duplication of any items):

13.1.3.1 For completed and acceptable WORK executed in accordance with the CONTRACT DOCUMENTS prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such WORK;

13.1.3.2 For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the CONTRACT DOCUMENTS in connection with uncompleted WORK, plus fair and reasonable sums for overhead and profit on such expenses;

13.1.3.3 For all claims, costs, losses and damages incurred in settlement of terminated contracts with SUBCONTRACTORS, SUPPLIERS and others; and

13.1.3.4 For reasonable expenses directly attributable to termination.

13.1.4 CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

13.2 CONTRACTOR MAY TERMINATE: If, through no act or fault of CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the CITY or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty (30) days after it is submitted or the CITY fails for thirty (30) days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven (7) days' written notice to the CITY and provided the CITY or ENGINEER do not remedy such suspension or failure within that time, terminate the AGREEMENT and recover from the CITY payment on the same terms as provided in Section 13.1.3.1, 13.1.3.2, 13.1.3.3, 13.1.3.4 and 13.1.4.

13.3 DEFAULT OF CONTRACT: If the CONTRACTOR fails to begin WORK within the time specified or if the construction or WORK to be done under this CONTRACT shall be abandoned, or if this CONTRACT, or any part thereof, shall be sublet without the previous written consent of the ENGINEER, or if the CONTRACT shall be assigned by the CONTRACTOR otherwise than as specified, or if at any time the ENGINEER shall be of the opinion that the WORK or any part thereof is unnecessarily or unreasonably delayed or that the CONTRACTOR has violated any provisions of this CONTRACT; or if the CONTRACTOR shall discontinue the prosecution of the

WORK without authority; or shall become insolvent or be declared bankrupt, or shall commit any act of bankruptcy, or insolvency, the ENGINEER may give notice in writing to the CONTRACTOR and his SURETY of such delay, neglect or default, specifying the same. If the CONTRACTOR within a period of ten (10) days after such notice shall not proceed in accordance therewith, then the CITY shall upon written certificate from the ENGINEER of the fact of such delay, neglect or default of the CONTRACTOR'S failure to comply with such notice, have full power and authority, without violating the CONTRACT, to take the prosecution of the WORK out of the hands of the CONTRACTOR and to appropriate or use any and all materials and equipment on the ground as may be suitable and acceptable and enter into an AGREEMENT for the completion of the CONTRACT according to the terms and provisions thereof or use such other methods as in his opinion may be required for the completion for the CONTRACT in an acceptable manner.

13.3.1 All costs and charges that may be incurred under this article or any damages that should be borne by the CONTRACTOR, shall be withheld or deducted from any monies then due or to become due the CONTRACTOR, under this CONTRACT or any part thereof; and in such accounting the CITY shall not be held to obtain the lowest cost of the WORK for completing the CONTRACT or any part thereof, but all sums actually paid therefor shall be charged to the CONTRACTOR. In case the costs and charges incurred are less than the sum that would have been payable under the CONTRACT, if the same had been completed by the CONTRACTOR, the CONTRACTOR or his SURETY shall be entitled to receive the difference and in case such costs and charges exceed the said sum, the CONTRACTOR or his SURETY shall pay the amount of excess to the CITY for the completion of the WORK.

13.4 TERMINATION OF CONTRACTOR'S RESPONSIBILITY: The CONTRACT will be considered complete when all WORK has been satisfactorily completed, the Final Inspection made, the WORK accepted by the ENGINEER and the CITY. The CONTRACTOR will then be released from further obligation except as set forth in his CONTRACT DOCUMENTS.

**SECTION 210 CONSTRUCTION LAYOUT**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 General Construction Requirements | 3.1 Payment     |

**1.1 DESCRIPTION.** The WORK consists of establishing lines and grades, taking all cross sections and staking out the construction work in accordance with the SPECIFICATIONS, DRAWINGS and as directed by the ENGINEER. The WORK also consists of providing assistance in the coordination of utility relocation activities to ensure that the placement of relocated facilities will not conflict with the required construction.

**1.2 CONSTRUCTION REQUIREMENTS.** The CONTRACTOR shall establish all line and grades and stake out all work on the PROJECT, including sufficient vertical and horizontal points for utility relocations for use by the CITY OF ALEXANDRIA and others. The project survey control and horizontal alignment will be based on the Louisiana State Plane Coordinate System as determined by GPS observations. The DRAWINGS shall show the coordinates of sufficient survey control points to establish horizontal control throughout the project. The CONTRACTOR shall employ such methods as approved by the ENGINEER for the location of project alignment and other necessary survey control points in accordance with acceptable surveying standards and practices. The ENGINEER shall provide one benchmark on or near the project for vertical control. The CONTRACTOR shall verify the values of any intermediate benchmarks shown on the DRAWINGS. The CONTRACTOR shall employ the services of a Professional Engineer or Land Surveyor registered in the State of Louisiana to supervise the WORK. The CONTRACTOR shall keep complete and comprehensive records of all lines and grades necessary from initial layout to final acceptance. The CONTRACTOR shall provide any necessary survey work to ensure there are no utility conflicts with required construction.

**2.1 MEASUREMENT.** No measurement will be made for Construction Layout

**3.1 PAYMENT.** Payment shall be made at the CONTRACT Lump Sum price for Construction Layout. The amount of partial payment for Construction Layout will be as approved by the ENGINEER as the work progresses. No price adjustment will be made for this item due to changes in the WORK, and any increase cost incurred by the CONTRACTOR due to additional work occasioned by such changes will be considered incidental to the additional work.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
210-01	Construction Layout	Lump Sum

**SECTION 220 MOBILIZATION**

1.1 Description	2.1 Payment
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**1.1 DESCRIPTION.** Mobilization shall include the CONTRACTOR'S preparatory WORK and operations, including those necessary for movement of personnel, equipment, supplies and incidentals to the project site; the establishment of temporary site facilities and other facilities necessary for WORK on the project; the cost of bonds and any required insurance; and other pre-construction expenses necessary for start of the WORK, excluding the cost of construction materials.

**2.1 PAYMENT.** Payment for mobilization will be made at the lump sum CONTRACT unit price for mobilization. The CONTRACTOR will not be compensated for demobilizing and re-mobilizing to the same project.

Payment will be made by the CONTRACT Lump Sum price consisting of partial payments made in accordance with the following schedule:

<u>Percent of Total CONTRACT Amount Earned</u>	<u>Percent of Mobilization Bid Item Allowable *</u>
First Partial Payment Estimate OR	25
10	50
25	75
50	100

**5% Limitation.** Lump Sum price provided for mobilization shall not exceed 5% of the amount of the CONTRACT.

No price adjustment will be made for this item due to changes in the WORK, and any increased mobilization cost incurred by the CONTRACTOR due to additional WORK occasioned by such changes will be considered incidental to the additional WORK.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
220-01	Mobilization	Lump Sum

**SECTION 310 CLEARING AND GRUBBING**

1.1 Description	2.1 Measurement
1.4 General Construction Requirements	3.1 Payment

**1.1 DESCRIPTION.** The WORK shall consist of clearing and grubbing and removal and disposing of vegetation and debris within the construction limits. This WORK shall include cutting trees, logs, brush, stumps and debris; excavating and removing stumps, roots, submerged logs, snags and other vegetative and objectionable material; legally disposing of removed material, and cleaning the work area.

**1.4 CONSTRUCTION REQUIREMENTS.** Trees, shrubs, plants, and other items designated to remain will be marked by the ENGINEER. The CONTRACTOR will protect the items designated to remain. The CONTRACTOR will not place equipment, materials, and supplies in close proximity to the items to remain. Any damage to these items caused by the CONTRACTOR shall be repaired at no cost to the CITY. Should damage occur to bark, trunks, limbs, or roots of vegetation marked to remain, the CONTRACTOR shall employ a licensed landscape arborist to make repairs. Any damage outside the construction limits caused by the clearing and grubbing shall be repaired at no cost to the CITY. Stump holes or other holes left from clearing and grubbing shall be filled by blading the area or backfilling with existing soil compacted to at least the density of the surrounding ground.

**2.1 MEASUREMENT.** No measurement will be made for the area of clearing and grubbing.

**3.1 PAYMENT.** Payment for clearing and grubbing will be made at the CONTRACT Lump Sum price. If a pay item for clearing and grubbing is not included in the CONTRACT, the cost shall be included in other items. The price shall include all equipment, labor, hauling, disposal of materials, backfilling of holes, and any other incidentals required to satisfactorily complete the WORK.  
Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
310-01	Clearing and Grubbing	Lump Sum

**SECTION 320 REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

- |                          |                 |
|--------------------------|-----------------|
| 1.1 Description          | 2.1 Measurement |
| 1.2 Construction Methods | 3.1 Payment     |

- 1.1 DESCRIPTION.** This WORK shall consist of removing and disposing of old pavement (surface and base course), curb and gutter, gutter, walks, catch basins, drainage structures, drainage pipes, concrete paved ditches, topsoil, and any other material as required to successfully complete a PROJECT.
- 1.2 CONSTRUCTION METHODS.** Where the removal of old pavement (surface and base course), curb and gutter, gutter, walks, catch basins, drainage structures, drainage pipes, topsoil, and any other material is called for on the PLANS, it shall be removed from the site and disposed of off the PROJECT outside the view of the traveling public and in accordance with all local, state, and federal regulations. Where a portion of the pavement, curb, curb and gutter, gutter or walk is to be left in place, the removed portion shall extend to an existing joint or shall be cut to a true line with a vertical face. Sufficient removal shall be made to provide for proper grades and connections with the new WORK.
- 2.1 MEASUREMENT.** Removal of structures and obstructions will not be measured but shall include the removal and disposal of old pavement (surface and base course), curb and gutter, gutter, walks, catch basins, drainage structures, drainage pipes, concrete paved ditches, topsoil, and any other material as required to successfully complete a PROJECT. Unless otherwise stated on the DRAWINGS, saw cutting concrete pavement will be measured by the linear foot of concrete sawed full depth.
- 3.1 PAYMENT.** Payment for the removing and disposing of old pavement (surface and base course), curb and gutter, gutter, walks, catch basins, drainage structures, drainage pipes, topsoil, and any other material as required to successfully complete a PROJECT will be made at the CONTRACT Lump Sum price for Removal of Structures and Obstructions. Unless otherwise stated on the DRAWINGS, saw cutting will be paid at the unit price per foot of concrete saw cutting and shall be full compensation for furnishing the necessary equipment as required.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
320-01	Removal of Structures and Obstructions	Lump Sum
320-02	Saw Cutting Concrete Pavement Full Depth	Linear Feet
320-03	Saw Cutting Asphalt Pavement Full Depth	Linear Feet

Should special removal items be required, the special items will be described and a letter, i.e. A, B, C, etc will be placed after the 320-01.

Example:

320-01-A	Removal of Concrete Pavement	Square Yards
320-01-B	Removal of Curbs	Linear Feet

**SECTION 330 EXCAVATION AND EMBANKMENT**

- |                        |                                  |
|------------------------|----------------------------------|
| 1.1 Description        | 1.7 General Construction Methods |
| 1.2 Louisiana One Call | 1.8 Subgrade                     |
| 1.3 General Excavation | 1.9 Shoulders, Berms, and Slopes |
| 1.4 Red Dirt Material  | 2.1 Measurement                  |
| 1.5 Top Soil           | 3.1 Payment                      |
| 1.6 Flowable Fill      |                                  |

- 1.1 DESCRIPTION.** This item shall consist of excavation, construction of embankment, backfilling, and disposal or compaction of all material that is encountered within the limits of the WORK not being removed under some other item. It shall include all operations necessary for the formation and compaction of subgrades, shoulders, berms and/or ditches necessary for the completion of the WORK, all in accordance with these SPECIFICATIONS and in conformity with the grades, alignments and cross sections shown on the PLANS or established by the ENGINEER.
- 1.2 LOUISIANA ONE CALL.** R.S. 1749.13 requires excavators and demolishers are to notify a Regional Notification Center of their excavation activity. Telephonic notice must be given to the Notification Center at least 48 hours, but no more than 120 hours, in advance, excluding weekends and holidays. The owner/operator of an underground facility must mark the location or provide information to enable an excavator or demolisher using reasonable means to determine the location of the underground facility. Contact **Louisiana One Call** (1-800-272-3020) prior to digging. Locate existing underground utilities by careful probing and hand excavation. Where utilities are to remain in place, protect them from damage during construction operations.
- 1.2.1 Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the ENGINEER immediately for directions prior to proceeding. All uncharted or incorrectly charted piping or other utilities that are encountered, by the CONTRACTOR, shall be denoted on the Record DRAWINGS with the type and location of the piping or utilities found. In the event that the CONTRACTOR damages uncharted or incorrectly charted piping or other utility, the CONTRACTOR shall contact the affected piping or utility company for repairs.
- 1.3 GENERAL EXCAVATION.** General excavation shall consist of the excavation of materials as required by the DRAWINGS or as directed by the ENGINEER. It shall include excavation of soils to the sub-grade shown on the DRAWINGS and placing and compacting these soils in the fill sections if required or disposal of excess soils that are not required or as directed by the ENGINEER.
- 1.3.1 General excavation shall also include the removal of unsuitable material. Unsuitable material are soils containing significant amounts of debris or organic matter including stumps, roots, logs, humus or other materials which will decay or

produce subsidence, including highly saturated soils, which the ENGINEER determines are not satisfactory for use in the embankment or other construction purposes. Unsuitable materials shall be removed and disposed of as General Excavation. The unsuitable materials will be replaced with "Red Dirt" Material.

- 1.3.2 General excavation shall not include excavation required for items of work that excavation is included in the SPECIFICATION for that item of work.
- 1.3.3 Density requirements shall be as stated in Section 1.4.5 of these SPECIFICATIONS.
- 1.4 "RED DIRT" MATERIAL.** "Red Dirt" Material shall include all acceptable excavation from borrow pits furnished by the CONTRACTOR to supplement soils required for construction of embankments or other portions of the work in excess of soils obtained from excavation.
- 1.4.1 Red Dirt fill and backfill material shall be natural soils conforming to LA DOTD Designation TR 423, Class A-2-4 soil or better material commonly known as "Red Dirt" with a minimum Plasticity Index (PI) of three (3). Red Dirt material shall be natural soils containing an organic content of five percent (5%) or less and a maximum silt content of sixty percent (60%).
- 1.4.2 Fill and backfill material, when not using native material and/or river sand material, shall be a borrow material obtained from an approved source. Borrow materials shall be tested and classified by a Testing Laboratory, before incorporation into a PROJECT.
- 1.4.3 A sample of "Red Dirt" material shall be provided to a Testing Laboratory by the CONTRACTOR for soil analysis prior to beginning borrow operations. The CONTRACTOR will not be permitted to begin borrow operations until soil tests have been completed and proposed materials have been approved.
- 1.4.4 "Red Dirt" material shall be used as a backfill material under all paved areas and areas within three feet (3') of the travel lane or shoulder.
- 1.4.5 "Red Dirt" Backfill Material. "Red Dirt" backfill material shall be placed at or near optimum moisture content. "Red Dirt" material shall be compacted in layers not exceeding six inches (8") compacted thickness. Each layer shall be compacted by approved methods to at least ninety five percent (95%) of maximum dry weight density prior to placement of a subsequent layer.
- 1.4.6 Density Requirements. Maximum density will be determined in accordance with LA DOTD Designation TR 418 or TR 415 and in-place density determined by LA DOTD Designation TR 401. The number and frequency of density tests will be made at the discretion of the ENGINEER during backfilling to determine that required density is being obtained.

**1.5 TOP SOIL.** Topsoil shall consist of furnishing and placing topsoil on areas designated on the PLANS or as directed by the ENGINEER.

- (A) **Materials.** Topsoil shall be workable, loamy soil, free of debris, refuse and similar foreign matter, and reasonably free of subsoil, hard lumps, gravel and other such materials. Topsoil shall have a minimum Plasticity Index (PI) of four (4), a maximum Plasticity Index (PI) of twelve (12), a pH of 5.5 – 8.0, a minimum organic content of three percent (3%), and shall be capable of supporting adequate vegetation. If agricultural lime or organic matter is added to a soil to bring topsoil into conformance with these SPECIFICATIONS, it shall be at no direct pay.
- (B) **Construction Requirements.** Areas to receive topsoil shall be scarified as directed by the ENGINEER. Agricultural lime, if required, shall be spread prior to scarifying the areas. Topsoil shall be uniformly spread over the areas to a depth of six inches (6”) and rolled to a uniform surface with a cultipacker or other suitable equipment.

**1.6 FLOWABLE FILL.** Flowable fill shall consists of furnishings, placing, and consolidating a flowable fill for backfilling drainage structures in accordance with these SPECIFICATIONS, PLAN details and as directed by the ENGINEER. The flowable fill shall be a cementitious mixture of Portland Cement, fly ash, concrete sand, and water.

- (A) **Materials.** Materials shall comply with Section ST-104 “Concrete” and the following SPECIFICATIONS.

Flowable fill shall be proportioned as follows:

Material	Quantity Per Cubic Yard
Portland Cement	100 lb
Fly Ash	250 lb
Sand	2,800 lb
Water	60 gal. (Max)

The mix design may be modified to conform to field conditions with the approval of a new mix design. Other mix designs and materials will be approved on the basis of compressive strengths and flowability as determined by trial batches. Compressive strengths for trial batches at twenty eight (28) days shall range from a minimum of five hundred pounds per square inch (500 psi) to a maximum of one thousand pounds per square inch (1,000 psi). Mix designs shall yield one (1.0) cubic yard absolute volume.

- (B) **Construction Requirements.** Before placement, temporary enddams or soil berms shall be placed as directed to confine the flowable fill. Flowable fill shall be placed continuously after the drainage structure has been

installed to the proper grade. Flowable fill shall be placed to the lines and grades shown on the PLANS and as directed by the ENGINEER.

- 1.7 GENERAL CONSTRUCTION METHODS.** While the excavation is being done and until the work is finally accepted, the CONTRACTOR shall take necessary steps to protect the work to prevent loss of material from the street, right-of-way, and/or servitude. During the construction of the street, the roadbeds shall be maintained in such condition that it will be well drained at all times.
- 1.8.1 All suitable materials from the excavation shall be used as far as practicable in the formation of the subgrade, berms or shoulders and slopes and at such other places as directed. No excavated material shall be wasted without written permission from the ENGINEER and when such material is to be wasted, it shall be disposed of off the project outside the view of the traveling public and in accordance with all local, state, and federal regulations.
- 1.8.2 Do not allow water to accumulate in excavations. Remove water using dewatering methods that will prevent softening of foundation bottoms, and undercut footings and soil changes detrimental to stability of subgrades and foundation. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
- 1.8.3 Convey water removed from excavations and rainwater to collecting or run-off areas. Provide and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use excavations as temporary drainage ditches.
- 1.8.4 Barricade open excavations and post with warning lights for safety of persons. Operate warning lights during hours from dusk to dawn each day. All signs, barricades, and warning lights shall be in accordance with the MUTCD.
- 1.8.5 Protect structures, utilities, sidewalks, pavements and other facilities immediately adjacent to excavations from damage and displacement.
- 1.8.6 Logs, stumps, and other undesirable material shall be removed two feet (2') below the bottom of paved surfaces, drainage structures, drainage conduits, and finished ground elevation at no additional cost to the City of Alexandria.
- 1.8 SUBGRADE.** The subgrade is that portion of the roadbed upon which the wearing course or base course is to be placed.
- 1.9.1 All soft and yielding material, boulders and loose stones and other portions of the subgrade that will not compact readily, shall be removed and replaced with "Red Dirt" material, tamped or tooled and the whole subgrade brought to line and grade and to a foundation of uniform compaction and supporting strength.

- 1.9.2 All submerged roots, stumps or other perishable matter encountered in the preparation of the subgrade shall be removed to a depth of not less than two (2') feet below the finished surface of the paving. The cost of this work shall be included in the cost of other items with no extra compensation allowed.
- 1.9.3 The subgrade shall be properly shaped, rolled and uniformly compacted so that it conforms to the lines and grades as shown and shall be brought to a firm unyielding surface by rolling the entire area with an approved roller weighing not less than five (5) tons or a sheepsfoot roller as directed by the ENGINEER. Any portion of the subgrade that is inaccessible to the roller shall be compacted thoroughly with hand or mechanical tamps weighing not less than fifty pounds (50 lbs.), the bearing and tamping face of which shall not exceed one hundred square inches (100 in.<sup>2</sup>) in area.
- 1.9.4 Place "Red Dirt" material in layers not more than eight inch (8") in compacted depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to the percentage of maximum density required. Do not place "Red Dirt" material on surfaces that are muddy, frozen or contain frost or ice. Do not place "Red Dirt" material on unsound surfaces.
- 1.9.5 After the subgrade has been prepared as specified above, the CONTRACTOR shall maintain it free from ruts and depressions and all damage resulting from the hauling or handling of any materials, equipment, tools, etc., and if ruts are formed, the subgrade shall be scarified and rolled or thoroughly tamped.
- 1.9 **SHOULDERS, BERMS, AND SLOPES.** Before any subgrade for pavement shall be approved, adjacent curb and gutter and all drainage structures shall be in place, the curb and gutter backfilled and the shoulders, berms and slopes shall be constructed to the full width, but not necessarily to the final height and shape. Upon completion of the paving operation, the shoulders, berms and slopes shall be shaped true to the cross section shown on the plans, with a uniform slope from the top of the curb to the property line.

## 2.1 **MEASUREMENT.**

- 2.1.1 Excavation will be measured by the cubic yard acceptably excavated within the limits of lines and slope described in typical sections and cross sections in the plans and contract documents. Materials excavated outside of the designated sections shall not be measured unless approved by the ENGINEER. When the project is constructed essentially to the dimensions shown on the plans, no further measurement will be required and payment will be made for the quantities shown in the contract for General Excavation. *If disagreement exists between the CONTRACTOR and the ENGINEER as to the accuracy of the plan quantities, either party shall, before any work is started which would affect the measurement, have the right to request in writing and thereby cause the quantities involved to be measured.* Should this request be made by the CONTRACTOR, the work shall be at no additional cost to the City of Alexandria.

Should the request be made by the ENGINEER, the work shall be performed by the City of Alexandria Engineering Department. In either case, the ENGINEER shall check the measurement for accuracy and decide the final quantity of General Excavation.

If, during construction, the ENGINEER finds it necessary to change the grades, slopes and sections, the revised grades, slopes and sections will be plotted or superimposed onto the original plan cross-sections. The excavation volume, delineated by these revised sections, will be computed by the average end area method and then revised quantities so computed and reflecting any increased or decreased volume will be the measurement for final payment.

Any additional excavation authorized by the ENGINEER that is not reflected in the cross-sections shall be calculated by the average end area method or other methods approved by the ENGINEER.

- 2.1.2 "Red Dirt" Material, River Sand Material, and Topsoil will be measured by the cubic yard (vehicular measurement) in approved hauling vehicles at the point of delivery.
- 2.1.3 Preparation of the areas to receive topsoil will not be measured for payment, but shall be included in the cubic yard bid price for topsoil.
- 2.1.4 Agricultural lime treatment of areas to receive topsoil will be measured in accordance with Section 104 "Seeding" of these SPECIFICATIONS.
- 2.1.5 Vehicular measurement for "Red Dirt" material, river sand material, and topsoil shall conform to the following:

Trucks used to haul material being paid by measured weight shall be weighed empty at such times as directed; and each truck shall bear a plainly legible identification mark. Materials specified to be measured by volume in hauling vehicles shall be hauled in approved vehicles and will be measured therein at the point of delivery on the project. Vehicles may be of any acceptable size or type, provided the body is of such shape that the volume can be readily and accurately determined. Vehicles shall be loaded to at least a predetermined permanently fixed mark, which defines a known volume, upon arrival at the point of delivery. Vehicles will be measured in increments of half (0.5) cubic yard. When materials are measured by weight and converted to volume for payment, conversion will be made to the nearest tenth (0.1) cubic yard.

Net certified scale weights or weights based on certified volumes (in the case of shipments by rail, truck or other transport) will be used as a basis of measurement, subject to correction when material has been lost in transit, wasted or otherwise incorporated in the work.

"Red Dirt" Material and River Sand Material will be measured by the cubic yard (Vehicular Measurement). Payment will be made at the CONTRACT unit price

per cubic yard of said material placed and compacted. Any additional material required to cover excavation or caving of trench sides will not be measured for payment.

The cubic yard capacity of each delivery truck will be pre-measured. Truck capacity measurement shall be approved by the ENGINEER.

Delivery tickets shall be numbered sequentially and shall include the following information:

- a) Date;
- b) Time Loaded;
- c) Truck identification;
- d) Delivery Location; and,
- e) Quantity loaded.

Each delivery ticket shall be approved by the ENGINEER at the time of delivery. In no case shall the loaded truck weight exceed the legal load limit. No payment shall be made for material quantities in excess of the legal load limit.

In case of dispute regarding the quantity loaded, the ENGINEER may require that the truck be weighed at a LA DOTD certified weighing station approved by the ENGINEER.

2.1.6 Flowable Fill. Flowable fill will be measured by the cubic yard using batch tickets as adjusted by the ENGINEER. When flowable fill is authorized for use on a PROJECT, the application for flowable fill or payment will be based on a 5 cubic yard minimum.

3.1 **PAYMENT**. Payment for accepted quantities for "Red Dirt Material" will be made at the CONTRACT Unit Price per cubic yard (vehicular measurement) which price shall constitute full compensation for hauling and compacting materials, furnishing of equipment, labor, materials, and any incidentals necessary to complete this work.

3.1.1 Payment for the accepted quantities of General Excavation will be made at the CONTRACT Unit Price per Cubic Yard (in place measurement) which price shall constitute full compensation for excavating, transporting and compacting material required in fill sections and hauling off and disposal of excess or unsuitable material.

3.1.2 Flowable Fill. Flowable fill in place and accepted, measured as provided above, will be paid at the Contract unit price per cubic yard, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, mixing, safety items, excavation, disposal of materials and incidentals necessary to complete this item in accordance with these SPECIFICATIONS.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
330-01	General Excavation	Cubic Yard
330-02	Embankment (Red Dirt)	Cubic Yard
330-03	Top Soil	Cubic Yard

**SECTION 340 EROSION CONTROL**

1.1 Description	1.6 General Construction Methods
1.2 Materials	1.7 Protection During Suspension of Operations
1.3 Control of Erodible Earth	2.1 Measurement
1.4 Exposure of Erodible Earth	3.1 Payment
1.5 Incorporation of Erosion Control Features	

- 1.1 DESCRIPTION.** The WORK consists of construction and maintaining temporary erosion control features shown on the plans or as directed by the ENGINEER. Installation of temporary erosion control features shall be coordinated with construction of permanent erosion control features to the extent necessary to ensure economical, effective and continuous control of erosion and water pollution throughout the life of the contract.

The CONTRACTOR shall be responsible for initiating, preparing, implementing and maintaining a Storm Water Pollution Prevention Plan in accordance with current governing regulations and guidelines. The use of erosion control features or methods in addition to those in the contract shall be as directed by the ENGINEER. The CONTRACTOR shall be solely responsible for updating the erosion control plan when new erosion control items are installed on the project site.

The Notice of Intent will be submitted by the CONTRACTOR to the Louisiana Department of Environmental Quality (DEQ) 2 days prior to the start of construction. The CONTRACTOR will complete and submit the Notice of Termination to the Louisiana Department of Environmental Quality (DEQ) after the project is complete.

- 1.2 MATERIALS.** Materials not covered by project specifications shall meet commercial grade standards and shall be approved before being incorporated into the PROJECT. No testing of materials used in temporary erosion control features will be required. Acceptability of temporary erosion control materials will be by visual inspections.
- (1) **SEEDING.** Grass shall be approved quick-growing species suitable to the area, providing a temporary cover, which will not complete with permanent grasses. Rye grass is the only acceptable grass for winter cover.
  - (2) **SILT FENCING.** Silt fencing shall be wire-supported or self-supported systems. Other silt fencing may be used when approved by the ENGINEER.
    - (A) **WIRE SUPPORTED.** Wire supported silt fencing shall consist of standard woven livestock wire of minimum 14 gage wire, a minimum of 36 inches in height with a maximum wire spacing of 6 inches. Post shall be either wood or steel installed a minimum of 2' in the ground. Filter material shall be approved geotextile fabric. Geotextile fabric

shall comply with Section 1019, Type F or the Louisiana Department of Transportation Standard Specifications for roads and Bridges, Latest Edition.

- (B) SELF-SUPPORTING. Self-supporting silt fencing shall consist of an approved geotextile fabric suitably attached to posts of either wood or steel installed in accordance with plan details. Geotextile fabric shall comply with Section 1019, Type G of the Louisiana Standard specifications for Roads and Bridges, Latest Edition.
- (3) HAYBALES. Hay or Straw bales shall be rectangular bales generally free from noxious weeds or spoil grasses, acceptable to the ENGINEER. The average length of bales shall be 36 inches with a minimum approved weight of 50 pounds.

### 1.3 CONTROL OF ERODIBLE SOIL.

- (1) GENERAL. The CONTRACTOR shall prevent the transmission of soil particles into streams, canals, lakes, reservoirs, bayous or other waterways.

Except as necessary for construction, excavated material shall not be deposited into streams, wetlands or impoundments, or in a position close enough to be washed in waterways by high water or runoff.

The CONTRACTOR shall not disturb lands or waters outside the limits of the project and designated areas to be cleared, except as authorized by the ENGINEER.

- (2) ADJACENT TO WATERWAYS. Stream banks shall be kept in their natural state. The CONTRACTOR shall not unnecessarily strip protective vegetation in the vicinity of stream banks and shall conduct operations without damage to banks. Banks shall not be excavated except as shown on the plans or as otherwise approved in writing. Work roads requiring bank cuts shall be approved by the ENGINEER prior to making such cuts. The banks shall be restored by the CONTRACTOR to the satisfaction of the ENGINEER.

- 1.4 EXPOSURE OF ERODIBLE EARTH. The ENGINEER may direct the CONTRACTOR to provide immediate permanent or temporary erosion or pollution control measures to prevent contamination of streams, lakes, bayous, reservoirs, canals or other impoundments or prevent detrimental effects on property outside the project site and damage to the project. Limitations of areas in which clearing and grubbing operations are underway shall be commensurate with the CONTRACTORS capability and progress in keeping finish grading, temporary erosion control, and permanent erosion control measures in accordance with the established Storm Water Pollution Prevention Plan (SWPPP).

**1.5 INCORPORATION OF EROSION CONTROL FEATURES.** Use of temporary erosion control features will be authorized to correct unforeseen conditions that develop during construction; to control erosion prior to the time it is practical to construct permanent control features; or to provide immediate temporary control of erosion that develops during normal construction operations but is not associated with permanent erosion control features. Permanent erosion control features shall be incorporated into the project at the earliest practical time.

**1.6 CONSTRUCTION REQUIREMENTS.**

- (1) GENERAL. Provide permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction according to the contract erosion control plan, and the Louisiana Department of Environmental Quality (DEQ), Louisiana Pollutant Discharge Elimination System (LPDES) and Stormwater General Permit for Large Construction Activities, Permit NO. LAR 100000.

Temporary erosion control features shall consist of, but not limited to, temporary seeding, sediment check dams, silt fence and stone entrances. The ENGINEER may direct use of temporary erosion control features or methods other than those included in the original contract. Soil deposits outside the designated areas to be cleared shall be immediately removed and the surface repaired at no direct payment. The ENGINEER shall have the authority to require the contractor's operations to be discontinued until erosion deposits have been cleared and the area restored.

- (a) Temporary Seeding. Temporary Seeding shall meet the requirements of Section 810 "Seeding" of these SPECIFICATIONS.
- (b) Baled Straw or Hay. Baled straw or hay shall be placed as directed to form checks or dams to control erosion or siltation. Bales shall be properly staked or otherwise secured as directed, as shown on the plans. The bales shall be buried as necessary to prevent scour under the bales. A minimum of 2 stakes shall be driven through each bale. Baled straw or Hay shall be used only with the approval of the ENGINEER.
- (c) Silt Fencing. Silt fencing shall be furnished and constructed at designated locations or other locations, as directed by the ENGINEER.
- (d) Temporary Stone Construction Entrance. The construction entrance shall be maintained to allow removal of mud from the tires.
- (e) Maintenance of Erosion Control Features. Temporary erosion control devices shall be inspected, maintained and replaced when needed by the CONTRACTOR at no direct payment.

- (2) Controls and Limitations on Work. The first item that the CONTRACTOR shall be required to complete is to clear and grub areas that will receive the erosion control features. After the erosion control features are installed at the locations shown on the Storm Water Pollution Prevention Plan (SWPPP), the CONTRACTOR can proceed with the remaining clearing and grubbing operations.

Construct erosion control and sediment control measures as follows:

- (a) Apply permanent seed and fertilizer to the finished cleared, grubbed and re-graded area within 14 days.
- (b) Apply temporary seed or other approved measures on disturbed areas within 14 days after the last disturbance except where the area will be disturbed within 21 days after last disturbance.
- (c) Construct outlet protection for culverts.
- (d) Following each day's grading operation, shape earthwork to minimize and control erosion from storm runoff.
- (e) Modify the type, size or location of erosion control devices and measures as required to meet the intended erosion and pollution control specified in the SWPPP.

- 1.7 PROTECTION DURING SUSPENSION OF OPERATIONS.** Prior to the suspension of operations, the CONTRACTOR shall shape the top of the earthwork in such a manner as to permit runoff of rainwater and shall construct earth berms along the top edges of embankments to intercept runoff. Temporary slope drains shall be provided in the earth berms to carry runoff. When such preventive measures fail, the CONTRACTOR shall immediately take other action as necessary to prevent erosion and siltation. The ENGINEER may direct the CONTRACTOR to perform other erosion control work during suspensions of contract time.

In case of failure of the CONTRACTOR to control erosion or siltation, the ENGINEER may employ outside assistance or use City of Alexandria forces to provide the necessary corrective measures and the cost thereof will be deducted from payments for the work. Partial payments will be withheld until satisfactory temporary erosion control is established. Once the ENGINEER has verbally notified the CONTRACTOR, he shall have three days to repair or replace deficient erosion control devices and/or install additional erosion control devices.

- 2.1 MEASUREMENT.** Erosion Control shall not be measured for payment. Erosion Control shall include all necessary labor, materials and equipment to install the Erosion Control as per these SPECIFICATIONS, as shown on the DRAWINGS or as directed by the ENGINEER. The DRAWINGS show only the minimum Erosion Control required. The CONTRACTOR shall install any additional Erosion Control

items required to prevent any soil from leaving the site at no additional cost to the City of Alexandria.

- 3.1 PAYMENT.** Payment for Erosion Control shall be made at the CONTRACT Lump Sum price. This price shall include all necessary labor, material and equipment to install and maintain the Erosion Control items for the life of the PROJECT. The ENGINEER will determine to percentage of this item to be paid per Pay Request.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
340-01	Erosion Control	Lump Sum

**SECTION 410 CRUSHED LIMESTONE BASE WITH GEOTEXTILE**

- |                                       |                              |
|---------------------------------------|------------------------------|
| 1.1 Description                       | 1.6 Compacting and Finishing |
| 1.2 Materials                         | 1.7 Dimensional Tolerances   |
| 1.3 Equipment                         | 2.1 Measurement              |
| 1.4 General Construction Requirements | 3.1 Payment                  |
| 1.5 Placing Materials                 |                              |

- 1.1 DESCRIPTION.** This work consists of furnishing and placing a crushed limestone base course on a prepared surface in accordance with these specifications, in conformity with the lines, grades, thickness, and typical sections shown on the PLANS or established by the ENGINEER.
- 1.2 MATERIALS.** Crushed limestone base course material shall be a uniform blend, sampled in dedicated stockpiles and approved prior to placement.
- 1.2.1 Crushed Limestone. This material shall be a uniform blend and consist of 100 percent limestone and shall comply with the following gradations:

U.S. Sieve	Percent Passing by Weight
1 1/2"	100
1"	90-100
3/4"	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-15

The fraction of stone passing the No. 40 Sieve shall comply with the following requirements.

Liquid Limit (Max.)	25
Plasticity Index (Max.)	4

Stone shall comply with Subsection 1003.01 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- 1.2.2 Geotextile Fabric. Geotextile fabric shall comply with and be installed in accordance with the latest edition of the Louisiana Standard Specifications for Roads and Bridges, Latest Edition, Section 1019.
- 1.3 EQUIPMENT.** Equipment will be approved prior to use.
- 1.3.1 Equipment used to mix crushed limestone shall produce a uniform blend conforming to the requirements elsewhere herein.

- 1.3.2 Crushed limestone shall be hauled in trucks with tight, smooth beds of sufficient size and condition to prevent segregation and the loss of material.
- 1.3.3 Crushed limestone compaction equipment shall be designed for the compaction of these materials and may be static or vibratory. Finish rolling shall be with static, smooth steel-wheel or pneumatic tire rollers. Pneumatic tires shall have smooth tread, shall be of the same size and ply rating, shall be inflated to a uniform pressure not varying more than plus or minus ( $\pm$ ) five (5) psi between tires. Wheels shall not wobble and shall be aligned such that gaps between tires on one axle are covered by tires of the other axle.
- 1.3.4 Vibratory rollers will not be permitted for use when it is detrimental to the underlying materials or in areas with high water table.
- 1.3.5 Small and irregular base course sections may be compacted by other approved methods.
- 1.4 CONSTRUCTION REQUIREMENTS.** Crushed limestone shall not segregate during construction. Water added to facilitate compaction shall not cause moisture damage to the subgrade layer.
- 1.4.1 Crushed limestone shall be sampled, tested, and approved from dedicated stockpiles prior to placement on the subgrade.
- 1.4.2 The CONTRACTOR shall control the selection, placement, compaction, moisture content, density, thickness, width, surface finish, and grade so that the completed base course is uniform and conforms to plan dimensions and other acceptance requirements as provided herein. The base course shall be constructed so that contamination, segregation, soft spots, wet spots, and other deficiencies are prevented. The CONTRACTOR shall perform tests to control moisture content, thickness, width, and density.
- 1.4.3 The CONTRACTOR shall construct base courses to the specified thicknesses and widths as set forth in the PLANS or established by the ENGINEER and shall construct base courses in such a manner as to meet the minimum tolerances as set forth in these SPECIFICATIONS.
- 1.4.4 Installation shall conform to Section 301, Class 1 Base Course of the Louisiana Standard Specifications for Roads and Bridges, latest edition.
- 1.5 PLACING MATERIALS.** The material shall be placed directly on geotextile fabric that is placed on a prepared and approved sub-grade. Geotextile fabric shall not be placed on damaged sub-grade until repairs have been completed and approved by the ENGINEER.

Base course materials shall not be placed or spread on adjacent Portland Cement Concrete or Asphaltic Concrete Pavements. Base course operations

shall be conducted so that pavement surfaces, edges, and joints are not damaged.

- 1.6 COMPACTING AND FINISHING.** The subgrade shall be proof rolled prior to installation of base course materials. Unstable areas designated by the ENGINEER to have suitable material that can be stabilized shall be scarified, dried and compacted until the existing sub-base is acceptable. This repair shall be done at no additional cost to the CITY OF ALEXANDRIA. Unstable areas and failures in the subbase layer, designated by the ENGINEER to be unsuitable material shall be removed and replaced with a class A-2-4 soil commonly known as "Red Dirt", as defined in Section 330 "Excavation and Embankment" of these SPECIFICATIONS.
- 1.6.1 Base material shall be shaped by suitable means and compacted. Base course materials shall be compacted to 95% of maximum dry weight density as determined by testing in accordance with the Louisiana Department of Transportation and Development Designation TR-418-98 (English Version) Method G.
- 1.6.2 Base material shall be shaped by suitable means and compacted. Shaping and compacting shall continue until the surface conforms to the required sections and is free from ruts and waves.
- 1.7 DIMENSIONAL TOLERANCES.** Areas with thickness and width deficiencies in excess of the following tolerances shall be corrected to plan or established dimensions by furnishing, placing, reworking, shaping, and compacting additional materials as required at no direct pay.
- 1.7.1 Thickness. Under-thickness shall not exceed one-half inch ( $\frac{1}{2}$ "). Over-thickness may be waived at no additional cost to the City of Alexandria.
- 1.7.2 Width. No tolerances are provided for underwidths of street base courses. Street base course shall not vary from plan width in excess of plus (+) six inches (6"). Over-width may be waived at no additional cost to the City of Alexandria
- 2.1 MEASUREMENT.** Crushed limestone base course shall be placed to the required thickness and shall be measured by the square yard of crushed limestone base course completed and accepted. Geotextile fabric will not be measured and shall be considered incidental to the Crushed limestone base course. Crushed limestone for Traffic Control shall be measured per ton of material delivered and spread on the PROJECT. Certified delivery tickets shall be provided at the time of delivery.
- 3.1 PAYMENT.** Payment for crushed limestone base course will be made at the CONTRACT unit price per square yard, which price and payment shall constitute full compensation for furnishing all materials, including Geotextile fabric, equipment, tools, labor, hauling, traffic control, signs, barricades, safety items, preparation of subbase, furnishing, placing and compacting required base

materials, water, and incidentals necessary to complete the WORK. Where sub-base is designated to be unsuitable material, remove and replace of the unsuitable material will be made at the contract unit price of the associated items. Crushed Limestone for Traffic Control shall be paid at the CONTRACT unit price per ton delivered and spread on the PROJECT.

Payment will be made under:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
410-01-(thick)	Crushed Limestone Base (thick)	Square Yards
410-02	Crushed Limestone for Traffic Control	Ton

**SECTION 420 SOIL CEMENT BASE**

- |                               |                              |
|-------------------------------|------------------------------|
| 1.1 Description               | 1.5 Compacting and Finishing |
| 1.2 Materials                 | 1.6 Protecting and Curing    |
| 1.3 Equipment                 | 2.1 Measurement              |
| 1.4 Construction Requirements | 3.1 Payment                  |

**1.1 DESCRIPTION.** This WORK shall consist of furnishing the necessary labor, materials and equipment to perform the work of stabilizing soil with Portland Cement. The WORK shall be performed on a prepared surface in accordance with these SPECIFICATIONS, in conformity with the lines, grades, thickness and typical sections shown on the plans or as directed by the ENGINEER.

**1.2 MATERIALS.** Soils for soil cement base course shall consist of materials that will stabilize with cement in accordance with DOTD TR 432. Such materials are those soils classified as A-1-a, A-1-b, A-2-4, A-2-6, A-4 and A-6 in accordance with DOTD TR 423. Soils with a Liquid Limit greater than 35 a Plasticity Index (PI) greater than 15 or an organic content greater than 2 percent shall not be used. Liquid Limit and Plasticity Index will be determined in accordance with DOTD TR 428. Organic Content will be determined in accordance with DOTD TR 413. Soils with over 79 percent sand or 60 percent silt when tested in accordance with DOTD TR 407 shall not be used. Soils may be blended to adjust the percentages of sand or silt to meet specification requirements. The ENGINEER will approve material prior to blending and the final product. Soils that do not meet Liquid Limit or PI requirements may be conditioned with Lime in accordance with Type I Lime Treatment as shown on Section 430 of these specifications.

Portland Cement shall be Type I or Type II as defined in Louisiana Department of Transportations Standard Specifications Section 1001.01. The quantity of Cement used shall be supported with Certified Delivery Tickets.

Portland-Pozzolan Cement shall be Type IP as defined in Louisiana Department of Transportation Standard Specifications Section 1001.02. The quantity of Cement used shall be supported with Certified Delivery Tickets.

**1.3 EQUIPMENT.** Equipment will be approved prior to use. In-place mixing equipment shall conform to Louisiana Department of Transportation Standard Specifications Subsection 303.03.

**1.4 CONSTRUCTION REQUIREMENTS.** Soils shall be combined with cement and water by in-place mixing and shaped on the subgrade. After placement of soil and prior to mixing with cement, the soil shall be shaped to required section and compacted to at least 93 percent of maximum dry density at the required grade.

The percentage of cement will be determined in accordance with DOTD TR 432 from materials sampled in-place on the project. Water needed to bring the moisture content of the mixture within the tolerance shall be added and uniformly

mixed with the materials. During the mixing process, water shall be added only through the spray bar of the in-place mixer which is adjusted to provide uniform coverage across the completed width of the roadway for the full depth of base. Wet streaks or spots will not be allowed. Depending on the type of cement and soil to be used, normal testing time to determine required cement content may require 21 calendar days.

The method of cement distribution shall be such that the amount of cement used can be readily determined. The spread rate of cement shall be determined in accordance with DOOTD TR 436.

When the moisture content is not within +/- 2.0 percent of optimum, operations shall be discontinued and will not be allowed to resume until the contractor demonstrates that moisture content is controlled within this tolerance. No more than one transport shall be placed and pulverized until moisture content is within +/- 2.0 percent of optimum.

Construction of soil cement base course will not be permitted when the subgrade is frozen, when raining or when the ambient air temperature is below 35 degrees or the temperature forecasted by the U.S. Weather Service is to be 25 degrees or less within the 24 hour period following placement.

- 1.5 COMPACTING AND FINISHING.** The finished base course shall have a smooth, uniform, closely knit surface, free from ridges, waves, laminations or loose material. The Surface shall be thoroughly rolled and finished to grade. Density requirements shall be in accordance with Section 330, 1.4.5 of these specifications.

Compaction and finishing operations shall be completed within 3 hours after initial placement of cement on base course material. Upon expiration of the 3-hour period after initial placement, only tight blading of the base course shall be allowed. Bladed material shall not be drifted along the base, but shall be wasted. Stabilized material shall be utilized in the base course except for the small amount necessary for tight blading. Excessive blading to achieve plan depth will not be allowed. The CONTRACTOR shall complete operations, including tight blading, before the next day's operation. No cement will be spread within 2 hours of sunset, unless otherwise approved by the ENGINEER.

- 1.6 PROTECTION AND CURING** Upon completion of intermediate finishing, the soil cement base shall immediately be protected against drying by applying an asphalt curing membrane in accordance with Louisiana Department of Transportation Standard Specifications, latest edition, Section 506. Asphalt curing membrane shall be placed on the same day as treatment. The CONTRACTOR shall protect the base course from damage from public traffic or the CONTRACTORS operations, and shall satisfactorily maintain the soil cement base including the asphalt curing membrane. Damage to the soil cement base shall be repaired by the contractor at no cost to the CITY OF ALEXANDRIA. When patching of the base is required, in addition to removing damaged and

unsound base course, the contractor shall remove a sufficient width and depth of base course to ensure satisfactory placement of patching material.

Neither public traffic nor construction traffic shall be allowed on the completed base course during a 72 hour curing period. Prior to surface construction, the CONTRACTOR shall correct deficiencies, clean the base course surface, repair any damages caused by traffic, and apply and maintain additional asphalt curing membrane or prime coat as directed at no direct pay.

When the surface is asphalt concrete, the first lift of surfacing shall be placed within 30 calendar days.

**2.1 MEASUREMENT.** Processing Cement shall be measured by the Square Yard for soil cement mixing completed in accordance with these SPECIFICATIONS.

2.1.1 Portland Cement or Portland-Pozzolan Cement will be measured by the Ton for cement delivered, spread and mixed in the soil in accordance with these SPECIFICATIONS. The measurement will be made by certified weight on the delivery tickets.

**3.1 PAYMENT.** Processing Cement shall be paid at the CONTRACT unit price per Square Yard of mixing soil with cement completed and accepted in accordance with these SPECIFICATIONS.

3.1.1 Portland Cement or Portland-Pozzolan Cement shall be paid at the CONTRACT unit price per Ton delivered spread and accepted in accordance with these SPECIFICATIONS. Payment will be made at the certified weight shown on the delivery ticket.

Payment will be made under the following:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
420-01	Cement for Cement Stabilization	Ton
420-02-(thick)	Processing Cement (thick)	Square Yard

**SECTION 430 LIME TREATMENT**

- |                               |                              |
|-------------------------------|------------------------------|
| 1.1 Description               | 1.5 Compacting and Finishing |
| 1.2 Materials                 | 1.6 Protecting and Curing    |
| 1.3 Equipment                 | 2.1 Measurement              |
| 1.4 Construction Requirements | 3.1 Payment                  |

**1.1 DESCRIPTION.** This WORK shall consist of treating soil or aggregate with lime and water in accordance with these SPECIFICATIONS, in conformity with the lines, grades, thickness, and sections shown on the DRAWINGS or as directed by the ENGINEER.

**1.2 MATERIALS.** Lime shall comply with Louisiana Department of Transportation Standard Specifications, latest edition, Subsection 1018.03. Emulsified Asphalt for curing shall comply with Louisiana Department of Transportation Standard Specifications, latest edition, Section 1002.

In order to meet air quality standards, the contractor may be required to use lime slurry or granular lime in dust sensitive areas at no direct pay. The ENGINEER will determine dust sensitive areas.

**1.3 EQUIPMENT.** Equipment will be approved prior to use. In place-mixing equipment shall conform to Louisiana Department of Transportation Standard Specifications, latest edition, Subsection 303.03.

In certain cases, such as lime treatment used for drying of soils, the ENGINEER may approve other equipment. This equipment must be approved by the ENGINEER prior to use.

**1.4 CONSTRUCTION REQUIREMENTS.** Lime shall be protected from moisture prior to use. Water shall be added as needed during mixing and remixing operations, during the curing period and to keep the cured material uniformly moist until covered.

When granular quicklime is applied in dry form, precautions shall be taken to prevent injury to persons, livestock and plants. Quicklime spilled or deposited outside the areas designated for treatment shall be immediately collected or buried.

Lime shall not be applied on a frozen foundation or when the ambient air temperature is below 35 degrees.

**1.4.1** Type I lime stabilization shall be used for base or subbase and conditioning for cement treatment or stabilization. When Type I lime stabilization is used, the lime shall be spread, initially mixed with the soil, watered, sealed and allowed to mellow for at least 48 hours. After the initial mixing and 48 hour mellowing period, the lime and soil mixture shall be remixed until pulverization is obtained meeting Louisiana Department of Transportation Standard Specifications, latest

edition, Subsection 304.06. It shall then be compacted, finished and maintained in accordance with the Protection and Curing section of these SPECIFICATIONS or as directed by the ENGINEER. The percentage of lime to be used shall be determined by DOTD TR 416. After treatment the treated soil shall have a maximum Liquid Limit of 40 and a maximum PI of 10 when used as base or subbase. When used as treatment for soil cement stabilization, it shall have a maximum Liquid Limit of 35 and a maximum PI of 15.

- 1.4.2 Type II lime stabilization shall be used for working table treatment under an embankment or for conditioning and drying of subgrades under a base. The lime shall be spread, mixed, watered and shaped to the satisfaction of the ENGINEER. The percentage of lime to be used will be determined by the ENGINEER.

- 1.5 **COMPACTING AND FINISHING.** For Type I lime treatment used for base or subbase, after pulverization requirements are met, the mixture shall be uniformly compacted to at least 95 percent of maximum dry density. The maximum dry weight density will be determined by DOTD TR 415 or TR 418 and the in-place density in accordance with DOTD TR 401. The compaction and finishing operations shall be completed within 6 hours after meeting pulverization requirements. The number of tests required will be determined by the ENGINEER. At places inaccessible to rollers, such as edges adjacent to curb and gutters, the mixture shall be compacted using devices that will obtain uniform compaction to required density without damage to the adjacent structure. Any section not meeting the density requirements shall be reconstructed in accordance with these specifications at no direct pay. Reconstruction shall include the additional of the specified amount of lime.

The lime shall be finished to meet grade and cross-slope requirements and shall have a smooth, uniform, closely knit surface, free from ridges, waves, loose material or laitance.

For Type I lime treatment used for conditioning soil for cement stabilization the CONTRACTOR shall make reasonable efforts to meet the requirements above. The ENGINEER will determine if a reasonable effort has been made.

For Type II lime treatment the material shall be uniformly mixed, compacted and finished to the satisfaction of the ENGINEER. The CONTRACTOR shall make reasonable efforts to meet the requirements above. The ENGINEER will determine if a reasonable effort has been made.

- 1.6 **PROTECTION AND CURING** Upon completion of intermediate finishing, the lime treated soil shall immediately be protected against rapid drying for a period of 72 hours. If lime treatment is to be used as base, it shall be protected with Emulsified Asphalt. The CONTRACTOR shall protect the lime treatment from damage from public traffic or the CONTRACTORS operations. Damage to the lime treatment shall be repaired by the contractor at no cost to the CITY OF ALEXANDRIA.

Neither public traffic nor construction traffic shall be allowed on the completed lime treatment during a 72 hour curing period.

When the surface is asphalt concrete, the first lift of surfacing shall be placed within 30 calendar days.

**2.1 MEASUREMENT.** Processing lime into the soil shall be measured by the Square Yard for lime-soil mixing completed in accordance with these SPECIFICATIONS.

2.1.1 Lime will be measured by the Ton for cement delivered, spread and mixed in the soil in accordance with these SPECIFICATIONS. The measurement will be made by certified weight on the delivery tickets.

**3.2 PAYMENT.** Processing lime shall be paid at the CONTRACT unit price per Square Yard processing lime completed and accepted in accordance with these SPECIFICATIONS. The unit price shall include the Emulsified Asphalt if Required.

3.1.1 Lime shall be paid at the CONTRACT unit price per Ton delivered spread and accepted in accordance with these SPECIFICATIONS. Payment will be made at the certified weight shown on the delivery ticket.

Payment will be made under the following:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
430-01	Lime for Lime Stabilization	Ton
430-02-(thick)	Processing Lime (thick)	Square Yard

**SECTION 510 ASPHALT CONCRETE PAVEMENT**

- |                                       |   |
|---------------------------------------|---|
| 1.1 Description                       | 1.6 Asph. Concrete Equip. and Processes |
| 1.2 Reference Standard                | Standard Specification Amendments       |
| 1.3 Asphaltic Concrete Mix Design     | 1.7 Asphaltic Tack Coat Standard        |
| 1.4 General Construction Requirements | Specification Amendments                |
| 1.5 Asphaltic Concrete Specification  | 2.1 Measurement                         |
| Amendments                            | 3.1 Payment                             |

**1.1 DESCRIPTION.** This WORK shall consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot in conformance with these specifications and in conformity with the lines, grades, thicknesses, and typical sections shown on the PLANS or established by the ENGINEER.

**1.2 REFERENCE STANDARD.** Asphaltic Concrete shall conform to the following sections of the Louisiana Standard Specifications for Roads and Bridges, latest edition, except as modified herein:

Section 502 – Asphaltic Concrete Mixtures  
 Section 503 – Asphaltic Concrete Equipment and Processes  
 Section 504 – Asphalt Tack Coat  
 Section 505 – Asphalt Prime Coat

**1.3 ASPHALTIC CONCRETE MIX DESIGN.** The CONTRACTOR shall submit a job mix formula for the ENGINEER'S approval at least five (5) days prior to commencement of the lay down operation. It will be permissible to submit mix designs that were used on previous LA DOTD projects and are approved by a District Lab Engineer.

**1.4 GENERAL CONSTRUCTION REQUIREMENTS.**

1.4.1 CONTRACTOR shall remove any existing raised pavement markers prior to asphaltic concrete overlay operations and no direct payment will be made thereof.

1.4.2 Where the existing street does not have curbs, the CONTRACTOR will place a string line in order to form neat lines for the paver to follow. The paver shall be positioned and operated to closely follow the established line. Irregularities in alignment shall be corrected by trimming or filling directly behind the paver. The string line shall closely follow the layout of the outer edges of the existing street. The CONTRACTOR shall take an average of the outer edge of the existing asphalt in each stretch of three hundred feet (300') to eliminate irregularities. Under no circumstances shall the overlay be permitted to extend beyond the limits of the existing pavement outer edge.

1.4.3 Under this item the CONTRACTOR shall blade back existing grass, gravel and shoulder material to allow for a clean laying surface. Unsuitable material shall be separated from the bladed material. After placement of the asphaltic concrete

and construction of the new shoulder, the laid back material, having been suitably separated, shall be neatly bladed back to the new edge. The materials shall be reshaped, and blended and bladed with several passes with a motor grader or box blade, until a suitable and neat appearance is obtained.

- 1.4.4 Asphaltic concrete overlays of stone and recycled portland cement concrete base courses shall be covered with asphalt prime coat, in accordance with Section 505 of the Louisiana Standard Specifications for Roads and Bridges, latest edition, as soon as practical to avoid water infiltration due to rainfall. Complete coverage of asphalt prime coat shall be maintained from initial application until the placement of the next course.
- 1.4.5 Driveway aprons shall extend into the existing driveways a minimum of two feet (2') past the specified overlay width and shall cover the entire driveway width. Apron overlay material shall be tapered in such a manner that will produce a smooth transition to the existing driveway surface. Where existing gravel driveways are encountered, the CONTRACTOR shall excavate a minimum of six inches (6") below the proposed finished grade of the roadway, prior to placement of the two feet (2') wide pavement section for the driveway.
- 1.4.6 Existing Asphaltic Pavement Intersecting Streets shall be overlaid approximately fifteen feet (15') past the specified overlay width and shall cover the entire street width or as directed by the ENGINEER. When cold planing asphaltic pavement is not a designated item on a PROJECT, street apron overlay material shall be tapered in such a manner that will produce a smooth transition to the existing street surface.
- 1.4.7 The roadway surface must be clean and free of debris and the condition of the surface must be approved by the inspector prior to the placing of the tack coat or the mixture.
- 1.4.8 Asphaltic Concrete shall be covered during transit with canvas, or other covering material, which shall retain the desired temperature. Temperatures for Asphaltic Concrete shall be no less than two hundred fifty degrees Fahrenheit (250° F) or what the job mix formula allows.
- 1.4.9 Care will be taken in the placement of the asphaltic tack coat so it will be applied only to areas and surfaces that will be overlaid with asphaltic concrete. The tack coat over-spray will not be permitted to spread on curbs, sidewalks, cars, etc. It will be the CONTRACTOR'S responsibility to clean and/or remove excessive tack coat over-spray.
- 1.4.10 Where the ENGINEER determines that a leveling course of asphaltic concrete is required to provide a suitable surface for application of the overlay; the CONTRACTOR shall make such application of leveling course or courses, with the surface asphalt mix as specified for the wearing course.

- 1.5 ASPHALTIC CONCRETE SPECIFICATION AMENDMENTS.** Asphaltic Concrete for overlays, driveways, turnouts, parking areas, and leveling courses shall conform to Section 502 “Superpave Asphaltic Concrete Mixtures” and referenced Sections and Sub-sections of the Louisiana Standard Specification for Roads and Bridges, latest edition, except as modified herein.
- 1.5.1 Subsection 502.08(b) “Paving Operations” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:  
Add the following:  
“A material transfer vehicle will not be required for paving operations.”
- 1.5.2 Subsection 502.09(c) “Hand Compaction” of the Louisiana Standard Specification for Roads and Bridges, latest edition is deleted and the following added:  
“The use of a vibratory plate compactor, minimum two thousand pound (2000lb) exciter force, is required along curbs, around manholes and valve boxes and in all locations that cannot be satisfactorily compacted by rollers.”
- 1.5.3 Subsection 502.11(a) “Roadway Acceptance” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:  
Add the following:  
“Cores shall be transported to the designated testing laboratory in approved styrofoam transport containers or one-gallon friction-top cans.”
- 1.5.4 Subsection 502.10 “Surface Tolerance Requirements”, of Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:  
Add the following:  
“The longitudinal surface tolerance of the wearing course for all roadway sections, shoulders, drives, turnouts, tie-ins, crossovers, and parking areas shall be tested with an approved ten foot (10’) metal static straight edge and the surface deviations shall not exceed one-half inch ( $\frac{1}{2}$ ”).”
- Areas with surface deviations in excess of one-half inch ( $\frac{1}{2}$ ”) shall be isolated and corrected by the CONTRACTOR in accordance with subsection 502.10(4) of the Louisiana Standard Specification for Roads and Bridges, latest edition.
- 1.5.5 Subsection 502.10 – “Surface Tolerance Requirements”, of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:  
Add the following:  
“The ENGINEER will determine the locations and lengths of pavement sections which are not within tolerance. Pavement sections, which are in excess of one-half inch ( $\frac{1}{2}$ ”) in ten feet (10’), shall be corrected. There will not be an option for out of tolerance sections to remain in place with a \$500.00 per bump rebate.”
- 1.5.6 Subsection 502.10 – “Surface Tolerance Requirements”, of Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:  
Add the following:

“Areas within the street or roadway that pond water on the wearing course shall be corrected by the CONTRACTOR at no additional cost to the City of Alexandria. Areas shall be corrected until pond areas can sufficiently drain. Diamond grinding of these deficient areas shall be done in accordance with Section 502.10(4) of the Louisiana Standard Specification for Roads and Bridges, latest edition.”

- 1.5.7 Subsection 502.11 – “Acceptance Requirements”, of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

Add the following:

“Roadway density requirements will not be applied for short irregular sections, such as drives, aprons, turnouts and leveling courses; however, mix shall be placed in such a manner as to provide a neat and uniform appearance and shall be compacted by methods satisfactory to the ENGINEER.”

- 1.5.8 Subsection 502.11 – “Acceptance Requirements”, of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

Add the following:

Testing of Marshall Stability, Anti-Strip Additive, Aggregate Gradation, and Pavement Density shall be done by an independent testing LABORATORY paid for by the City of Alexandria. When an individual test or the average of tests representing the lot is outside acceptance limits shown in Tables 502-4 through 502-6, an adjustment in unit price for the lot will be made in accordance with Tables 502-7, 502-8a and 502-8b of the Louisiana Standard Specification for Roads and Bridges, latest edition. After placement and compaction of asphalt concrete, the CONTRACTOR shall core five (5) pavement samples per lot where designated by the ENGINEER within twenty-four (24) hours after placement of mix.

## **1.6 ASPHALTIC CONCRETE EQUIPMENT AND PROCESSES STANDARD SPECIFICATION AMENDMENTS.**

Subsection 503.18: “Miscellaneous Equipment and Hand Tools” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

Add the following:

“The use of a vibratory plate compactor, minimum two thousand pound (2000lb) exciter force, is required along curbs, around manholes and valve boxes and in all locations that cannot be satisfactorily compacted by rollers.”

## **1.7 ASPHALTIC TACK COAT STANDARD SPECIFICATION AMENDMENTS.**

- 1.7.1 Subsection 504.06 “Application” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

“Tack coat shall be applied in such a manner as to cause the least inconvenience to traffic. For asphaltic concrete overlay course, the tack coat shall be applied on the same day as the mixture lay-down.”

- 1.7.2 Subsection 505.06 “Application” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

Add the following:

“For asphaltic concrete paving courses on reconstructed base, the CONTRACTOR shall apply the primer coat in a timely manner as soon as the surface has been satisfactorily prepared and is dry. If primer coat has been damaged by traffic pick-up, or contamination by dirt, dust or mud, the surface shall be cleaned and re-primed prior to the mixture lay-down.”

- 1.7.3 Subsection 505.06 “Application” of the Louisiana Standard Specification for Roads and Bridges, latest edition is amended as follows:

Add the following:

“Prime coat shall extend six inches (6”) beyond the width of newly installed base courses and/or cement treated base courses unless curb or curb and gutter sections are adjacent to the travel lane. Prime coat over-spray will not be permitted to spread on curbs, sidewalks, cars, etc. It will be the CONTRACTOR’S responsibility to clean and/or remove excessive prime coat over-spray.

- 2.1 MEASUREMENT.** Cleaning, removing and reshaping of material along the edges of the pavement, tack coat, prime coat, and curing membrane will not be measured for payment. Asphaltic Concrete Overlay, Leveling, Driveways, Cross Overs, Turnouts, and Transitions satisfactorily completed and accepted as specified or established will be measured by the ton of two thousand pounds (2000lbs).

- 2.1.1 Stamped printer tickets (haul tickets) will be issued for each truckload of material delivered. Haul tickets showing the weight of the asphalt in tons shall be furnished to the inspector on the job and shall serve as the basis of payment. That portion of material lost, wasted, rejected or applied contrary to these SPECIFICATIONS will not be measured for payment.

- 2.1.2 Cost of cleaning up and hauling off all asphalt waste will not be measured for payment. The asphalt waste will be cleaned up and hauled off at the end of each day’s operation. No asphaltic material will be allowed to remain on the natural ground, sidewalks and/or adjacent streets.

- 2.1.3 All taxes that may be levied under existing local, STATE and federal laws shall also be included in the price per ton of asphaltic concrete.

- 3.1 PAYMENT.** Asphaltic Concrete Overlay, Leveling, Driveways, Parking Areas, Turnouts, Cross Overs, and Transitions in place and accepted, measured as provided above, will be paid at the CONTRACT unit price per ton on a lot basis, which price and payment shall constitute full compensation for applying tack coat or prime coat to the surface of the pavement; for furnishing materials; for heating, mixing, hauling, placing, and compacting the materials; and for all labor, tools, equipment, safety items and incidentals necessary to complete the work in

accordance with the SPECIFICATIONS. When the mix does not conform to acceptance requirements, payment will be made at an adjusted price per unit of measure in accordance with Section 1002 and Tables 502-7, 502-8a and 502-8b for both plant and roadway acceptance in accordance with the Louisiana Standard Specification for Roads and Bridges, latest edition.

Payment will be made under the following:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
510-01	Superpave Asphalt	Ton
510-01-(thick)	Superpave Asphalt (thick)	Square Yard

**SECTION 520 ASPHALT CONCRETE PAVEMENT PATCHING**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Materials                         | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** This item shall consist of patching an existing asphalt roadway, shoulder, and/or City of Alexandria property using limestone, Portland cement concrete, or an asphaltic concrete material. The CONTRACTOR shall furnish all labor, materials, tools, and equipment necessary to remove and replace existing pavements in accordance with these SPECIFICATIONS and to the lines, grades and typical sections or thicknesses as shown in the PLANS or as directed by the ENGINEER.

**1.2 MATERIALS.**

- 1.2.1 Portland Cement Concrete for patching shall comply with Section 620 "Concrete" of these SPECIFICATIONS.
- 1.2.2 Steel Reinforcement shall comply with Section 630 "Reinforcing Steel" of these SPECIFICATIONS.
- 1.2.3 Asphaltic concrete for patching may be any type mixture listed in Section 502 of the Louisiana Standard Specifications for Roads and Bridges, latest edition. Asphaltic tack coat shall comply with Section 504 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.
- 1.2.4 Limestone. This material shall consist of 100 percent limestone and shall comply with the following gradation:

U.S. Sieve	Percent Passing by Weight
1 1/2"	100
1"	90-100
3/4"	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

The fraction of stone passing the No. 40 Sieve shall comply with the following requirements.

Liquid Limit (Max.)	25
Plasticity Index (Max.)	4

Stone shall comply with Subsection 1003.01 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- 1.3 GENERAL CONSTRUCTION REQUIREMENTS.** Unstable areas and base failures in existing roadways and shoulders, designated by the ENGINEER to be repaired, shall be removed to provide firm vertical sides and a firm, stable, bottom generally parallel with the existing surface to the specified depth. All loose or foreign material shall be removed from the hole and the sub-grade shall be graded and compacted uniformly. Prior to installation of patching material, the vertical sides of the hole shall be swept clean of all loose material and debris.
- 1.3.1 The ENGINEER will determine the depth and type of patching material to be used on a PROJECT. The CONTRACTOR shall construct pavement patches to specified depths using the following types of material:
- (A) Portland Cement Concrete (6" minimum thickness)
  - (B) Portland Cement Concrete with No. 4 rebar (12" O.C. both ways) (6" minimum thickness)
  - (C) Stone or Recycled Portland Cement Concrete (9" minimum thickness)
  - (D) Asphaltic Concrete Material with tack coat (9" minimum thickness)
- 1.3.2 Contact surfaces of pavement to receive pavement patching material shall be cleaned. A uniform coat of asphaltic tack coat shall be applied to contact surfaces before asphaltic concrete is placed against them. Asphaltic Concrete Hot Mix Binder or Surface Course shall be placed in the hole in uniform layers, not to exceed four inches (4") loose measurement. Compaction, satisfactory to the ENGINEER, shall be accomplished with a mechanical tamper or other approved methods. The finished surface shall be smooth and level with the surrounding surface.
- 1.3.3 Patches shall be finished flush with the existing or cold planed surface. Tack coat shall be applied to the surface of concrete patches prior to overlay in accordance with Section 504 of the Louisiana Standard Specifications for Roads and Bridges, latest edition. A prime coat shall be applied to the surface of limestone patches in accordance with Section 505 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.
- 1.3.4 Curing.
- (A) Overlay of Asphalt Concrete patches shall proceed as soon as possible after the completion of the patching work on the street.
  - (B) Portland Cement Concrete patches shall cure at least three (3) days prior to overlay.
  - (C) Overlay of limestone patches shall proceed as soon as possible after the completion of the patching work on the street.
- 1.3.5 The contractor shall patch existing roadways in one travel lane at a time, in order to not impede the flow of through and local traffic. Holes that will be left

unattended during working hours shall be properly marked with signs, barrels, and/or barricades conforming to the M.U.T.C.D.

- 1.3.6 Removed and excavated materials shall be hauled off and disposed of in a legal manner at an approved off site location.
- 1.3.7 At the end of a workday, all excavated holes that are not filled with the required amount of patching material shall be sufficiently backfilled with a material that will sustain the safe passage of traffic until the pavement patching operation resumes.
- 2.1 MEASUREMENT.** Patching of pavement will be measured by the square yard of existing pavement designated to be removed and replaced. WORK completed, accepted and measured will be paid for at the contract unit price per square yard. The contract unit price shall be full compensation for excavation of the existing surfacing and base course; for removal and disposal of excavated material; for compaction; for tacking the excavated area, and applying tack coat or prime coat to the surface of the patch if required; for furnishing materials; for heating, mixing, hauling, placing, and compacting the materials; and for all labor, tools, equipment, and incidentals necessary to complete the WORK.
- 2.1.1 When the ENGINEER orders additional thickness of patching in excess of the specification thickness, payment for the additional thickness will be made as follows. The value per inch thickness will be determined by dividing the contract unit price per square yard by the PLAN thickness. Thickness of patches will be measured from the surface that exists at the time of patching. Payment for the additional thickness will be made at fifty percent (50%) of the value per inch thus determined.
- 2.1.2 When the ENGINEER approves of an underthickness of patching less than the required specification thickness, a deduction in payment will be made. This deduction per inch of underthickness will be made at 50 percent of the value per inch. The value per inch will be calculated by dividing the contract unit price per square yard by the required PLAN minimum thickness.
- 3.1 PAYMENT.** Payment for pavement patching will be made at the contract unit price per square yard of pavement patching completed and accepted.

Payment will be made as follows:

Item No.	Pay Item	Pay Unit
520-01	Pavement Patching	Square Yard

**SECTION 530 COLD PLANING ASPHALT PAVEMENT**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Equipment                         | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** This WORK consist of removing asphaltic concrete surfacing in accordance with these SPECIFICATIONS and in conformity with the average depth, width, grade, cross-slope and typical sections shown on the PLANS or established by the ENGINEER. Unless otherwise provided, the reclaimed pavement shall become the property of the City of Alexandria. The pavement remaining after cold planing shall provide a surface suitable for maintaining traffic.

**1.2 EQUIPMENT.** Equipment for cold planing asphaltic surfacing shall be an approved, self-propelled planing machine or grinder. They shall have sufficient power, traction and stability to remove the thickness of asphaltic concrete necessary to provide profile grade and cross slope uniformly across the surface. Cold planing equipment shall be capable of working from an erected stringline, shoe device or approved traveling reference plane that will accurately reflect the average grade of the surface on which it is to be operated and shall have an automatic system for controlling cross slope at a given rate. Adequate loading equipment shall be provided to immediately remove materials cut from the surface and discharge the cuttings into a truck or on the shoulder as specified or directed by the ENGINEER. When cuttings are placed directly on the shoulder, surfacing with lightweight aggregate shall be removed separately. Adequate personnel shall be provided to ensure that the cuttings are removed from the surface daily. The drum shall be round and true with sufficient number of teeth to yield a uniform and fine textured surface for bonding of the subsequent overlay. The machine shall be equipped with means to control dust created by the cutting action and shall have a system providing for uniformly varying the depth of cut while the machine is in motion.

At the end of each day's operation, the CONTRACTOR shall remove all loose materials, and cutting materials that were not discharged into a truck. Loose cutting materials shall not be broomed, discharged, or placed in catch basins, drainage pipe, and/or ditches. Any drainage structure that is filled with material from the CONTRACTOR'S operation shall be immediately cleaned in order to not impede the flow of storm water.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.**

**1.3.1** The maximum forward speed of the planing machine shall be forty feet (40') per minute. This speed shall be reduced as directed to provide a planed surface of uniform and fine texture with the specified grade and cross slope. Ridges left in the surface due to missing teeth shall be corrected by additional passes. The maximum depth of cold planing shall be two inches (2") per pass when traffic is being maintained. Teeth lost during planing shall be immediately replaced.

- 1.3.2 The traveling reference plane will be used on the first pass of the cold planing machine. The shoe device may be used on adjacent passes. This is the minimum acceptable method and the contractor must meet or exceed surface tolerance requirements. Surface tolerance requirements for the cold-planed surface shall not show any variation more than one-half inch ( $\frac{1}{2}$ "), when checked with a ten foot (10') metal static straight edge.
- 1.3.3 When the entire roadway width has not been planed to a flush surface by the end of a work period resulting in a vertical or near vertical longitudinal face exceeding two inches (2") in height, this longitudinal face shall be sloped as directed. Transverse faces present at the end of a work period shall be beveled as directed. Provisions shall be made at drives and turnouts to maintain local traffic.
- 1.3.4 Asphaltic concrete next to structures that cannot be removed by the planing machine shall be removed by other acceptable methods at no additional cost to the City of Alexandria.
- 1.3.5 Pavement surfaces resulting from planing operations shall be of uniform texture, grade and cross-slope and free from loose material. Planed surfaces not meeting these requirements shall be re-planed at no direct pay. Uneven, undulating surfaces will not be accepted. The contractor shall provide drainage of planed areas by cutting through the shoulder to the ditch.
- 1.3.6 The cold planing operation shall not precede the subsequent paving operation by more than 15 calendar days. This time may be extended if extensive joint repairs or patching is required.
- 1.3.7 Required joint repairs shall be made after planing. Pavement patching shall be completed before planing. When additional areas requiring patching are exposed by planing operations, such additional patching shall be performed after planing. Pavement patching shall be in accordance with Section ASPH-101 "Asphaltic Concrete Pavement Patching" of these SPECIFICATIONS.
- 1.3.8 All reclaimed asphaltic pavement material (RAP) generated by the project shall become the property of the City of Alexandria and shall be hauled to a storage facility as designated by the City of Alexandria Street Department and stockpiled by the CONTRACTOR as directed at no direct pay.
- 2.1 MEASUREMENT.** Measurement will be made by the square yard, at the specified depth, of asphaltic concrete surfacing satisfactorily removed.
- 3.1 PAYMENT.** Payment of cold planing asphaltic pavement will be made at the contract unit price per square yard at the specified depth, which price includes removal of asphaltic concrete surfacing, hauling and disposal of removed materials to an approved City of Alexandria owned facility, furnishing all labor, tools, equipment, and incidentals necessary to complete the WORK.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
530-01	Cold Planing Asphalt Pavement ( $\leq 4''$ )	Square Yard
530-02	Cold Planing Asphalt Pavement ( $> 4''$ )	Square Yard

**SECTION 540 AGGREGATE SURFACE COURSE**

- |  |   |
|--|---|
| 1.1 Description                        | 1.6 Shaping and Compacting Aggregate Surface Course |
| 1.2 Materials                          | 1.7 Dimensional Tolerances                          |
| 1.3 Equipment                          | 2.1 Measurement                                     |
| 1.4 Shoulder and Driveway Construction | 3.1 Payment   |
| 1.5 Placing Materials                  |   |

**1.1 DESCRIPTION.** This WORK consists of furnishing and constructing aggregate surface courses for shoulders, drives and/or other City of Alexandria facilities in accordance with these SPECIFICATIONS, and in conformity with the lines, grades, thickness and typical sections shown on the PLANS or established by the ENGINEER.

**1.2 MATERIALS.** The contractor shall furnish one of the following types of aggregate surface course materials complying with the following:

- (A) Crushed Limestone
- (B) Sand Clay Gravel (Untreated)

Aggregate surface course materials shall be a uniform blend, sampled in dedicated stockpiles and approved prior to placement.

1.2.1 Materials shall conform to the following:

- (A) Crushed Limestone. This material shall be a uniform blend and consist of 100 percent stone and shall comply with the following gradations:

U.S. Sieve	Percent Passing by Weight
1 1/2"	100
3/4"	50-100
No. 4	35-65
No. 40	10-32
No. 200	3-15

The fraction of stone passing the No. 40 Sieve shall comply with the following requirements.

Liquid Limit (Max.)	25
Plasticity Index (Max.)	4

Stone shall comply with Subsection 1003.01 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- (B) Sand Clay Gravel (Untreated). This material shall be a mixture of sand, clay, and siliceous gravel, stone, or recycled portland cement concrete.

The mixture shall be a uniform blend and reasonably free from foreign matter as determined by visual inspection.

The mixture shall comply with the following gradation:

U.S. Sieve	Percent Passing by Weight
1 ½"	95-100
No. 4	40-65
No. 40	---
No. 200	10-25

The fraction of stone passing the No. 40 Sieve shall comply with the following requirements.

Liquid Limit (Max.)	40
Plasticity Index	4-15

Stone and aggregate shall comply with Subsection 1003.01 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- 1.3 EQUIPMENT.** Equipment necessary to produce a finished product meeting specification requirements shall be furnished and maintained by the contractor. Equipment will be approved prior to use.
- 1.4 SHOULDER AND DRIVEWAY CONSTRUCTION.** On existing shoulders and driveways, where only aggregate surface course is to be placed, vegetation shall be removed and the shoulders and driveways shaped and satisfactorily compacted prior to placing aggregate surfacing. Repairs for existing gravel driveways shall not extend beyond the City of Alexandria Property, Right of Ways and/or Servitudes.
- 1.4.1 After completion of an asphalt overlay or concrete street pavement and compaction and curing of materials are complete, a shoulder shall be constructed against the outer edge of the travel lane with the specified material extending out to the required width and depth as set forth in the PLANS or established by the ENGINEER.
- 1.4.2 Materials used for shoulders and driveways shall be of the same type and uniform blend throughout the entire length of the PROJECT. Materials used for shoulders shall be compacted and shaped to slope down away from the roadway surface.
- 1.4.3 After completion of street and shoulder improvements, the material that was bladed away from the original roadway shall be worked and shaped to transition from the new shoulder to adjacent areas without blocking drainage or creating ponding along the shoulders or roadway. Any excess materials or debris shall be picked up and satisfactorily disposed of by the CONTRACTOR. No material or

debris of any nature resulting from the work will be allowed to remain in the ditches, drainage ways or on the shoulders.

- 1.4.4 The CONTRACTOR shall construct shoulders to the specified thicknesses and widths as set forth in the PLANS or established by the ENGINEER and shall not construct shoulders in such a manner as to meet the minimum tolerances as set forth in these specifications.

- 1.5 **PLACING MATERIALS.** The material shall be placed directly on the prepared and approved sub-grade from hauling vehicles or spreading equipment. No aggregate surface course shall be placed on damaged sub-grade until repairs have been completed and approved by the ENGINEER.

Aggregate surfacing materials shall not be placed or spread on adjacent Portland Cement Concrete or Asphaltic Concrete Pavements. Aggregate surfacing operations shall be conducted so that pavement surfaces, edges, and joints are not damaged.

1.6 **SHAPING AND COMPACTING AGGREGATE SURFACE COURSE.**

- 1.6.1 General. The material shall be shaped by suitable means and compacted. Shaping and compacting shall continue until the surface conforms to the required sections and is free from ruts and waves.

- 1.6.2 Aggregate Surfacing. Aggregate surfacing shall be compacted by approved methods and to the satisfaction of the ENGINEER. After initial compaction, the surface shall be wetted as necessary and rolled with a pneumatic-tire or steel-wheel roller to a tight, uniform surface.

- 1.7 **DIMENSIONAL TOLERANCES.** Areas with thickness and width deficiencies in excess of the following tolerances shall be corrected to plan or established dimensions by furnishing, placing, reworking, shaping, and compacting additional materials as required at no direct pay.

- 1.7.1 Thickness. Under-thickness shall not exceed three quarters of an inch ( $\frac{3}{4}$ "). Over-thickness may be waived at no additional cost to the City of Alexandria.

- 1.7.2 Width. Under-width on shoulders shall not exceed 3 inches (3"). Over-width may be waived at no additional cost to the City of Alexandria

- 2.1 **MEASUREMENT.** Aggregate surface course shall be placed to the required width and thickness and shall be measured by the Ton of aggregate surface course installed and accepted.

- 2.1.1 Net certified scale weights shall be used as a basis of measurement. Delivery tickets shall include the following information:

- a) Date
- b) Time Loaded
- c) Truck Identification
- d) Delivery Location
- e) Quantity Loaded

2.1.2 Each delivery ticket shall be approved by the ENGINEER at the time of delivery. In no case shall the loaded truck weight exceed the legal load limit. No payment shall be made for material quantities in excess of the legal load limit.

2.2 Grading, removal of existing shoulder material and reshaping of areas beyond the shoulder will not be measured for payment.

3.1 **PAYMENT.** Payment for aggregate surface course shall be made at the contract unit price per Ton, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, traffic control, signs, barricades, safety items, preparation of existing shoulders, furnishing, placing and compacting required aggregate materials, water, and incidentals necessary to complete the WORK.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
540-01	Aggregate Surface Course	Ton

**SECTION 610 BEDDING MATERIAL**

- |                                    |                 |
|------------------------------------|-----------------|
| 1.1 Description                    | 2.1 Measurement |
| 1.2 Materials                      | 3.1 Payment     |
| 1.3 Placement of Bedding Materials |                 |

- 1.1 DESCRIPTION.** This work consists of furnishing and placing bedding material for drainage structures in accordance with these SPECIFICATIONS and in conformity with the lines, grades and sections shown on the PLANS or established by the ENGINEER.

Bedding material may be any type of material listed herein. Unless otherwise approved in writing, the same type material shall be used throughout a project.

- 1.2 MATERIALS.** Materials shall be properly proportioned and mixed prior to being placed in the foundation.

Materials shall conform to the following:

- (A) Stone. This material shall consist of one hundred percent (100%) stone and shall comply with the following gradations:

U.S. Sieve	Percent Passing by Weight
1 ½ inch	95-100
No. 4	0-15
No. 200	0-2

- (B) Sand-Aggregate. The sand-aggregate material shall be a natural or artificial mixture of sand and gravel, recycled Portland Cement Concrete, or other approved aggregate listed in this subsection. Material passing the No. 40 sieve shall be non-plastic. The mixture shall be free of foreign matter as determined by visual inspection and shall comply with the following gradation prior to placement.

**Sand-Aggregate Gradation**

U. S. Sieve	Percent Passing by Weight
1 ½"	95-100
No. 4	30-50
No. 10	20-45
No. 200	0-10

- (C) Mixtures. Recycled Portland Cement Concrete, gravel, or stone shall be mixed with  $35 \pm 5$  percent granular material by volume. The mixture shall be verified by proof of material deliveries.

- (1) Gravel. Gravel shall comply with the following gradation.

U.S. Sieve	Percent Passing by Weight
1 1/2"	95-100
No. 4	0-15
No. 200	0-2

- (2) Recycled Portland Cement Concrete, or Stone. Recycled Portland cement concrete, or stone shall conform to the following gradation:

U.S. Sieve	Percent Passing by Weight
1 1/2"	95-100
3/4"	40-85
No. 4	0-15

- (3) Granular Material. Granular material shall be non-plastic and siliceous material, and shall comply with the following gradation:

U.S. Sieve	Percent Passing by Weight
1/2 inch	100
No. 10	75-100
No. 200	0-10

- (D) Geotextile Fabric.

- (1) General Requirements. Geotextile fabric rolls shall be furnished with an opaque, waterproof wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged with the manufacturer's name, date of manufacture, batch number, and name of product.

Unless otherwise specified on the plans or in the project specifications, the geotextile fabric shall be an approved product in the LA DOTD Qualified Products List 61.

- (2) Detailed Requirements. Bedding fabric shall conform to Section 1019 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- 1.3 PLACEMENT OF BEDDING MATERIAL.** Materials shall be placed, shaped and uniformly compacted to the satisfaction of the ENGINEER.

- 1.3.1 All excavated material, which will not be incorporated in a project, shall be removed from the project site, outside the view of the traveling public, and disposed of in accordance with all local, state, and federal regulations.
- 1.3.2 A layer of compacted plastic soil material twelve inches (12") thick shall be placed at structure ends when bedding material is exposed. Plastic soil blanket shall consist of soils having a minimum PI of twelve (12) and a maximum PI of thirty five (35), a pH no less than five and one-half (5.5) or greater than eight and one-half (8.5), and a minimum organic content of three percent (3%). The plastic soil blanket shall support adequate vegetation. After materials are placed and spread, lumps, stones, roots and other foreign matter shall be removed from the area. Soil blanket material shall be spread and rolled in a manner that leaves a uniform surface. Plastic soil blanket shall be placed in a timely manner to prevent erosion.
- 1.3.3 Geotextile fabric shall be placed in accordance with plan details or as directed by the ENGINEER prior to placing bedding materials. Care shall be taken to prevent damage to geotextile fabric during placement of bedding material.
- 1.3.4 Adjacent rolls of fabric will be overlapped. When rolls are overlapped, the overlap shall be a minimum of eighteen inches (18"), including the ends of the rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of bedding materials placement.
- 1.3.5 Damaged fabric shall be either removed and replaced with new fabric or covered with a second layer of fabric extending two feet (2') in each direction from the damaged area.
- 2.1 METHOD OF MEASUREMENT.** Bedding material, completed and accepted, will be measured by the Ton. The depth will be shown on the PLANS or established by the ENGINEER. The quantity will be based on Certified Weight delivery tickets. The Delivery tickets shall include the following information.
- a) Date
  - b) Time Loaded
  - c) Truck Identification
  - d) Delivery Location
  - e) Quantity Loaded
- 2.1.1 Plastic soil blanket will not be measured for payment, but shall be included in the price for bedding material.
- 2.1.2 Necessary excavation and the removal and disposal of excess excavated materials and excavated materials not suitable for use on a project will not be measured for payment, but shall be included in the price for bedding material.
- 2.1.3 Geotextile fabric will not be measured for payment, but shall be included in the price for bedding material.

- 3.1 PAYMENT.** Bedding Material will be paid for at the contract unit price per Ton, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, necessary excavation, preparation of subgrade, placing and compacting required bedding materials, and incidentals necessary to complete the WORK.  
Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
610-01	Bedding Material	Ton

**SECTION 620 CONCRETE**

1.1	Description	1.12	Forms
1.2	Equipment	1.13	Placing Concrete
1.3	Composition of Concrete	1.14	Cold Weather Concreting
1.4	Pre-molded Non- Extruding Expansion Joint Filler	1.15	Forming Joints
1.5	Proportions and Consistency of Concrete	1.16	Curing Concrete
1.6	Handling, Measuring and, Batching	1.17	Removal of Forms and Falsework
1.7	Mixing	1.18	High-Early Strength Portland Cement Concrete
1.8	Consistency	1.19	Flowable Fill
1.9	Ready Mixed Concrete	1.20	Finishing Concrete
1.10	Concrete Strength Requirements	1.21	Drainage and Weep Holes
1.11	False-work	2.1	Measurement
		3.1	Payment

**1.1 DESCRIPTION.** This WORK shall consist of concrete masonry composed of approved portland cement, fine aggregate, coarse aggregate and water, prepared and constructed in accordance with these SPECIFICATIONS, at the locations and of the form and dimensions shown on the PLANS or directed in writing by the ENGINEER. The use of High-Early-Strength concrete will not be permitted without the written consent of the ENGINEER.

**1.2 EQUIPMENT.** Concrete shall be mixed thoroughly in a batch mixer of approved type and capacity with accurate timing and water measuring devices. The timing device shall be of the type that will automatically lock the discharging apparatus so as to prevent the emptying of the mixer until the materials have been mixed the minimum specified time.

**1.2.1 Minimum Size of Mixer.** No mixer shall be operated above its rated capacity and no mixer shall be used which has a rated capacity of less than a (1) one-bag batch, except in the construction of pipe headwalls where a three and one-half cubic foot (3-½ ft.<sup>3</sup>) mixer may be used.

In determining the capacity of mixers, the output per hour shall be as follows:

7 cubic foot mixer	-----	3 Cu. Yd.
10 cubic foot mixer	-----	7 Cu. Yd.
½ cubic yard mixer	-----	10 Cu. Yd.
1 cubic yard mixer	-----	20 Cu. Yd.

The maximum continuous pouring for the various sized mixers, unless other wise permitted by the ENGINEER, shall be as follows:

7 cubic foot capacity	-----	35 Cu. Yd.
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10 cubic foot capacity -----	70 Cu. Yd.
½ cubic yard capacity -----	100 Cu. Yd.
1 cubic yard capacity -----	200 Cu. Yd.

Under special conditions and with satisfactory proof; the rating of mixers, as stated above, may be increased.

- 1.2.2 Blades. Pick-up and throw-over blades in the drum of the mixer that are worn down three-quarters of an inch ( $\frac{3}{4}$ " ), or more, in depth must be replaced by new blades.
- 1.2.3 Unsatisfactory Mixers. When, in the opinion of the ENGINEER, a concrete mixer is not adequate or suitable for the WORK, it shall be removed from the job and a suitable mixer provided.

### 1.3 COMPOSITION OF CONCRETE.

#### 1.3.1 Portland Cement.

- (A) Chemical Limits. The following maximum limits shall not be exceeded by amounts greater than the respective tolerances indicated as allowable in the chemical determinations:

		Limits	Tolerances
Loss on ignition, percent	----	4.00	0.25
Insoluble residue, percent	----	0.85	0.15
Sulfuric anhydrite (SO <sub>3</sub> ), percent	----	2.00	0.10
Magnesia (MgO), percent	----	5.00	0.40

Portland cement is the product obtained by pulverizing clinker consisting essentially of calcium silicates, to which no additions have made subsequent to calcination other than water and/or untreated calcium sulphate except that additions not exceed one percent (1%) of other materials may be added, provided such materials have been shown to not be harmful by tests prescribed and carried out by Committee C-1 on Cement.

- (B) Soundness. A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking, or disintegration in the steam test for soundness.
- (C) Time of Setting. The cement shall not develop initial set in less than forty five (45) minutes when the vicat needle is used or in less than sixty (60) minutes when the Fillmore needle is used. Final set shall be attained within ten (10) hours.
- (D) Tensile Strength.

- (1) The average tensile strength in pounds per square inch of not less than three (3) standard mortar briquettes (see Section I) composed of one (1) part of cement and three (3) parts of standard sand, by weight, shall be equal to or higher than the following:

Age at Test, Days	Storage of Specimens	Tensile Strength PSI
7	1 day in moist air, 6 days in water	275
28	1 day in moist air, 27 days in water	350

- (2) The average tensile strength of standard mortar at twenty eight (28) days shall be higher than the strength at seven (7) days.
- (E) Packaging and Marking. When, as specified, the cement is delivered in packages, the name and brand of the manufacturer of the cement and the nature and amount of the material (found not to be harmful by Committee C-1 on Cement, Cement Reference Laboratory, National Bureau of Standards, Washington, D.C.) added to the clinker other than water and/or untreated calcium sulphate shall be plainly marked thereon. Shipment of cement in bulk will be permitted. A bag shall contain ninety four pounds (94 lbs.) net. A barrel shall contain three hundred seventy six pounds (376 lbs.) net. All packages shall be in good condition at the time of inspection.
- (F) Storage. The cement shall be stored in such a manner as to permit easy access for proper inspection and identification of each shipment, and in a suitable weather-tight building that will protect the cement from dampness.
- (G) Inspection. Every facility shall provide the purchaser careful sampling and inspection at either the mill or at the site of the WORK, as may be specified by the purchaser. At least twelve (12) days from the time of sampling shall be allowed for the completion of the seven (7) day test, and at least thirty three (33) days shall be allowed from completion of the twenty eight (28) day test. The cement shall be tested in accordance with the methods hereinafter prescribed. The twenty eight (28) day test need not be made if waived by the purchaser.
- (H) Rejection.
- (1) The cement may be rejected if it fails to meet any of the requirements of these SPECIFICATIONS.
- (2) Cement remaining in storage prior to shipment for a period greater than six (6) months after completion of the tests shall be retested and shall be rejected if it fails to meet any of the requirements of these SPECIFICATIONS.

- (3) Cement failing to meet the test for soundness in steam may be accepted if it passes a retest using a new sample at any time within twenty eight (28) days thereafter. The provisional acceptance of the cement at the mill shall not deprive the purchaser of the right of rejection on a retest of soundness and time of setting at the time of delivery of cement to the purchaser.
- (4) Packages varying more than five percent (5%) from the specified weight may be rejected; and if the average weight of packages in any shipment, as shown by weighing fifty (50) packages taken at random, is less than that specified, the entire shipment may be rejected.
- (l) Methods of Testing. The cement shall be sampled and tested in accordance with the ASTM C150.

### 1.3.2 High-Early-Strength Portland Cement.

- (A) Chemical Limits. The following maximum limits shall not be exceeded by amounts greater than the respective tolerances indicated as allowable in the chemical determinations:

		Limits	Tolerances
Loss on ignition, percent	-----	4.00	0.25
Insoluble residue, percent	-----	0.85	0.15
Sulfuric anhydrite (SO <sub>3</sub> ), percent	-----	2.00	0.10
Magnesia (MgO), percent	-----	5.00	0.40

Portland cement is the product obtained by pulverizing clinker consisting essentially of calcium silicates, to which no additions have been made subsequent to calcination other than water and/or untreated calcium sulphate except that additions not to exceed one percent (1%) of other materials may be added, provided such materials have been shown not to be harmful by tests prescribed and carried out by Committee C-1 Cement.

- (B) Soundness. A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking, or disintegration in the steam test for soundness.
- (C) Time of Initial Setting. The concrete shall not develop initial set in less than forty five (45) minutes when the Vicat needle is used or in less than sixty (60) minutes when the Fillmore needle is used. Final set shall be obtained within ten (10) hours.
- (D) Strength.

- (1) The average strength in pounds per square inch of not less than three (3) standard specimens shall be equal to or higher than the following:

Age at Test (Days)	Option No. 1 Tensile Strength (PSI)	Option No. 2 Compressive Strength (PSI)	Storage of Days Specimen
1	275	1300	1 day in moist air
3	375	3000	1 day in moist air 2 days in water

- (2) If, at the option of the purchaser, a twenty eight (28) day test (with storage of one (1) day in moist air and twenty seven (27) days in water) is required; the average strength at twenty eight (28) days shall be higher than the strength at three (3) days.
- (3) When the optional strength test is not specified by the purchaser, the tensile strength test shall be used.
- (E) Packaging and Marking. When, as specified, the cement is delivered in packages, the name and brand of the manufacturer of the cement and the nature and amount of the material (found not to be harmful by Committee C-1 on Cement, Cement Reference Laboratory, National Bureau of Standards, Washington, D.C.) added to the clinker other than water and/or untreated calcium sulphate shall be plainly marked thereon.
- Shipment of cement in bulk will be permitted. A sack shall contain ninety four pounds (94 lbs.) net. A barrel shall contain three hundred seventy six pounds (376 lbs.) net. All packages shall be in good condition at the time of inspection.
- (F) Storage. The cement shall be stored in such a manner as to permit easy access for proper inspection and identification of each shipment and in a suitable weather-tight building that will protect the cement from dampness.
- (G) Inspection. Every facility shall provide the purchaser careful sampling and inspection at either the mill or at the site of the WORK, as may be specified by the purchaser. At least six (6) days from the time of sampling shall be allowed for completion of the one (1) day test, at least eight (8) days shall be allowed for completion of the three (3) day test, and at least thirty three (33) days shall be allowed for the completion of the twenty eight (28) day test. The cement shall be tested in accordance with the methods hereinafter prescribed. The twenty eight (28) day test need not be made unless specified by the purchaser.
- (H) Rejection.

- (1) The cement may be rejected if it fails to meet any of the requirements of these SPECIFICATIONS.
  - (2) Cement remaining in storage prior to shipment for a period greater than six (6) months after completion of the tests shall be retested and shall be rejected if it fails to meet any of the requirements of these SPECIFICATIONS.
  - (3) Cement failing to meet the test for soundness in steam may be accepted if it passes a retest using a new sample at any time within twenty eight (28) days thereafter. The provisional acceptance of the cement at the mill shall not deprive the purchaser of the right of rejection on a retest of soundness and time of setting at the time of delivery of cement to the purchaser.
  - (4) Packages varying more than five percent (5%) from the specified weight may be rejected; and if the average weight of packages in any shipment, as shown by weighing fifty (50) packages taken at random, is less than that specified, the entire shipment may be rejected.
- (I) Methods of Testing. The cement shall be sampled and tested in accordance with ASTM C150 with the following exception:

Compressive strength, when specified (Section D, Option 2) shall be determined in accordance with AASHTO T22 and ASTM C39.

- 1.3.3 Water For Use with Cement. Water suitable for human consumption may be used in mixtures with portland cement without testing. Water obtained from other sources, when tested in accordance with AASHTO T26 shall meet the following requirements:

	Percent by Weight <u>(Mass) (Max.)</u>
Sugar, Oil, or Acid -----	0.0
Alkali -----	0.1
Solids (organic) -----Not over-----	0.1
Solids (Inorganic) -----Not over-----	0.4
Salt (NaCl) -----Not over-----	0.5

Water for use in concrete shall comply with AASHTO T26. Water quality shall be tested, when used in standard soundness, time of setting, and 1-3 mortar - strength test with standard sand and cement shall show no unsoundness; nor when compared with a similar test of distilled water using the same sand and cement shall it show a marked change in time of setting; shall show at least ninety five percent (95%) of the strength at seven (7) and twenty eight (28) days

of age. No water will be approved for use until seven (7) day test has been completed.

The amount of water in the mixture, including admixtures and free water, shall not exceed the maximum water\cement ratio. Free water shall include all water entering the mix with aggregate.

1.3.4 Fine Aggregate. This SPECIFICATION covers fine aggregate for cement concrete and mortar.

Sand shall consist of clean, hard, durable grains, graded from coarse to fine. It shall be substantially free from lumps of clay and all vegetation or other deleterious substances. The maximum percentages of deleterious substances shall not exceed the following values:

	Percent by Weight
Removed by decantation -----	3.0
Coal or lignite -----	0.25
Clay lumps -----	0.5

Fine aggregate shall comply with AASHTO T21. Fine aggregates subjected to the colormetric test for organic impurities and producing a color darker than Part Three (3), shall be rejected.

Fine aggregate shall be uniformly graded from coarse to fine and conforming to the following requirements:

Passing $\frac{3}{8}$ In. Sieve -----	100 percent
Passing No. 4 Sieve -----	95 - 100 percent
Passing No. 16 Sieve -----	45 - 80 percent
Passing No. 50 Sieve -----	5 - 30 percent
Passing No. 100 Sieve -----	0 - 10 percent
Sand for Mortar:	
Passing No. 8 Sieve -----	100 percent
Passing No. 50 Sieve -----	15 - 40 percent
Passing No. 100 Sieve -----	0 - 10 percent

Strength. Fine aggregate when subjected to the mortar strength test shall comply with AASHTO T35 and show a strength ninety five percent (95%) that developed using the same cement and standard Ottawa sand.

1.3.5 Coarse Aggregate. Coarse aggregate shall consist of gravel or limestone. All gravel or limestone shall consist of clean, tough, durable stone of high resistance to abrasion, free of clay coating of any character. "Run of Bank" gravel or gravel that contains disintegrated or soft stone or shale, or excess of flat pieces shall not be used. The gravel or limestone shall not contain more than fifteen percent (15%) of thin or elongated particles and shall have a percent of wear (Deval

abrasion test) of not more than fifteen (15). The maximum amounts of deleterious substances shall be as follows:

		Percent by Weight
Removed by washing	-----	1.0
Clay lumps	-----	0.5
Soft fragments	-----	5.0
Iron Ore (Included in soft fragments)	-----	1.5
	Max. retained $\frac{3}{4}$ in. -	0.5%
	Max. passing $\frac{3}{4}$ in. -	1.0%
Coal and lignite	-----	1.0
Sticks (wet)	-----	0.25
Totals, clay lumps, soft fragments, coal and lignite, and sticks shall not exceed	-----	5.0

Gradation of Coarse Aggregates for Concrete. All coarse aggregate shall be uniformly graded from coarse to fine, and when tested by means of laboratory sieves shall meet the following gradation requirements:

Percent by weight passing laboratory sieves, square openings in inches.

2"	1"	$\frac{3}{4}$ "	$\frac{3}{8}$ "	No. 4
100	90-100	80-95	20-55	0-1

Larger sizes may be used by obtaining permission of the ENGINEER in order that mix adjustments and tests may be made.

1.3.6 Chemical Admixtures. An air-entraining admixture will be required in paving concrete, and concrete placed by slip-form methods. When multiple admixtures are used, the admixtures shall be manufactured by the same company and shall be compatible.

- (A) Air-entraining. When an air-entraining admixture is used, the total air content of the concrete mix, when tested in accordance with AASHTO T196, shall be between three percent (3%) and six percent (6%).
- (B) Water-reducing, Normal-set, and Set-retarding. When the ambient air temperature is 70°F (20°C) or below, the water-reducing admixture shall be the normal-set type. When the ambient air temperature is above 70°F (20°C) and below 85°F (30°C), the water-reducing admixture may be either the normal-set type or the set-retarding type. When the ambient air temperature is above 85°F (30°C) the water-reducing admixture shall be the set-retarding type. Set-retarding admixtures shall be used in an amount sufficient to produce the necessary retardation; however, the amount used

shall not be less than is necessary to comply with Subsection 1011.02 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

The CONTRACTOR shall consider the influence of different materials and job conditions on setting characteristics. With approval of the mix design, the CONTRACTOR may use approved admixtures other than as stated above in order to maintain normal setting characteristics.

- (C) Superplasticizers shall comply with Subsection 1011.02 of the Louisiana Standard Specifications for Roads and Bridges, latest edition and be on LA DOTD Qualified Products List designation QPL 58. Water contents for superplasticized concrete mixes shall not be reduced to levels, which will restrict cement hydration.

Final slump of superplasticized concrete mixes shall not exceed 8 inches after addition of the superplasticizer.

The CONTRACTOR shall run trial mixes to determine the proper dosage for the designed water cement ratio when using superplasticizers. The amount of liquid in the superplasticizer shall be included as a part of required mixing water. The dosage of superplasticizer may be adjusted depending on the consistency of the mix.

The method of adding and mixing the superplasticizer to the mix shall be as recommended by the manufacturer, except that it shall not be added after partial discharge of concrete at the job site.

- 1.4 PREMOLDED NON-EXTRUDING EXPANSION JOINT FILLER.** Non-extruding fillers complying with Section ST-103 "Portland Cement Concrete Pavement" may be used. Extrusion shall not exceed one-quarter of an inch ( $\frac{1}{4}$ " ) when a sample is compressed to fifty percent (50%) of its thickness with three (3) of the edges restrained; recovery after compression shall be at least eighty percent (80%) and absorption shall not exceed eight percent (8%).
- 1.5 PROPORTIONS AND CONSISTENCY OF CONCRETE.** The concrete pavement shall be a mix proportioned in a manner acceptable to the ENGINEER and have a minimum twenty-eight (28) day compressive strength of three thousand five hundred pounds per square inch (3,500-psi) when tested in accordance with AASHTO T22 and ASTM C39. The concrete shall also contain sufficient fine aggregate to fill all voids. The fine and coarse aggregates shall be uniformly graded, and the mix shall contain a minimum of six (6) sacks of cement per cubic yard of concrete.
- 1.5.1 Should the CONTRACTOR desire to use High-Early-Strength Portland cement in any part of the WORK, other than specifically provided for by the PLANS or in the SPECIAL PROVISIONS and if considered desirable by the ENGINEER, the CONTRACTOR may be permitted to use a High-Early-Strength Portland Cement. The additional cost involved (if any) shall be assumed by the

CONTRACTOR. In the event the ENGINEER orders the CONTRACTOR to use High-Early-Strength Portland cement in any part of the WORK, other than as specifically provided for by the PLANS and use such cement instead of standard portland cement, the City of Alexandria will reimburse the CONTRACTOR for the difference between the delivered cost of the standard portland cement otherwise being furnished for use on the PROJECT. The CONTRACTOR will be required to furnish freight bills and invoices to substantiate statements showing difference in cost.

- 1.5.2 After the material components for concrete, provided by the CONTRACTOR have been accepted for use on the PROJECT, the testing LABORATORY, and the ENGINEER, the CONTRACTOR will provide a concrete mix design "Job Mix" in accordance with the above requirements as to total weight of aggregate, designating such relative amounts of fine to coarse aggregate, and such water-cement ratio as will produce concrete of the consistency desired within the range of slump as hereinafter limited. During the progress of the WORK, the ratio of the amount of fine aggregate to the amount of coarse aggregate may be altered as required by the ENGINEER, but the weight of total dry aggregate per bag shall not be changed unless tests made under the authority of the ENGINEER indicate that the specific gravity of either or both of the aggregates has changed. There will be no adjustment of cost of cement. Substitute mixes will not be accepted.
- 1.5.3 The unit of the aggregates in a dry and rodded condition shall be determined in accordance with ASTM C29 and ASTM C33. The unit weight of aggregate, of a given specific gravity, is controlled by voids and may affect the yield of concrete material and the CONTRACTOR'S attention is directed to the type and grading requirements of the coarse aggregate.
- 1.5.4 The batch weights of aggregates, as given the CONTRACTOR, will be corrected weights adjusted by the testing laboratory employed by the CONTRACTOR to compensate for moisture content, and shall be used by the CONTRACTOR as job condition weights. The amount of water will be adjusted by the testing laboratory to compensate for moisture content of the aggregates and for absorption of water by the aggregate during mixing. The CONTRACTOR shall at once alter his batch whenever directed to conform to an adjusted or altered "job mix".
- 1.5.5 Slump. In determining the slump of portland cement concrete, the testing procedure shall comply with AASHTO T119. The consistency of the concrete shall be such that the slump shall be no less than two inches (2") and no more than four inches (4") when subjected to the following test: A frustum of a cone having a top diameter of four inches (4"), a base diameter of eight inches (8") and height of twelve inches (12") shall be placed on its base and filled with concrete in four inch (4") increments, each increment being rodded twenty-five (25) times with a smooth, round bullet-pointed, steel rod, twenty-four inches (24") long and five-eighths of an inch (5/8") in diameter. The frustum of the cone

shall then be immediately removed slowly and the vertical settlement or slump of the concrete measured.

1.5.6 Cement and Aggregates. The proportions by volume of cement to aggregates, measured separately, shall be as determined by the ENGINEER. The CONTRACTOR shall vary, without charge, the ratio of fine to coarse aggregate as directed by the ENGINEER but in no case shall it be varied so as to materially affect the unit volume of cement per unit volume of concrete as determined by the original proportions designed to obtain a cement factor of not less than six (6) sacks of ninety four pounds (94 lbs.) cement to one cubic yard (1 yd.<sup>3</sup>) of concrete.

1.5.7 Water. The maximum amount of water per sack of cement permitted including the free water in the aggregates shall not exceed six (6) gallons. Free water shall be deemed to include all water entering the mix with the aggregate, except the water absorbed by the particles of aggregate.

1.6 **HANDLING, MEASURING AND BATCHING.** Concrete shall be made up of accepted material batched in the proportions set by the ENGINEER for the specific materials. Corrections necessitated by variations from day to day in the moisture content of the raw materials or for other similar reasons shall be made as directed by the ENGINEER.

1.6.1 Devices for and Methods of Measuring Materials. All cement and aggregate for concrete pavements shall be measured by weight. Cement shall be measured by the bag as packed by the manufacturer or by the pound, one bag of cement being assumed to be one cubic foot in volume and to weigh ninety-four pounds (94 lbs.). The weights of coarse and fine aggregates to be used shall be calculated from the proportions specified by the ENGINEER. Water shall be measured by volume or by weight.

1.6.2 Weighing and Batching Equipment. All weighing equipment shall be arranged so as to permit making compensation for changes in the weight of moisture contained in the aggregates and to permit the convenient removal of excess material, when weighing hoppers are provided.

Weighing equipment shall be so arranged that the operator has convenient access to all control levers and cables. The weighing beam and auxiliary device shall be in full view of the operator when manipulating the gates that deliver material to the weighing hopper.

The batching plant shall include batcher bins, either of the stationary or mobile types, with adequate separate compartments for the fine aggregate, each compartment designed to discharge efficiently and freely into the weighing hopper or hoppers. Means of control shall be provided in each case so that as the quantity desired in the weighing hopper is being approached, the material

may be added slowly in minute quantities and shut off with precision. Means of removing the overload of any one of the several hoppers shall be provided.

The coarse and fine aggregate shall be handled and measured separately. In the type where more than one aggregate is weighed into one hopper, each aggregate shall be held in a separate compartment and so arranged that an overload of any aggregate can be removed. Hoppers shall be constructed so as to eliminate accumulations of tar materials and to discharge fully without jarring the scales. Partitions between compartments, both in bins and in hoppers, shall be ample to prevent spilling under any working condition. All batching plant structures shall be maintained properly leveled within the accuracy required by the design of the weighing mechanism.

The scales for weighing aggregates shall be either the horizontal beam or the springless dial types, designed of rugged construction as an integral unit of the batching plant, with a maximum allowable error of one-half percent ( $\frac{1}{2}\%$ ) of net load and with significant graduation down to two pounds (2 lbs.). Provision, such as "tell tale" dial, shall be made for indicating to the operator that the required load in the weighing hopper is being approached, which device shall indicate at least the last two hundred pounds (200 lbs.) of the load. A device on weighing beams shall indicate critical position clearly.

Poises shall be designed for locking in any position and prevent unauthorized removal. The weight beam and "tell tale" device shall be in full view of the operator while charging the hopper and he shall have convenient access to all controls and a clear view of all operations at the batching plant. If necessary, burlap or other suitable materials shall be arranged about the scales to afford protection against the wind.

Clearance between scale parts, hoppers and bin structures shall be such as to avoid displacement of or friction between working parts due to accumulations, vibrations or other causes. Pivot mountings shall be designed so none of the parts will jar loose and so as to assure unchanging spacing of knife edges under all circumstances. Scales shall be so designated that all exposed fulcrums, clevises and similar working parts may readily be kept clean. Scales shall be constructed of noncorrosive materials, excluding material softer than brass. Ten (10) fifty pound (50 lbs.) weights shall be available for checking. Weight beams shall have leveling lugs, and weighing parts of other types shall be provided with means for precision adjustment. Scales shall be sealed at the expense of the CONTRACTOR when required by the ENGINEER. If necessary to provide stability, concrete foundations for batching and weighing equipment shall be provided. All structural members of the batching plant shall be of sufficient size to withstand the load to which they will be subjected and the ENGINEER may require the CONTRACTOR to submit, for approval, PLANS showing structural design and type of foundation to be used. The CONTRACTOR shall maintain the equipment in good condition and adjustment and shall provide for accurate operation. If, for any reason, equipment previously approved becomes unsatisfactory, it shall be repaired or replaced before proceeding with the WORK.

Water measuring equipment shall be accurate to within one percent (1%), and shall be so arranged that the measurement will not be affected by variations of pressure in the water supply line, or tilting of the mixer, and will be uniformly accurate under all construction conditions encountered. Unless the water is to be weighed, the water measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. The volume of the auxiliary tank shall be at least equal to that of the measuring tank.

- 1.6.3 Handling Materials. In stock-piling aggregates, the location and preparation of the sites, the minimum size of pile, the method adopted to prevent "coning" or other segregation of the component sizes shall be subject to the approval of the ENGINEER. In any case, stock piles shall be at least six feet (6') in height and built up in layers of not more than three feet (3') in thickness.

Each layer shall be completely in place before beginning the next, which shall not be allowed to "Come" down over the under layer. Aggregates from different sources and of different grading shall not be stock-piled together. Each "separate size" of coarse aggregate, if such are required by the CONTRACTOR, shall be stored separately. The CONTRACTOR shall avoid, as much as possible, the mixing of material from the stock pile with material from the cars when filling the proportioning bins and shall not fill the proportioning bins alternately from the stockpile and the cars, except when directed to do so by the ENGINEER for the purpose of changing the gradation of the materials. He shall fill the bins exclusively from the stockpile. Storing of aggregates in stockpiles or otherwise upon the subgrade or shoulders will not be permitted.

The aggregates shall be handled from the stockpile or other source to the batching plant in such manner as to secure a typical grading of the material. Aggregates that have become mixed with earth or foreign material or coated with dust shall not be used. All aggregates, where handled by hydraulic methods or where washing is involved, shall be stock-piled or binned for draining at least twelve (12) hours before being batched.

Aggregates shall be transported from the batching plant to the mixer in batch boxes, vehicle bodies or other containers of adequate capacity and construction to carry properly the volume required. Partitions separating batches shall be adequate and effective to prevent spilling from one compartment to another while in transit or being dumped.

Cement in original shipping packages may be transported on top of the aggregates, each batch containing the number of bags required by the SPECIFICATIONS.

Batches shall be delivered to the mixer separate and intact and each batch container shall be dumped clearly into the mixer without loss of cement or mixing or spilling of material from one batch compartment into another.

- 1.6.4 Mixing Conditions. Concrete shall be mixed only in the quantity required for immediate use. Concrete that does not meet the requirement for consistency at the time of placing, shall be rejected. Tempering concrete by adding water or by other means will not be permitted.

The use of admixtures for the purpose of increasing the workability of the mix or for accelerating the set, will be permitted only when specifically approved by the ENGINEER, in writing.

Materials containing frost shall not be used. Fine aggregate containing lumps of hardened materials shall not be used.

Salt or other chemical mixtures shall not be added to the concrete to prevent freezing.

The use of central mixing plant will be permitted when approved by the ENGINEER. When approval is given, the concrete shall be mixed to such consistency that the hauling will cause no segregation to the constituent materials.

The methods of storing and hauling materials and equipment used shall be subject to the approval of the ENGINEER. Vehicles shall be equipped with suitable devices for slowly agitating the concrete during transit and for delivering of the concrete in an unsegregated condition of uniform consistency.

Any vehicle load showing non-uniform consistency upon arrival will be subject to rejection.

- 1.7 **MIXING.** Aggregates or bags of cement containing lumps or crusts of hardened material shall not be used. Concrete shall be mixed for not less than one (1) minute after all materials, including water are in the drum.

During such period, the drum shall be operated at drum speeds specified by the mixer manufacturer and shown on his nameplate on the machine. The entire contents of the mixer shall be removed from the drum before materials for the succeeding batch are placed therein and the mixer preferable shall be equipped with mechanical means for preventing the attrition of aggregates after mixing has commenced.

- 1.7.1 Mixing Concrete. Concrete shall be mixed in a batch mixer of approved type and capacity for not less than one (1) minute after all materials, except water, are in the drums. If tandem or dual drum mixers are used, the mixing time required shall be exclusive of the time of transfer of materials between mixing drums or compartments.

The batch shall be so charged into the drums that some water shall enter in advance of cement and aggregate and shall continue to flow at a uniform rate for a period not exceeding twenty (20) seconds. The rate of flow shall be so

regulated that the water will enter the drum for approximately five (5) seconds before the materials and continue to flow for approximately ten (10) seconds after the materials have been charged into the drum, and after the mixing time begins.

After water has been added to the concrete mix at the batch plant, water may only be added twice to the concrete mix at the job site, provided that the concrete has not been partially discharged. Water may be added to obtain the required slump and to increase the workability of the concrete. In no case shall the amount of water added exceed the allowable water to cement ratio of the "job mix". Water may only be added by a truck mixer equipped with an approved water measuring device.

During the period of mixing, the drum shall operate at the speed for which it was designed. Any concrete mixed less than the minimum mixing time speed specified shall be rejected. If in the opinion of the ENGINEER, the concrete resulting from mixing the specified minimum time is not of a uniform texture, a sufficient number of additional revolutions of the drum at the same rate shall be given until a thorough mixing of each batch of concrete is secured.

The volume of mixed concrete per batch shall not exceed the manufacturer's rated capacity by more than ten percent (10%), except where the rate capacity of the mixer exceeds the volume of the mixed concrete for the nearest to capacity bag batch by a volume of concrete involving three-tenths or more of a bag of cement, in which case, the volume of concrete produced per batch may be that produced from a number of bags of cement which exceeds the nearest to rated capacity number by one (1) bag. The entire contents shall be removed from the drum before the succeeding batch is introduced. The skip and the throat of the drum shall be kept free of accumulation.

- 1.7.2 Hand Mixing. Hand mixing will not be permitted, except in case of emergency and with the written permission of the ENGINEER. When permitted, it shall be done only on watertight platforms. The sand shall be spread evenly over the platform and the cement spread upon it. The sand and cement shall then be mixed thoroughly while dry by means of shovels until the mixture is of uniform color after which it shall be formed into a "crater" and water added in an amount necessary to produce mortar of the proper consistency. The material upon the outer portion of the "crater" ring shall then be shoveled into the center and the entire mass turned and sliced until a uniform consistency is procured. The coarse aggregate shall then be wetted thoroughly and added to the mortar and the entire mass turned and returned at least six (6) times and until all the stone particles are covered thoroughly with mortar and the mixture is of a uniform color and appearance. Hand mixed batches shall not exceed one-half ( $\frac{1}{2}$ ) cubic yard in volume. Hand mixing will not be permitted for concrete to be placed under water.

- 1.7.3 **Mixers.** Mixers, except those at central mixing plants, shall be of the boom and bucket type, full power controlled, and no mix shall be used which requires less than five (5) sacks of cement per batch except where it is impracticable to use machine methods of placing and finishing the concrete, a smaller mixer of the design approved by the ENGINEER and having a capacity of not less than two (2) sacks will be permitted.

Mixers shall operate at the drum speed shown on the manufacturer's name plate, which, unless otherwise approved, shall be not less than fourteen (14) and not more than twenty (20) revolutions per minute.

The mixer shall be equipped with an approved batch meter and timing device that will automatically lock the discharge lever and release it only at the end of the mixing period; the device shall be equipped with a bell adjusted to ring each time the lock is released. If the timer permitted to operate the mixer is not functional and while same is being repaired, the CONTRACTOR shall furnish an approved timepiece equipped with a minute hand and a second hand and each batch is mixed one and one-half (1-1/2) minutes while the timing device is out of order. If, in the opinion of the ENGINEER, the repair of the timing device is unreasonably delayed, the failure of the timing device shall be cause for the discontinuance of the use of the mixer until the device is repaired or a new timer substituted.

The water measuring equipment shall meet the requirements set forth under "Weighing and Batching Equipment" of these SPECIFICATIONS.

Pickup and throw over blades in the drum of the mixer that are worn down three-quarters of an inch ( $\frac{3}{4}$ " ) or more in depth must be replaced with new blades.

Tandem or dual drum mixers will be permitted provided the mixer units are designed and built for synchronized operation and provided the material is mixed in the first drum for not less than thirty (30) seconds.

- 1.8 **CONSISTENCY.** The composition of the combined mixture shall be such as to produce concrete of maximum density consistent with workability containing no free water, with the specified cement content, and not more than the volume of water specified.

The quantity of water used shall not be changed without the consent of the ENGINEER.

The consistency of the concrete shall be such as to have a slump between three inches (2") and five inches (4") for concrete placed in forms.

- 1.9 **READY MIXED CONCRETE.**

1.9.1 Ready-mixed concrete. Ready-mixed concrete shall be transported in truck mixers, truck agitators or in other approved vehicles, provided that the haul units and delivery time are such that segregation is avoided and concrete of specified consistency is delivered at the site.

1.9.2 Definitions.

(A) Ready-Mixed Concrete. Ready-mixed concrete is central-mixed concrete or transit-mixed concrete transported and delivered in a plastic state ready for placement in the WORK. It shall be the type of concrete selected for use by the CONTRACTOR prepared in accordance with the "job mix" proportions established by the ENGINEER.

All ingredients shall meet the quality and gradation requirements specified under "Materials".

(B) Central-Mixed Concrete. Central-mixed concrete is concrete that has been mixed in a central mixing plant approved by the ENGINEER.

(C) Transit-Mixed Concrete. Transit-mixed concrete is concrete mixed in a truck mixer while in transit to the destination.

(D) Shrink-Mixed Concrete. Shrink-mixed concrete is concrete that has been partially mixed in a central mixing plant, the mixing then being completed in a truck mixer while in transit to the destination.

(E) Agitating. Agitating is the process of continuing the mixing of central-mixed concrete at the reduced speed specified for the purpose of preventing segregation while in transit to the destination.

1.9.3 Quality. Ready-mixed concrete shall be proportioned and batched as provided for the various types of concrete pavement, and shall meet all requirements as to quality, materials, strength, etc.

1.9.4 Equipment.

(A) The mixing equipment shall be capable of combining the aggregates, cement and water within the specified time into a thoroughly mixed and uniform mass and of discharging the mixture without segregation. Either the revolving drum type or the revolving blade type of mixer will be permitted. The mixer shall not permit leakage of any of the ingredients of the concrete.

(B) For central mixing, the size of the mixer drum shall be in accordance with the concrete mixer standards adopted by the Mixer Manufacturers Bureau of the Association of General Contractors of America. The mixer shall be equipped with a batch meter, a locking device capable of preventing the

discharge of the concrete until the specified mixing time has elapsed, and a water-measuring device meeting the requirements hereinafter contained.

- (C) The truck mixer shall be equipped with a revolution counter, and with a locking device capable of preventing the discharge of the mixer prior to the completion of the required number of drum revolutions. If it is desired to add the mixing water while in transit, the truck mixer shall be equipped with a tank. Except when the exact amount of required mixing water is placed in the tank at the proportioning plant, the truck mixer shall be equipped with a water measuring device meeting the requirements hereinafter contained.
- (D) The truck agitator shall be capable of transporting and discharging central-mixed concrete without segregation at the consistency specified and without leakage of any of the ingredients of the concrete. Unless otherwise specified by the ENGINEER, the use of open-top agitators will not be permitted.
- (E) Each truck mixer and each truck agitator shall have attached to it, in a prominent place, a metal plate on which is stamped its rated capacity in cubic yards of mixed concrete, as guaranteed by the manufacturer for the different uses to which the equipment is adapted.
- (F) Other transportation equipment than that described in the foregoing paragraphs, if the use of same is permitted by the ENGINEER, shall conform to such requirements as the ENGINEER may designate.

1.9.5 Central Mixing. The mixer shall be rotated as provided in another Paragraph of this Section, at the rate recommended by the manufacturer. The mixing time shall be measured from the time that all cement and aggregates are in the mixer. The batch shall be so charged into the mixer that some water shall enter in advance of cement and aggregate and water shall continue to flow into the mixer for a period that shall not exceed beyond the end of the first one-fourth ( $\frac{1}{4}$ ) of the specified mixing time. When the central plant is used for the complete mixing time of the concrete to be transported in an agitator truck, the mixing time for mixers having a capacity of one cubic yard (1 yd.<sup>3</sup>) or less shall be not less than one (1) minute; for mixers of larger capacity, this minimum mixing time shall, if so specified, be increased at the rate of fifteen (15) seconds or more for each cubic yard, or fraction thereof, additional capacity.

1.9.6 Transit Mixing. The size of the batch shall conform to requirements hereinafter contained under "Capacities". When the mixer is charged with fine and coarse aggregates simultaneously not less than fifty (50) nor more than one (100) hundred revolutions of the drum or blades at mixing speed shall be required after all the ingredients, including water, are in the drum. When fine and coarse aggregates are charged separately, not less than sixty (60) revolutions shall be required. Additional mixing beyond one hundred revolutions, if any, shall be done at agitating speed. Mixing shall start immediately after the cement and

water or the cement and wet aggregates, come in contact. Mixing and agitating speeds shall conform to the requirements hereinafter contained under "Mixing Speeds". The ingredients of the batch shall be completely discharged from the drum before the succeeding batch is placed therein. Drums and auxiliary parts of the equipment shall be kept free from accumulations of materials.

- 1.9.7 Shrink Mixing. For shrink mixing, the mixing time at the central mixing plant may be reduced to a minimum of thirty (30) seconds to intermingle the ingredients and the mixing may be completed in a truck mixer. All ingredients for the batch shall be in the central mixer and partially mixed before any of the mixture is discharged into the truck mixer. The partially mixed batch shall be transferred to the truck mixer without delay and without loss of any portion of the batch, and mixing in the truck mixer shall start immediately. The mixing time in the truck mixer shall not be less than forty (40) nor more than one hundred (100) revolutions of the drums or blades at mixing speed. Units designed solely as agitation shall not be used in connection with shrink mixing. Except for the preceding requirements, shrink mixing shall conform to the requirements contained above for "Transit Mixing".
- 1.9.8 Agitating. When central-mixed concrete is transported in a truck agitator or truck mixer, the size of the batch and the agitating speed shall conform, respectively, to the requirements hereinafter contained under "Capacities" and "Mixing Speeds". The central-mixed batch shall be transferred to the agitating unit without delay and without loss of any portion of the batch. Agitating shall start immediately and shall continue without interruption until the batch is discharged from the agitator. The ingredients of the batch shall be completely discharged from the agitator before the succeeding batch is placed therein. Drums and auxiliary parts of the equipment shall be kept free from accumulations of materials.
- 1.9.9 Mixing Water. Mixing water for both central-mixing and transit-mixing shall be measured by volume or by weight. The device for measurement of the water shall be readily adjustable, and under all operating conditions, shall be accurate to within one percent (1%) of its maximum capacity. The quantity of water used shall be the amount determined by the "job mix" proportions established by the ENGINEER within the tolerance permitted for the measuring device.
- 1.9.10 Mixing Speeds. The mixing speed for the revolving drum type of truck mixer shall not be less than four revolutions of the drum per minute, nor greater than a speed resulting in a peripheral velocity of the drum of two hundred twenty-five feet (225') per minute. For the revolving blade type of mixer, the mixing speed shall be not less than six (6) nor more than sixteen (16) revolutions of the mixing blades per minute.

Agitating speed, for both the revolving drum and the revolving blade types shall be not less than two (2) nor more than six (6) revolutions of the drum or the mixing blades per minute.

1.9.11 Capacities. The volume of batch in the truck mixer, or the truck agitator shall in no case be greater than the manufacturer's rated capacity for the particular use in question, as shown by the rating plate, nor shall it be greater than the following percentages of the gross volume of the drum or container:

For Truck Mixing	----- 57.5%
For Shrink Mixing	----- 70.0%
For Agitating	----- 80.0%

To determine the gross volume of the container of the revolving blade type of truck mixer or agitator, the height of the container above the center shaft shall be considered no greater than the radius of the circular section of the container below the center shaft, and the over-all width shall be considered no greater than the diameter of the circular section.

1.9.12 Time of Haul. Unless otherwise directed, concrete transported in truck mixers or truck agitators shall be delivered to the site of WORK and completely discharged from the hauling container within a period of forty five (45) minutes after the cement comes in contact with the mixing water, or with the combined aggregates when the combined aggregates contain free moisture in excess of two percent (2%) by weight.

1.9.13 Production and Delivery. The production and delivery of ready-mixed concrete shall be such that placing and finishing shall be continuous to meet the job operation requirements. The CONTRACTOR shall be responsible for producing a concrete that will have the required consistency when delivered to the WORK, even though the requirements regarding time of haul contained in the above paragraph have been met. Concrete that is unsuitable for placement as delivered shall be rejected. The use of admixtures for increasing the workability or for accelerating the set will be permitted only when specified in the SPECIAL PROVISIONS, or when permitted in writing by the ENGINEER.

The ENGINEER may require such modification of procedure as will produce satisfactory results, and if it shall prove impractical to complete the WORK before the concrete becomes too stiff to finish properly, he may order the discontinuance of the use of central-mixed or transit-mixed concrete and require the use of concrete mixed at the site of the WORK.

## 1.10 **CONCRETE STRENGTH REQUIREMENTS.**

1.10.1 State of Louisiana Right-of-Way. For all Portland Cement Concrete used within the State of Louisiana right-of-way, the concrete shall contain a minimum of six and one-quarter (6¼) sacks of cement per cubic yard of concrete. When required by the ENGINEER, samples of concrete for compression tests, as prescribed in the AASHTO M205 and T23, shall show a minimum compressive strength of three thousand eight hundred pounds per square inch (3,800 psi) in

twenty eight (28) days when tested in accordance with AASHTO T22 and ASTM C39.

Payment for Deficient Portland Cement Concrete. If cylinders do not meet twenty eight (28) day compressive strength requirements, the CONTRACTOR may either:

- (A) Accept an adjusted price in accordance with Schedule 1 below; or
- (B) Within five (5) days following the receipt of the twenty eight (28) day cylinder test report, CONTRACTOR may choose to core pavement in deficient area at his expense. The core sample strength will be used as basis for payment in accordance with Schedule 1 below:

**SCHEDULE 1  
PRICE ADJUSTMENT SCHEDULE**

Average Compressive Strength (PSI) at 28 days	Payment (Percent of Contract Unit Price/Lot)			
	100	95	80	Remove
3800 and over	3450 – 3799	3300 – 3449	Below 3300	

- 1.10.2 Portland Cement Concrete Street Pavement, Sidewalks, Driveways, Slope Pavement, and Drainage Structures.** All Portland Cement Concrete used within City of Alexandria right-of-way, servitudes, and/or property shall contain a minimum of 6 sacks of cement per cubic yard of concrete. When required by the ENGINEER, samples of concrete for compression tests, as prescribed in AASHTO M205 and T23, shall show a minimum compressive strength of three thousand eight hundred pounds per square inch (3,500 psi) in twenty eight (28) days when tested in accordance with AASHTO T22 and ASTM C39.

Payment for Deficient Portland Cement Concrete. If cylinders do not meet twenty eight (28) day compressive strength requirements, the CONTRACTOR may either:

- (A) Accept an adjusted price in accordance with Schedule 1 below; or
- (B) Within five (5) days following the receipt of the twenty eight (28) day cylinder test report, CONTRACTOR may choose to core pavement in deficient area at his expense. The core sample strength will be used as basis for payment in accordance with Schedule 1 below:

**SCHEDULE 1  
PRICE ADJUSTMENT SCHEDULE**

<b>Average Compressive Strength (PSI) at 28 days</b>	<b>Payment (Percent of Contract Unit Price/Lot)</b>			
	<b>100</b>	<b>95</b>	<b>80</b>	<b>Remove</b>
	3500 and over	3150 – 3499	3000 – 3149	Below 3000

- 1.11 **FALSEWORK.** Falsework for supporting concrete shall be built on foundations of sufficient strength to carry the loads without appreciable settlement. Falsework that cannot be founded upon solid footings must be supported by ample falsework piling. Falsework shall be designed to carry full loads coming upon it. All spans shall be given sufficient temporary camber to allow for shrinkage and settlement. Bridges shall have a permanent camber only when shown on the PLANS. If appreciable settlement occurs in the falsework, the work shall be stopped and any masonry affected shall be removed and the falsework rebuilt. In general, double wedges or other suitable means shall be provided for constructing and maintaining falsework and forms to correct lines.

If requested by the ENGINEER, detail drawings of the falsework shall be submitted to him for approval, but such approval shall not operate to relieve the CONTRACTOR of any of his responsibility under the contract for the successful completion of the improvement.

- 1.12 **FORMS.** Forms shall be so designed and constructed that they may be removed without injuring the concrete. Forms for exposed surfaces shall not adhere to nor discolor concrete.

Forms for exposed surface shall be made of sized and dressed tongue and groove or shiplap lumber, plywood or metal of uniform thickness in which all bolt and rivet holes are countersunk so that in either case, a plane smooth surface of the desired contour is obtained. Rough lumber may be used for backing or for surfaces, which will not be exposed in the finished structure. All lumber shall be free from knot holes, loose knots, cracks, splits, warps or other defects affecting the strength or appearance of the finished structures. Form lumber shall be free from bulge or warp and shall be cleaned thoroughly if used a second time.

In designing forms and centering, the concrete shall be treated as a liquid weighing one hundred fifty pounds per cubic foot (150 pcf) for vertical loads, and not less than eighty five pounds per cubic foot (85 pcf) for horizontal pressure. The unsupported length of wooden columns and compression members shall not exceed thirty times (30) times the diameter of the least side.

The forms shall be so designed that portions where finishing is required may be removed without disturbing portions of forms, which are to be removed later and

as far as practicable, so that form marks will conform to the general lines of the structure. Column form marks shall be vertical and symmetrically placed.

When possible, forms shall be daylighted at intervals not greater than ten feet (10') vertically; the openings being sufficient to permit free access to the forms for the purpose of inspecting, working and spading the concrete.

The forms shall be built in line and braced in a substantial and unyielding manner. Wires for tying forms shall not extend through faces of concrete that will be exposed in the finished work. In general, forms shall be tied together with bolts that can be removed. The forms shall be mortar tight and, if necessary to close cracks due to shrinkage, shall be soaked thoroughly with water. Forms for reentrant angles shall be chamfered and forms shall be filleted at sharp corners. The interior surfaces of forms shall be adequately oiled, greased, or soaped to insure non-adhesion of mortar. Forms shall be inspected by the ENGINEER immediately prior to placing concrete. Dimensions shall be checked carefully and any bulging or warping shall be remedied and all dirt, sawdust, shavings or other debris be paid to ties and bracing, and where forms appear to be insufficiently braced or unsatisfactorily built either before or during construction, the ENGINEER shall order the WORK stopped until the defects have been corrected to his satisfaction.

Forms shall be so constructed that the finished concrete shall be of the form and dimensions shown on the PLANS and true to line and grade. Cleanout ports shall be provided at the top surface of concrete where a stoppage of placing occurs.

**1.13 PLACING CONCRETE.** The internal temperature of plastic concrete for portland cement concrete pavement shall not exceed ninety five degrees Fahrenheit (95°F) at the time of placement.

Concrete shall be placed in the forms immediately after mixing and in no case shall concrete be used which does not reach final position in the forms within forty five (45) minutes after water is first added to the mix. The method of placing shall be such as to avoid segregation of the aggregates or displacement of reinforcement.

Use of long chutes for conveying concrete from mixing plant to forms will not be permitted. Troughs, pipes or short chutes used as aids in placing concrete shall be arranged and used in such a manner that the ingredients of the concrete are not separated. Where steep slopes are required, troughs and chutes shall be equipped with baffle boards or be in short lengths that reverse the direction of movement. When pipes are used, they shall be kept full of concrete and have their lower ends kept buried in fresh concrete as required when a tremie is used. All chutes, troughs and pipes shall be kept clean and fresh and free from coatings of hardened concrete by flushing thoroughly with water after each run. Water used for flushing shall be discharged clear of the concrete in place. Troughs and chutes shall be either of metal or metal lined and shall extend, as

nearly as possible, to the point of deposit. When the discharge must be intermittent, a hopper or other device for regulating the discharge shall be provided.

When placing operations involve dropping concrete a distance of more than five feet (5'), it shall be deposited through a sheet of metal or other approved tremie. Placing of concrete shall be so regulated that the pressures caused by the wet concrete shall not exceed those used in the design of the forms.

Special care shall be taken to fill each part of the forms by depositing concrete directly as near final position as possible, to work the coarser aggregates back from the face and to force the concrete under and around the reinforcement bars without displacing them. After the concrete has taken its initial set, care shall be exercised to avoid jarring the forms or placing any strain on the ends of projecting reinforcement.

The placing of concrete shall be done in such a manner that the steel reinforcement is not coated with cement before its final embedment. In depositing concrete around steel shapes and closely spaced reinforcing bars, the concrete shall be deposited on one side of the steel and worked until it flushes under the steel to the opposite side before any concrete is placed on the opposite side or over the steel.

**Internal Vibration.** Concrete, during and immediately after depositing, shall be thoroughly consolidated. Consolidation shall be done by mechanical vibration subject to the following provisions.

- (A) Vibration shall be internal unless authorization for other methods is obtained or as provided herein.
- (B) Vibrators shall be of an approved type and design, capable of transmitting vibration to concrete at frequencies of at least 4,500 impulses per minute.
- (C) Intensity of vibration shall be such as to visibly affect concrete over a radius of at least 18 inches (18").
- (D) The CONTRACTOR shall provide a sufficient number of vibrators to properly consolidate each concrete batch immediately after it is placed.

The CONTRACTOR shall furnish and use as a minimum, one vibrator for every twenty five cubic yards (25 yd.<sup>3</sup>) of concrete placed per hour and shall keep spare units in reserve.

- (E) Vibrators shall be manipulated so as to thoroughly work concrete around reinforcement and imbedded fixtures and into corners and angles of forms.

Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. Vibrators shall be inserted and withdrawn from the concrete slowly. Vibration shall be of sufficient duration and intensity to thoroughly compact concrete, but shall not cause segregation. Vibration shall not be continued at any one (1) point to the extent that localized areas of grout are formed.

Application of vibrators shall be at points uniformly spaced and not farther apart than twice (2) the radius over which vibration is visibly effective.

- (F) Vibration shall not be applied directly to or through reinforcement to sections or layers of concrete, which have hardened to the degree that concrete ceases to be plastic under the vibration. It shall not be used to make concrete flow over distances so great as to cause segregation. Vibrators shall not be used to drag concrete in forms.
- (G) Vibration shall be supplemented by such spading as necessary to ensure smooth surfaces and dense concrete along form surfaces and in corners and locations inaccessible to vibrators.
- (H) These provisions for vibration shall also apply to precast concrete except that, if approved, the manufacturer's methods of vibration may be used.

Concrete shall be placed in horizontal layers not more than 15 inches thick unless otherwise permitted. When less than a complete layer is placed in one operation, it shall be terminated at a vertical bulkhead. Each layer shall be placed and consolidated before the preceding batch has taken initial set to prevent damage to green concrete and avoid surfaces of separation between batches. The top surface of concrete adjacent to forms shall be finished to a suitable grade strip.

When concrete placement is temporarily discontinued, the concrete shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete after becoming firm enough to retain its form.

Where a featheredge might be produced at a construction joint, as in the sloped top surface of a wing-wall, an inset form shall be used to produce a blocked out portion in the preceding layer, which shall produce an edge thickness of not less than 6 inches in the succeeding layer. Placement of concrete shall not be discontinued within 18 inches of the top of any face, unless provision has been made for a coping less than 18 inches thick, in which case, the construction joint may be made at the underside of the coping.

Following concrete placement, accumulations of mortar splashed on reinforcement steel and forms shall be removed. Dried mortar chips and dust shall not be mixed in fresh concrete.

Concrete shall be placed in each section of the WORK in a continuous operation working day and night, if necessary, to avoid stopping. The depth of layers used shall be such that the succeeding layer is placed before the previous layer has attained initial set. Each layer shall be compacted in a manner that will break up and obliterate any tendency to form a plane of separation between the layers. If it is necessary, by reason of an emergency, to stop placing concrete before any section is completed, bulkheads shall be placed as the ENGINEER may direct. Any place where the placing of concrete is discontinued for a sufficient time to allow the concrete to take initial set shall be deemed a construction joint and treated as hereinafter described under "Forming Joints".

Horizontal layers so located as to produce a construction joint at a location wherein a "Featheredge" might be produced in the succeeding layer shall be formed by inset WORK so that the succeeding layer will end in a body of concrete having a thickness of not less than six inches (6").

After the concrete finished surface has begun to set, it shall not be disturbed for forty eight (48) hours.

The method and manner of placing concrete shall be so regulated as to place all construction joints across regions of low shearing stress and in such locations as will be hidden from view to the greatest possible extent.

- 1.14 COLD WEATHER CONCRETING.** Except by specific written authorization by the ENGINEER, concreting operations shall not be continued when a descending air temperature in the shade and away from artificial heat falls below forty degrees Fahrenheit (40° F) nor resumed until an ascending air temperature in the shade and away from artificial heat reaches thirty-five degrees Fahrenheit (35° F). If such authorization is granted, the aggregates shall be heated by either steam or dry heat to a temperature of not less than seventy degrees Fahrenheit (70°F) nor more than one hundred fifty degrees Fahrenheit (150°F). The temperature of the mixed concrete shall be not less than sixty degrees Fahrenheit (60°F) nor more than one hundred degrees Fahrenheit (100°F) at the time of placing it in the forms. Neither salt nor chemical admixtures shall be added to the concrete to prevent freezing. When directed by the ENGINEER, the CONTRACTOR shall furnish sufficient canvas and framework, or other type of housing, to enclose and protect the structure in such a way that the air surrounding the fresh concrete can be kept at a temperature above fifty degrees Fahrenheit (50°F) for a period of five (5) days after the concrete is placed. Sufficient heating apparatus, such as stoves, salamanders or steam equipment, and fuel to furnish all required heat shall be supplied. The heating apparatus

shall be such as to heat the mass uniformly and preclude the possibility of the occurrence of hot spots that will burn the material.

The CONTRACTOR shall assume all risk in connections with placing concrete in cold weather and permission given to place concrete under the above conditions shall in no way relieve the CONTRACTOR or responsibility for proper results. Should concrete placed under such conditions prove unsatisfactory, it shall be removed and replaced at the CONTRACTOR'S expense.

When concrete is being placed during cold weather and the air temperature may be expected to drop below thirty-five degrees Fahrenheit (35° F), a sufficient supply of straw, hay, grass, or other suitable blanketing material shall be provided along the line of the WORK and at any time when the air temperature may be expected to reach the freezing point during the day or night, the materials so provided shall be spread over the pavement to a sufficient depth to prevent freezing of the concrete before it has thoroughly hardened. The CONTRACTOR shall be responsible for the quality and strength of the concrete laid during cold weather and any concrete injured by frost action shall be removed and replaced at no additional cost to the City of Alexandria.

Concrete shall not be placed if the temperature is forecasted by the U.S. Weather Service to be twenty-five degrees Fahrenheit (25° F) or less within the twenty four (24) hour period following placement.

## **1.15 FORMING JOINTS.**

- 1.15.1 Construction Joints. When the WORK of placing concrete is delayed until the concrete has taken initial set, the point of stopping shall be deemed a construction joint. The location of construction joints shall be planned in advance and shall be subject to approval by the ENGINEER. The placing of concrete shall be carried continuously from joint to joint. These joints shall be perpendicular to the principal lines of street and, in general, be located at points of minimum shear.

At all horizontal construction joints and at other locations, when directed, a gage strip not less than two inches (2") thick, shall be placed inside the forms along all exposed faces to give the joint a straight line and to eliminate wedge-shaped particles of concrete that might chip off. In placing concrete up to construction joints, the forms shall be "over filled" at least one inch (1") and all excess material removed, including all laitance.

In joining fresh concrete to concrete that has already set, the forms shall be drawn tight against the face of the set concrete and all gage strips and key forms removed. The surface of the set concrete to be contacted shall then be cut over with suitable tools to remove all residual laitance, and loose and foreign material. This surface shall then be washed and scrubbed with wire brooms, drenched with water until saturated and kept saturated until the new

concrete is placed. Immediately prior to placing new concrete, the old surface shall be coated thoroughly with a very thin coating of neat cement mortar. If approved by the ENGINEER, broken paving or curbs may be repaired by using an epoxy glue approved by the ENGINEER.

- 1.15.2 Keys. To bond successive courses, suitable keys shall be formed at the top of the upper layer of each day's WORK and at other levels where WORK is interrupted. These keys shall be formed by the insertion and subsequent removal of beveled wood strips that shall be saturated thoroughly with water prior to insertion. Rough stone or steel dowels may, at the discretion of the ENGINEER, be used in lieu of keys. All construction joints shall be keyed or doweled as shown on the PLANS or directed by the ENGINEER.
- 1.15.3 Sliding Joints. Sliding joints shall be true planes parallel to the direction of movement. Where sliding joints are to be provided at the ends of slabs, girders or beams or between walls, etc., the surface of the supporting concrete shall be given a smooth finish and covered with two (2) layers of (3) three-ply roofing felt to separate the concrete.
- 1.15.4 Expansion Joints. Expansion joints shall be used where shown on the PLANS. The thickness of the expansion joint shall be as required on the PLANS. Premoulded bituminous joint filler when required, shall be cut to the same shape as the area to be covered but one-quarter of an inch ( $\frac{1}{4}$ " ) smaller along all surfaces that will be exposed in the finished WORK. It shall be fixed firmly against the surface of the concrete already in place in such a manner that it will not be displaced when the concrete is deposited against it. Where necessary to use more than one piece to cover any surface, the abutting pieces shall be placed in close contact and the joint between the separate pieces shall be covered with hot asphalt to insure proper retention. The one-quarter of an inch ( $\frac{1}{4}$ " ) space along the edge at exposed faces shall be filled with wooden strips of the same thickness as the joint material. These wooden strips shall be saturated with oil and have sufficient "draft" to make them readily removable after the concrete is placed. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be cut neatly and removed.
- 1.15.5 Special Joints. Special water-tight and flashed expansion joints shall be constructed as shown on the PLANS.

## **1.16 CURING CONCRETE.**

- 1.16.1 Curing Materials. The curing materials shall conform to the following requirements:
- (A) Burlap and Combined Burlap and White Polyethylene Sheeting. Burlap cloth from Jute or Kenaf shall comply with AASHTO M182, Class 3. Combined burlap and white polyethylene sheeting shall comply with

AASHTO M171. Worn burlap, burlap with holes, and burlap reclaimed from other uses than that of curing concrete will not be permitted. New burlap having "misprint brands" or stenciling will be permitted. If burlap is furnished in strips, they shall be in no case less than three feet (3') in width and for transverse laying the strips, after full shrinkage, shall be not less than two feet (2') longer than the width of pavement slab under construction.

Testing for efficiency of burlap furnished for use on projects shall comply with ASTM C156.

Other precautions to ensure the proper development of concrete strength shall be taken as the ENGINEER may direct.

- (B) Impervious Membrane Curing Compound White Pigmented. This material shall be a Type 2 white-pigmented compound complying with AASHTO M 148 and be an approved product listed in the LA DOTD Qualified Products List Number 65. Curing compound shall be of a consistency suitable for spraying, shall be relatively non-toxic, and shall satisfactorily adhere to a horizontal surface of damp concrete when applied immediately after the disappearance of surface water. The resultant film shall be continuous, uniform, free from pinholes, moisture impermeable and shall not react with the components of the concrete.

Testing for the efficiency of membrane curing compound furnished for use on this project shall comply with ASTM C156; however, when applied to test specimens at the rate of coverage recommended by the manufacturer for one application, the specimens shall not lose more than the maximum amount of moisture as follows:

At 24 hours-----	2.5%*
At 72 hours-----	5.5%
At 7 days-----	7.0%

\*Based on moisture remaining in specimen at time of coating.  
The specimen shall remain in the mold throughout the test.

The compound shall be of such viscosity that it may be readily applied by standard power-spraying equipment at temperatures above forty degrees Fahrenheit (40°F).

The compound shall be dry to touch, on a damp horizontal concrete surface, in not more than two (2) hours at a temperature of seventy five degrees Fahrenheit (75°F), when applied at the rate of coverage recommended by the manufacturer.

The compound, when applied to a new concrete surface at the specified coverage, shall provide a uniformly white appearance and shall effectively obscure the original color of concrete. After the compound has dried, it shall have an apparent daylight reflectance of not less than sixty (60) as determined by Method 612 of Federal Specification TT-P-141a. The compound shall have a building power of not less than eighty (80) square feet per gallon, when tested as follows:

The 1-square foot test area of black and white checkerboard high power chart (type used in Federal Specification TT-P-141a, Method 411.1) shall be cut into four (4) equal rectangles, dried at 105° to 110°C for one (1) hour, cooled and weighed. The sealing compound shall be sprayed on two (2) of the rectangles in an amount that barely permits identifying a contrast between the black and white areas. On the other two rectangles, the compound shall be applied in an amount slightly more than necessary to eliminate completely the contrast between the black and white area. The coated rectangles shall then be dried at 105° to 110°C for three (3) hours, cooled and weighed. The hiding power shall be computed from the following formula:

$$\text{Hiding Power in sq. ft./gallon} = \frac{W_g \times S}{W_d \times 100}$$

Where:

$W_g$  = Weight per gallon of compound in grams.

$S$  = Solids content of compound (Paragraphs 7 and 8 ASTM E154).

$W_d$  = Total weight of dried coating on all four rectangles.

Other precautions to ensure the proper development of concrete strength shall be taken as the ENGINEER may direct.

- 1.16.2 Curing Methods. After finishing operations have been completed, the newly laid concrete shall be protected and cured by the burlap or the impervious membrane method, if standard portland cement has been used in the construction of the pavement, as hereinafter provided. If High-Early-Strength Portland cement has been used in the construction of portland cement concrete pavement, the concrete shall be protected and cured by the method of curing concrete constructed with High-Early-Strength Portland cement, as hereinafter provided.

In all cases, curing shall have prior rights to all water supply or supplies. Failure to provide sufficient approved cover material and to maintain the protection as prescribed, or lack of water supply capacity to take care of both curing and other requirements shall be cause for immediate suspension of concreting operations. Water shall be applied by a spray fine enough to avoid damage to the fresh concrete.

Burlap method shall meet the respective requirements of the following section:

- (A) Burlap and Combined Burlap and White Polyethylene Sheeting Method. Immediately after finishing operations have been completed, the entire surface of the newly laid concrete shall be covered with wet burlap, laid directly upon the finished surface. The burlap shall be in a thoroughly wet condition when placed on the concrete and shall be kept continuously saturated with water both day and night, including weekends and holidays, until removed. The manner of laying the burlap and the arrangement of the strips shall be as required by the ENGINEER to best accommodate the necessary surface testing, joint trimming and other operations. The strips of burlap must be laid to overlap six inches (6"), or such greater overlap as the ENGINEER may order, to prevent occurrence of gaps or uncovered spots during the curing. Curing shall continue for a period of four days dating from the time the slab is finished. The period of time the burlap shall remain on the pavement may be extended by the ENGINEER, if, in his opinion, weather or other conditions make it advisable to extend the curing period. After the forms are removed, the burlap shall be folded down and held in contact with the edges of the slab, or the overhanging ends of the burlap folded back on top of the pavement so that the top surface of the slab is just covered and the edges of the slab cured by banking them with earth from the shoulders and keeping the banked earth wet.
- (B) Impervious Membrane Method. The use of membrane curing shall be restricted to the curing of horizontal surfaces only. Upon completion of finishing operations and immediately after the disappearance of all water sheen, the entire surface of the pavement slab shall be covered with a single application of WHITE PIGMENTED membrane curing compound. Curing compounds shall be thoroughly agitated during use and shall be uniformly sprayed, in a single application, by approved mechanically powered, pressure spraying equipment on all concrete surfaces, at the specified rate of coverage recommended by the manufacturer and in no case to exceed one hundred square feet (100 ft.<sup>2</sup>) per gallon. The curing shall continue for a period of not less than seven (7) days before opening to traffic. In the event rain should fall before the final set of the compound (dry to touch), it shall be reapplied as required herein. If concrete surfaces have become dry, they shall be thoroughly moistened immediately prior to the application of the curing compound. Should the coating show any discontinuities or pin-holes, a second coat shall be applied immediately, at the same coverage called for in the initial application, wherever such defects are found. When the concrete has hardened sufficiently, and in no case less than twelve (12) hours nor more than thirty-six (36) hours, except in extremely hot weather, when at the option of the ENGINEER, this time shall be decreased, the form shall be removed and the edges of the slab or curb and gutter banked with earth from the shoulders, thoroughly wetted and left undisturbed without additional wetting, for the duration of the curing period.

- (C) Method of Curing Concrete Constructed with High-Early-Strength Portland Cement. When High-Early-Strength Portland cement has been used in the construction of the pavement, the concrete shall be protected and cured by and of the methods provided herein for the standard portland cement. In addition, burlap will be permitted for the entire curing period. The curing, by whatever method used, shall continue for a period of not less than forty-eight (48) hours from the time finishing operations were completed.

- 1.16.3 Unless otherwise permitted by the ENGINEER, concrete bridge floors shall be closed to traffic for a period of at least fourteen (14) days after placing and for such additional time as may be considered advisable.

- 1.17 REMOVAL OF FORMS AND FALSEWORK.** Except as herein provided, forms for surfaces required to be finished, shall be removed when the concrete has aged not less than one-half ( $\frac{1}{2}$ ) nor more than two (2) curing days after the concrete is placed. To facilitate slab finishing, forms for inside curb faces on roadway slabs may be removed in not less than three (3) hours provided the concrete has set sufficiently and forms are constructed in a manner to permit their removal without damage to the curbs.

The following SPECIFICATIONS for the removal of forms and falsework from portions of structure that do not require surface finish shall apply to the forms and falsework under the portions of slabs that cantilever more than one foot (1') beyond the outside beams, to the forms and falsework under girders and to the forms and falsework under bent caps of framed bents regardless whether or not those surfaces are required to be finished.

Forms and falsework for the portions of the structures that do not require finishing shall be removed in accordance with either of the following methods, as the CONTRACTOR elects:

- 1.17.1 Method 1. Forms and falsework may be removed as soon as the concrete has attained a compressive strength, as determined by either beam or cylinder tests of three thousand pounds per square inch (3,000-psi).

Test specimens shall be made from the concrete and cured under the same conditions as the portion of the structure involved. For the test beams, the standard method of tests for flexural strength of concrete (Laboratory method using simple beam with third-point loading, ASTM C78) shall be used, except the test beam will be made in the field and sampling of concrete for molding specimens and storing of the test beams shall be done in the same manner as provided for the test cylinders. For the test cylinders, the standard methods of tests for compressive strength ASTM C-39 shall be used.

- 1.17.2 Method 2. Forms and falsework may be removed when the concrete has aged for the minimum number of curing days set forth in the following table:

Forms and falsework under slabs or girders having span lengths of ten feet (10') or less	-----	7 Days
Forms and falsework under slabs or girders having span lengths over ten feet (10') and less than seventeen feet (17')	-----	7 Days plus one (1) day for each foot of span over 10 feet
Forms and falsework under slabs or girders having spans over seventeen feet (17') in length	-----	14 Days
Forms and falsework under the portion of slabs that cantilever more than one foot (1') beyond the outside beams	-----	4 Days
Forms and falsework under caps or tie beams of framed bents	-----	5 Days
Forms under caps of pile bents	-----	2 Days
Forms and falsework under webwalls of piers	-----	7 Days
Forms for walls, columns, side of beams and under slabs that cantilever one foot (1') or less beyond the outside beam	-----	2 Days
Forms for concrete caissons	-----	2 Days

The term "curing day" will be interpreted as any calendar day on which the temperature is above fifty degrees Fahrenheit (50°F) for at least nineteen (19) hours. Colder days may be counted if satisfactory provision is made to maintain the air temperature adjacent to the concrete constantly above fifty degrees Fahrenheit (50°F) throughout the entire day. If continued cold weather when artificial heat is not provided, the ENGINEER may permit the removal of forms and falsework at the end of a period of calendar days equal to twice the number of curing days stated in the table.

In the determination of the time for the removal of forms and falsework, and the discontinuance of heating, consideration shall be given to the location and the character of the structure, the weather and other conditions influencing the setting of concrete, and the materials used in the mix.

The foregoing provisions relative to forms and falsework removal, under either method the CONTRACTOR elects to use, shall apply only to forms or parts of forms that are so constructed as to permit removal without disturbing forms of

falsework that are required to be left in place for a longer period on other portions of the structure.

Method of form removal likely to cause overstressing of the concrete shall not be used. In general, the forms shall be removed from the bottom upwards. Forms and their supports shall not be removed without the approval of the ENGINEER. Supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take the stresses due to its own weight.

In general, arch centering shall be struck and the arch made self-supporting before the railing or coping is placed. This precaution is essential in order to avoid jamming of the expansion joints and variations in alignment. For filled spandrel arches, such portions of the spandrel walls shall be left for construction subsequent to the striking of centers, as may be necessary to avoid jamming of the expansion joints.

Centers shall be gradually and uniformly lowered in such a manner as to avoid injurious stresses in any part of the structure. In arch structures of two (2) or more spans, the sequence of striking centers shall be specified or approved by the ENGINEER.

No forms shall be removed at any time without the consent of the ENGINEER. Such consent shall not relieve the CONTRACTOR of responsibility for the safety of the WORK. Blocks and bracing shall be removed with the forms and in no case shall any portion of the wood forms be left in the concrete. As soon as the forms are removed, all projecting wire or other metal devices used for holding the forms in place and which pass through the body of the concrete shall be removed or cut back at least one-quarter of an inch ( $\frac{1}{4}$ " ) beneath the surface of the concrete and the holes or depressions thus made, and all other holes, depressions and small voids which show upon the removal of the forms, shall be filled with cement mortar mixed in the same proportions as that which was used in the body of the WORK. Lips or mortar and irregularities caused by form joints shall be removed. The presence of excessive honeycomb areas may be considered sufficient cause for the rejection of the structure, and upon written notice from the ENGINEER, the CONTRACTOR shall remove and rebuild the structure in part or in whole as specified, at his own expense. In patching holes or porous spots, all coarse or broken material shall be chipped away until a dense uniform surface of concrete exposing solid coarse aggregate is obtained. Feathered edges shall be cut away to form a face perpendicular to the surface being patched. All surface of the cavity shall be saturated thoroughly with water, after which a thin layer of neat cement mortar shall be applied. The cavity shall then be filled with a thick, dry mortar composed of one (1) part of portland cement to two (2) parts of sand, which shall be tamped into place thoroughly. The surface of this mortar shall be floated with a wooden float before initial set takes place and shall present a neat and workmanlike appearance. The patch shall be kept wet for five (5) days. For patching large or deep areas, coarse aggregate shall be added to

the patching material and special precautions shall be taken to ensure a dense, well-bonded and properly cured patch, all as required by the ENGINEER. An approved epoxy gluing compound may be used with the consent of the ENGINEER.

- 1.18 High-Early-Strength Portland Cement Concrete.** The use of High-Early-Strength cement in part of the WORK other than as may be provided for by the PLANS or SPECIAL PROVISIONS will not be permitted without the written consent of the ENGINEER.

The use of High-Early-Strength cement when permitted on the request of and for the convenience of the CONTRACTOR will be the CONTRACTOR'S responsibility. This responsibility shall extend to the replacement by the CONTRACTOR at his own expense of any defective WORK that may result from the use of high-early-strength cement, no matter what the extent of the replacement may be. Request for permission to use high-early-strength cement in any part of the WORK as may be provided for by the PLANS or SPECIAL PROVISIONS must be in writing and addressed to the ENGINEER.

When high-early-strength cement is used in structures, the concrete must be maintained in a saturated condition for at least seventy-two (72) hours.

If high-early-strength cement is used, forms and falsework shall be removed in accordance with the requirements contained herein. However, if the CONTRACTOR elects to use Method 2, the number of curing days given in the table may be reduced as directed by the ENGINEER, except that in no case shall forms and falsework be removed before the lapse of seventy-two (72) hours after the completion of placing of the concrete depending on such forms or falsework for support.

- 1.19 FLOWABLE FILL:** Flowable Fill shall consist of furnishing, placing and consolidating a controlled low strength flowable fill as an alternative to compacted soil. Applications for this material include, but are not limited to, general backfilling of drainage structures, entrenchments across pavements, encasements, bedding, void filling and other uses as shown on the plans or as approved by the ENGINEER. The flowable fill shall be a cementitious mixture of Portland cement, fly ash (depending on application and mix design), fine aggregate, water, entrained air and appropriate admixtures for the particular application.

- (a) **Materials and Mix Design:** Material and Mix Design shall conform to Subsection 710.02 of the Louisiana Department of Transportation Standard Specifications, Latest Edition.
- (b) **Construction Requirements:** Before placement, temporary end-dams or soil berms shall be provided as directed by the ENGINEER to confine the flowable fill. Flowable fill shall be placed to the lines and grades shown on the plans or as directed. Where flotation or misalignment may occur due to

hydrostatic pressure, the contractor shall assure correct alignment and placement of the encased structure by using straps, soil anchors, or other approved means of restraint. Flowable Fill shall be placed by chute, pumping or other methods approved by the ENGINEER. Due to flowable fill's liquid condition, hydrostatic pressure on adjacent structures shall be taken into account on deep fills where multiple lifts may be required. While in a liquid state, flowable fill in deep excavations is in a quick condition and shall be protected until hardening occurs.

## **1.20 FINISHING CONCRETE.**

- (A) General. All concrete surfaces exposed in the completed WORK shall comply with the requirements of the clause defining "Rubbed Finish" except as provided hereinafter for "Concrete Floors" and for "Curb and Sidewalk Finish". Concrete street pavement shall have a brush or broom finish. For all concrete WORK where the vibrating screed can not be used, a hand electric vibrator shall be used. All concrete surfaces that are not exposed in the completed WORK shall comply with the requirements of the clause defining "Ordinary Finish".
- (B) Rubbed Finish. After the concrete has sufficiently set to permit pointing, the expose surfaces shall be thoroughly wetted and rubbed with a carborundum stone or other abrasive of equal quality to bring the surface to a smooth texture and remove all form marks. The paste formed by the rubbing as above described may be finished by carefully stripping with a clean brush, or it may be spread uniformly over the surface and allowed to take a reset, after which it shall be finished by floating with a canvas, carpet-faced or cork float or rubbed down with dry burlap.
- (C) Ordinary Finish. An "Ordinary Finish" is defined as the surface left by the removal of the forms with all holes left by form ties filled and all defects repaired. The surface shall be true and even, free from stone pockets, depressions or projections beyond the surface. All surfaces that cannot be repaired to the satisfaction of the ENGINEER shall be given a "Rubbed Finish".
- (D) Concrete Floor Finish. The roadway surface shall conform to the grade and cross section shown on the PLANS. After the deck is placed, it shall be struck off with a longitudinal screed that shall be constructed of steel shaped and adjustable for sag. It shall be of sufficient length to strike off a full span or panel length in one operation. The screed shall pass over all floor surfaces a minimum of three (3) times. The surface shall then be hand finished to produce an even riding surface by means of floats and belts. Before the concrete has taken its final set, the surface shall be tested for irregularities or waves by means of a ten foot (10') straightedge laid parallel

to the center line of the roadway. Should any point of the concrete surfaces be one-eighth inch ( $\frac{1}{8}$ " ) or more below or above the straight line, such defect shall be immediately remedied.

- (E) Curb and Sidewalk Finish. Exposed faces of curbs and sidewalks shall be finished to true surfaces having the lines and grades shown on the plans. Concrete shall be worked until the coarse aggregate is forced down into the body of the concrete and a layer of mortar one-quarter of an inch ( $\frac{1}{4}$ " ) thick is flushed to the top. The surface shall then be struck off to obtain a true surface and given a brush finish. The junction of the sidewalk with masonry parapets shall be finished with a fillet of three-quarters of an inch ( $\frac{3}{4}$ " ) inch radius. Walk surfaces shall be laid out in squares with a grooving tool, as shown on the PLANS or as directed by the ENGINEER.
- (F) Special Finishes. The following finishes shall be used only when specifically called for on the PLANS.
  - (1) Ground or Terrazzo Finish. Using a number sixteen carborundum stone or an abrasive of equal quality, the surface shall be ground dry or in water until it is smooth and individual pebbles and aggregate particles are cut and polished. The surface shall then be completely cleansed with water, and the final rubbing done by means of a number thirty (30) stone. The finished surface shall present the texture of polished marble and shall show the various aggregate particles in polished outline.
  - (2) Tooled Finish. Finish of this character for panels and other like work may be secured by the use of a bush hammer, pick, crandall or other approved tool. Air tools, preferably, shall be employed. No tooling shall be done until the concrete has set for at least fourteen (14) days and as much longer as may be necessary to prevent the aggregate particles from being picked out of the surface. The finished surface shall show a grouping of broken aggregate particles in a matrix or mortar, each aggregate particle being in slight relief.
  - (3) Sand Blast Finish. This type of finish shall be similar to that above described for tooled finish, but finer grained in texture. The sand blasting must be done by means of approved equipment and in such manner as to produce an even, fine-grained surface in which the mortar has been cut away leaving the aggregate particles exposed.

**1.21 DRAINAGE AND WEEP HOLES.** Drainage and weep holes shall be constructed in the manner and where indicated on the PLANS or directed by the ENGINEER. Drains and weep holes in the faces of the abutments shall be connected with the roadway drains wherever indicated on the PLANS. Ports or vents for equalizing hydrostatic pressure shall be placed below low water. Weep holes shall be placed at the elevations shown or directed by the ENGINEER.

Forms for weep holes through concrete may be PVC having an SDR-26 or better rating or concrete drain pipe. Drain pipes embedded in concrete shall be standard light weight cast iron water pipe, wrought iron pipe, or SDR-26 PVC pipe. The pipe shall be held rigidly against displacement during the placing of the concrete.

## 2.1 **MEASUREMENT.**

- (a) **Concrete for General Use:** Concrete for General Use shall be measured by the Cubic Yard, by batch tickets, furnished and installed in accordance with the plans or as directed by the Engineer. No measurement will be made for Concrete unless specifically directed by the ENGINEER and if not included in other Items of work.
- (b) **Flowable Fill:** Flowable Fill will be measured by the Cubic Yard, by batch tickets, furnished and installed in accordance with the plans or as directed by the ENGINEER. Flowable Fill shall be used only at the direction of the ENGINEER.

## 3.1 **PAYMENT.**

- (a) **Concrete for General Use:** Concrete for General Use will be paid at the Contact Unit Price per Cubic Yard furnished and installed in accordance with the plans or as directed by the ENGINEER. Payment shall be full compensation for all necessary labor, material, equipment required to complete the item in accordance with these SPECIFICATIONS or as directed by the ENGINEER.
- (b) **Flowable Fill:** Flowable fill will be paid at the Contract Unit Price per Cubic Yard furnished and installed in accordance with the plans or as directed by the ENGINEER. Payment shall be full compensation for all necessary labor, material, equipment, end-dams, anchors and all incidentals to complete the item in accordance with these SPECIFICATION or as directed by the ENGINEER.

Payment will be made as follows:

Item No.	Pay Item	Pay Units
620-01	Concrete for General Use	Cubic Yard
620-02	Flowable Fill	Cubic Yard

**SECTION 630 REINFORCING STEEL**

- |                          |                       |
|--------------------------|-----------------------|
| 1.1 Description          | 1.5 Structures        |
| 1.2 Billet Steel         | 1.6 Concrete Pavement |
| 1.3 Fabric Reinforcement | 2.1 Measurement       |
| 1.4 General Requirements | 3.1 Payment           |

**1.1 DESCRIPTION.** This item shall consist of furnishing and placing reinforcing steel of the quality, type, size and quantity for reinforced portland cement concrete structures as designated in accordance with these SPECIFICATIONS and as shown on the DRAWINGS.

1.1.1 The grades and types of reinforcing steel shall be as follows, unless otherwise shown on the PLANS.

- (A) Structure. Reinforcing steel for structures shall be deformed bars, of new billet steel.
- (B) Concrete Paving. Reinforcing steel for concrete paving shall be plain or deformed bars or deformed bars of billet steel or fabric reinforcement, as indicated on PLANS.

**1.2 BILLET STEEL.** Steel reinforcing bars shall conform to ASTM A615, Grade 60.

**1.3 FABRIC REINFORCEMENT.** Wire mesh reinforcement shall conform to ASTM A185.

**1.4 GENERAL REQUIREMENTS.**

- (A) Protection of Material. Steel reinforcement shall be protected at all times from injury. When placed in the WORK, it shall be free from dirt, detrimental scale, paint, oil or other foreign substance. However, when steel has on its surface loose mill scale, rust and dust, which is easily removable, it may be cleaned by a satisfactory method if approved by the ENGINEER.
- (B) Approval of Reinforcement Placing. Placing and fastening of reinforcement in each section of the WORK shall be approved by the ENGINEER before any concrete is deposited in that section.
- (C) Bending. When bending is required, it shall be accurately done without the use of heat and bars having cracks or splits at the bends shall be rejected.

**1.5 STRUCTURES.**

- (A) **Placing and Fastening.** All reinforcement shall be accurately placed in the exact position shown on the PLANS and shall be so securely held in position by wiring and blocking from the forms and by wiring together at intersections that it will not be displaced during the depositing and compacting of the concrete. Blocks for holding reinforcement from contact with forms and for separating layers of bars shall be precast mortar blocks of approved shape and dimensions. Metal chairs for holding reinforcement from contact with forms and for separating layers of bars may be used. Metal chair devices shall be approved by the ENGINEER, as to the condition and type of metal chairs used, prior to incorporating these devices into the WORK.

The use of pebbles, pieces of broken stone or brick, metal pipes and wooden blocks shall not be permitted for use as blocking material.

Cutting coated reinforcement bars by burning will not be permitted.

- (B) **Splices.** All reinforcement bars shall be furnished in the full length shown on the DRAWINGS. No splicing of bars, except where shown on the DRAWINGS, will be permitted without the written approval of the ENGINEER.

Splices, which are permitted, shall not be located at points of maximum stress; they shall, where possible, be staggered and they shall have a length of not less than fifty (50) times the nominal diameter of the bars. The bars shall be rigidly clamped or wired at all splices in a manner approved by the ENGINEER.

- (C) **Welding.** No welds will be permitted.

**1.6 CONCRETE PAVEMENT.** Reinforcing bars and fabric reinforcement shall be placed in accordance with the directions specified under Section 910, "Portland Cement Concrete Pavement".

**2.1 MEASUREMENT.** No measurement will be made for Reinforcing Steel as a separate item, but shall be included in other items, unless otherwise stated in the SPECIAL PROVISIONS.

**3.1 PAYMENT.** Reinforcing Steel will be paid for as part of the various bid items in which it is a part, unless otherwise stated in the SPECIAL PROVISIONS.

**SECTION 640 RIPRAP**

- |                         |                 |
|-------------------------|-----------------|
| 1.1 Description         | 2.1 Measurement |
| 1.2 Materials           | 3.1 Payment     |
| 1.3 Placement of Riprap |                 |

**1.1 DESCRIPTION.** This work consists of furnishing and placing Riprap on Geotextile Fabric in accordance with these SPECIFICATIONS and in conformity to lines, grades and thickness shown on the plans or as directed by the ENGINEER.

**1.2 MATERIALS.** Stone riprap shall not disintegrate upon exposure to the elements or be easily broken from handling, and shall be reasonably free from earth or other foreign materials. The solid weight of stone shall be at least 155 pounds per cubic foot. The least dimension of any individual stone shall be at least 1/3 its maximum dimension. Each shipment of stone shall be reasonably well graded within the specified limits.

Control of gradation will be by visual inspection at the source, project site or both. Any difference of opinion between the engineer and contractor will be resolved by checking the gradation of two random truckloads. Equipment, labor and sorting site shall be furnished by the CONTRACTOR at no direct pay.

Riprap shall be reasonably well graded and shall comply with Louisiana Department of Transportation Standard Specifications, latest edition, Section 711, Table 711-1.

Geotextile Fabric shall conform to the Louisiana Department of Transportation Standard Specification, latest edition, Section 1019.01.

**1.3 PLACEMENT OF RIPRAP.** The area to receive the riprap shall be graded to the required section. Geotextile fabric shall be placed on the area to receive the riprap. Care shall be taken not to damage the geotextile fabric when placing the riprap. Riprap shall be placed on the prepared area in a manner that will produce a reasonably well-graded mass of stone with a minimum practicable percentage of voids. The entire mass of stone will be placed to be in conformance with the lines, grades and thickness at one operation and to avoid displacing underlying material.

**2.1 METHOD OF MEASUREMENT.** Riprap, completed and accepted, will be measured by the Ton. The depth will be shown on the PLANS or established by the ENGINEER. The quantity will be based on Certified Weight delivery tickets. The Delivery tickets shall include the following information.

- a) Date
- b) Time Loaded
- c) Truck Identification
- d) Delivery Location

## e) Quantity Loaded

2.1.1 Necessary excavation and the removal and disposal of excess excavated materials and excavated materials not suitable for use on a project will not be measured for payment, but shall be included in the price for riprap.

2.1.2 Geotextile fabric will not be measured for payment, but shall be included in the price for bedding riprap.

**3.1 PAYMENT.** Riprap will be paid for at the contract unit price per Ton, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, necessary excavation, preparation of subgrade, geotextile fabric, placing required riprap and incidentals necessary to complete the WORK.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
610-01-(Class)	Riprap (Class)	Ton

The class will be designated by a letter, i.e. A, B, C, etc. and the Class will be stated in the Pay Item.

**SECTION 710 CULVERT PIPE**

- |                      |                                  |
|----------------------|----------------------------------|
| 1.1 Description      | 1.7 Relaying Pipe                |
| 1.2 Materials        | 1.8 Backfilling                  |
| 1.3 Excavation       | 1.9 Cleaning Pipes               |
| 1.4 Forming Pipe Bed | 1.10 Stubbing and Plugging Pipes |
| 1.5 Laying Pipe      | 2.1 Measurement                  |
| 1.6 Joining Pipes    | 3.1 Payment                      |

**1.1 DESCRIPTION.** This WORK consist of furnishing, installing, and cleaning pipe culverts, pipe arch culverts, and storm drains, also referred to as conduit, in accordance with these SPECIFICATIONS and in conformity with lines and grades shown on the PLANS or established by the ENGINEER.

**1.2 MATERIALS.** Materials and design requirements for pipe culverts shall conform to the following:

All Culvert Pipe: Acceptance of pipe and preformed gaskets will be based on certification and testing procedures. All shipment of pipe and gaskets delivered to a job site shall be accompanied with a certificate of delivery, listing the size, type, length, and date pipe was manufactured.

(A) Reinforced Concrete Pipe (RCP). Reinforced concrete pipe (RCP) shall comply with Subsection 1006.03 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

(B) Reinforced Concrete Pipe Arch (RCPA). Reinforced concrete pipe arch (RCPA) shall comply with Subsection 1006.04 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

(C) Polyvinyl Chloride Culvert Pipe (PVC). Polyvinyl Chloride Culvert Pipe (PVC) shall have a minimum SDR-26 rating and shall be in conformance with ASTM D1784 and ASTM D2241, latest revisions, with an integral bell push-on gasketed joint conforming to ASTM D3139.

(D) Geotextile Fabric. Geotextile fabric material shall conform to Section 1019 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

**1.3 EXCAVATION.** Trenches shall be excavated to a width sufficient for proper joining of pipe sections and thorough compaction of bedding and backfill material under and around pipes. Excavated material that is not satisfactory for backfill or is surplus material shall be satisfactorily disposed.

**1.4 FORMING PIPE BED.** Rock, or similar material encountered shall be removed below grade and replaced with satisfactory materials in such manner as to provide a compacted earth cushion having a thickness under the pipe of at least two inches (2") per foot of fill height over the top of pipe with a minimum compacted thickness of eight inches (8").

- 1.4.1 If pipe is not laid in a trench, a uniform firm bed shall be made as specified for the bottom of the trench.
- 1.4.2 When specified or directed by the ENGINEER, additional excavation shall be performed below established grade and bedding material placed. (See Section DR-102 "Bedding Material" for additional information).
- 1.5 **LAYING PIPE.** Pipe laying shall begin at the downstream end of the line. The pipe shall be in contact with the foundation throughout its length. Bell or groove end of pipe shall be placed facing upstream. Pipes in each continuous line shall have the same wall thickness. After pipe has been laid and before backfill is placed, the ENGINEER will inspect the pipe for alignment, grade, integrity of joints, joint wrap, and pipe lifting holes are filled with geotextile fabric and concrete plugs.
- 1.6 **JOINING PIPE.**

- (A) Reinforced Concrete Pipe. Reinforced concrete pipe may be either bell or spigot, or tongue and groove. The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are reasonably flush and even. Joints shall conform to Subsection 1006.05 of the Louisiana Standard Specifications for Roads and Bridges, latest edition and shall be sealed with gasket material conforming to Subsection 1006.06 of the Louisiana Standard Specifications for Roads and Bridges, latest edition, and/or ASTM C443. All reinforced concrete pipe and gasket material shall be installed in accordance with the manufacturer's recommendations.

Types of Joints.

- (1) Type 2 joints shall be used for side drains, and cross drains under roadways.
- (2) Type 3 joints shall be used for closed sanitary and storm sewer systems, flumes and siphons.
- (B) Reinforced Concrete Pipe Arch. The method of joining reinforced concrete pipe arch shall be the same as enumerated in the above paragraph, Reinforced Concrete Pipe Arch. The types of joints for arch pipe and their uses shall be as cited in the previous reinforced concrete pipe paragraph.
- (C) Joint Wrap. Type 2 and 3 joints shall be wrapped with geotextile fabric for a minimum of eighteen inches (18") on each side of joint. Ends of the cloth shall be lapped at least twelve inches (12") and outside edges of cloth shall be secured with Contrax No. 844 strapping (2 | plastic strapping with locks) or approved equal. The edges and ends of fabric shall be suitably secured for the entire circumference of the pipe.

- (D) Concrete Collar for RCP. When concrete collars are required in order to extend the ends of existing pipes that have been damaged or to join dissimilar pipe types and/or joints, the concrete collar shall conform to the following:
- (1) The pipe joints shall be wrapped with a twenty four inch (24") wide strip of geotextile fabric, prior to pouring concrete.
  - (2) The concrete for collars shall be a minimum of two and one-half feet (2-½') wide and one foot (1') thick where applicable, and shall extend around the entire circumference of the outside diameter of the pipe. Measurement for thickness of collars is to be taken from the larger outside diameter of the two pipes.
  - (3) The concrete is to be placed in one continuous pour around the entire outside circumference of the pipe.
  - (4) Concrete for pipe collars shall be constructed of a four (4) cement sack mix with a minimum eighteen hundred pounds per square inch (1800 PSI) average compressive strength at 28 days. When required by the ENGINEER, samples of concrete for compression test, as prescribed in the ASTM C-31, shall show a minimum compressive strength of eighteen hundred pounds per square inch (1800 PSI) in 28 days. If the concrete test for cylinders do not meet the compressive strength requirements, the deficient concrete will be removed and replaced at the CONTRACTOR'S expense. Concrete collars shall be constructed in accordance with plan details, or as directed by the ENGINEER.
- (E) Concrete Pipe Tap. Concrete pipe taps shall be made at the plant providing the concrete pipe for a project. The tap in the concrete pipe shall be made in the center of the length of the pipe to be furnished and shall have a PSX: Series VI Unit consisting of a power sleeve, gasket and stainless steel take up clamp. The power sleeve shall be mechanically expanded to compress the gasket against the receptacle hold surface and the reinforced concrete pipe. After adequate pressure of the gasket is achieved, the ends of the power sleeve shall interlock to insure against any loss of compression. The PSX: Positive Seal Gasketing System shall be provided by Press Seal Gasket Corporation, Concrete Product Supply Company, or an approved equal. The Concrete Pipe Tap gasket diameter shall be capable of accommodating at least an 8" PVC SDR-26 Pipe.
- (F) 8" PVC Drain Pipe (SDR-26). Plastic pipe required for "Yard Drain" shall be PVC (SDR-26), eight inch (8") diameter pipe.

Connection of existing four inch (4"), six inch (6"), and eight inch (8") diameter steel or PVC drain pipes to new eight inch (8") diameter PVC (SDR-26) drain pipe shall be made by connecting a four inch (4") to eight inch

(8") reducer, a six inch (6") to eight inch (8") reducer, or an eight inch (8") connector at the end of the existing drain pipe.

8" PVC Drain Pipe (SDR-26) shall be measured by the linear foot from the outside face of the concrete pipe to the outside face of the CB-18, or the end of the new fitting connected to an existing drain pipe to the outside face of the concrete pipe. 8" PVC Drain Pipe (SDR-26) shall not protrude past the inside wall of a RCP and/or a CB-18. The price per linear foot at 8" PVC Drain Pipe (SDR-26) shall include the furnishing and installation of all required fittings needed to connect the existing drain pipe or CB-18 catch basins to the reinforced concrete pipe. All fittings shall be a minimum SDR-26 rating.

**1.7 RELAYING PIPE.** If specified or directed, existing pipes shall be removed and all suitable sections reinstalled as specified for new pipes.

**1.8 BACKFILLING.**

- (A) General. Pipes found to be damaged or out of required alignment or grade shall be removed and reinstalled, or replaced at no direct pay.
- (B) Side Drain Pipes. Backfill for side drain pipes for drives, field roads and similar installations shall conform to the following:
  - (1) Non paved Areas: A Class A-2-4 soil or better material commonly known as "Red Dirt" shall be used to backfill drainage conduits to the springline of the pipe in non paved areas. Pipe backfill above the springline of the pipe shall be a usable existing native material, an approved "River Sand" material, or "Red Dirt" material, as defined in Section 330 "Excavation and Embankment", placed by approved methods and uniformly compacted to the satisfaction of the ENGINEER.
  - (2) Paved Areas: Pipe backfill material, placement and compaction shall be as specified in Subparagraph "C" below.
- (C) Pipes other than Side Drains. Backfill for pipes other than side drains for drives, field roads and similar installations shall be a minimum Class A-2-4 soil or better material commonly known as "Red Dirt" as defined in Section 330 "Excavation and Embankment" of these SPECIFICATIONS.

When the top of pipe is even with or below the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to an elevation of one foot (1') above the top of pipe (or to subgrade if less than one foot (1')) or to natural ground elevation, whichever is greater.

When the top of pipe is above the top of trench, backfill material shall be brought up evenly on both sides of pipe for its full length to an elevation

one foot (1') above the top of pipe (or to subgrade if less than one foot (1')). Material in the trench and above the top of trench for a distance on each side of pipe equal to the horizontal outside diameter and to one foot (1') above the top of pipe (or subgrade if less than one foot (1')) shall be backfill material.

The embankment shall be constructed to a minimum of two feet (2') over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, installations with less than two feet (2') of cover over the top of the pipe shall be constructed after all heavy hauling is completed over the pipe location. After completion of hauling operations, the CONTRACTOR shall remove excess cover material. Any pipe damaged by hauling operations shall be removed and re-laid, or replaced, at the CONTRACTOR'S expense.

- (1) Backfill. Backfill shall be placed at or near optimum moisture content. Backfill material shall be thoroughly compacted under haunches and then compacted in layers not exceeding eight inches (8") compacted thickness. Each layer shall be compacted by approved methods to at least ninety five percent (95%) of maximum density prior to placement of a subsequent layer.
- (2) Density Requirements. Maximum density will be determined in accordance with LA DOTD Designation TR 418 or TR 415 and in-place density determined by LA DOTD Designation TR 401. The number and frequency of density tests will be made at the discretion of the ENGINEER during backfilling to determine that required density is being obtained.

## 1.9 **CLEANING PIPES.**

- (A) Existing Pipes. Existing pipes designated to be cleaned shall be cleaned of soil, debris and other materials to the invert of the pipe. Designated pipes shall be cleaned by approved methods that will not damage the pipes. Any damage caused by the CONTRACTOR'S operations shall be satisfactorily repaired at no direct pay. Removed soil, debris and other material shall be disposed of off the project outside the view of the traveling public in accordance with all local, state, and federal regulations.
- (B) Contractor Installed Pipes. Prior to final acceptance, pipes installed or extended by the CONTRACTOR shall be cleaned of soil, debris and other material to the invert of the pipe at no direct pay. Removed soil, debris and other material shall be disposed of off the project outside the view of the traveling public and in accordance with all local, state, and federal regulations.

## 1.10 **STUBBING AND PLUGGING PIPES.** When it is required that pipes be plugged, such plugs shall be constructed of a four (4) cement sack mix with a minimum

eighteen hundred pounds per square inch (1800 PSI) average compressive strength at 28 days. When required by the ENGINEER, samples of concrete for compression test, as prescribed in the A.S.T.M. Designation: C-31-33, shall show a minimum compressive strength of eighteen hundred pounds per square inch (1800 PSI) average compressive strength at 28 days. If the concrete tests for cylinders do not meet the compressive strength requirements, the deficient concrete will be removed and replaced at the contractor's expense. Thickness of plug and method of construction shall be as directed by the ENGINEER.

When new pipes are to be stubbed into new or existing pipes or other structures, the connection shall be made with approved mortar complying with Subsection 702.02 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

## 2.1 **MEASUREMENT.**

- (A) The length of pipe, both new and re-laid, will be measured by the linear foot by the following methods:
  - (1) Pipe not confined by fixed structures will be measured by the number of joints at the nominal length of each joint.
  - (2) Pipe confined by fixed structures will be measured along the pipe between the termini of pipe in structure walls.
  - (3) Pipe confined by a fixed structure on one end and unconfined at the other end will be measured along the pipe from the terminus of pipe in the structure wall to the unconfined end of pipe.
- (B) Fabrication of pipe tees, elbows and other fittings will be measured per each fitting and the length of pipe in such fittings will be included in the pay length measurement of pipes of which they form a part.
- (C) Plugging and stubbing of pipes will not be measured for payment
- (D) Cleaning existing pipes will be measured by the length of pipe cleaned and accepted.
- (E) Concrete collars will be measured per each.
- (F) Excavation required for installation of pipes will not be measured for payment. Excess excavation if suitable shall be used as fill above the "Red Dirt" backfill or as roadway embankment or removed from the site at no additional cost to the CITY OF ALEXANDRIA.
- (G) Pipe backfill will not be measured for payment but shall be considered incidental to the pipe. Pipe backfill shall be to the limits described under subsection 1.8, "Pipe Backfill". Backfill material shall meet the

requirements of “Red Dirt” in accordance with Section 330, “Excavation and Embankment” of these specifications.

### 3.1 **PAYMENT.**

- (A) Payment for pipe will be made at the contract unit price per linear foot of the types and sizes specified.
- (B) Payment for fabricating pipe tees, elbows and other fittings will be made at the contract unit price per each fitting.
- (C) When unstable conditions are encountered payment will be made as follows:
  - (1) Payment for excavation will at the CONTRACT unit price for “Excavation” in accordance with Section 330, “Excavation and Embankment” of these specifications.
  - (2) Payment for replacement of the unstable material will be made in at the CONTRACT unit price for “Red Dirt” accordance with Section 330 “Excavation and Embankment” of these SPECIFICATIONS.
  - (3) When suitable foundation cannot be obtained, unsuitable soil below established grade shall be removed and replaced with suitable material as defined in Section 610, “Bedding Material” of these SPECIFICATIONS or as directed by the ENGINEER. Removal of the unsuitable soil will not be measured and shall be included in the unit price for “Bedding Material”.
- (D) Payment for cleaning existing pipes will be made at the contract unit price per linear foot.
- (E) Payment for concrete collars will be made at the contract unit price per each.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
710-01-(size)	(size) PVC Yard Drain (SDR 26)	Linear Foot
710-02-(size)	(size) RCP Culvert Pipe	Linear Foot
710-03-(size)	(size) Equiv RCP Arch	Linear Foot
710-04	Pipe Collars (Per Plan)	Each
710-05	Cleaning Existing Pipe (Per Plan)	Linear Foot

**SECTION 720 MANHOLES, JUNCTION BOXES AND CATCH BASINS**

- |                               |                 |
|-------------------------------|-----------------|
| 1.1 Description               | 2.1 Measurement |
| 1.2 Materials                 | 3.1 Payment     |
| 1.3 Construction Requirements |                 |

**1.1 DESCRIPTION.** This WORK consists of the construction, installation and adjustment of manholes, junction boxes and catch basins in accordance with these SPECIFICATIONS and in conformity with lines and grades shown on the PLANS or established by the ENGINEER.

**1.2 MATERIALS.** Materials shall conform to the following SPECIFICATIONS and Sections of the City of Alexandria Standard Specifications.

(A) Solid Concrete Masonry Units. Solid concrete masonry units (brick) shall be made of concrete complying with ASTM C 139, except that the minimum thickness of each unit shall not be less than three and five-eighths inches (3-<sup>5</sup>/<sub>8</sub>" ).

(B) Manhole Frames, Grates and Covers. Metal units shall comply with the following requirements:

(1) Castings shall be true to pattern in form and dimensions and free from pouring faults, sponginess, cracks, blowholes and other defects in positions affecting their strength and value for the service intended. Castings shall be boldly fitted at angles, and rises shall be sharp and perfect. Castings shall be sandblasted or otherwise effectively cleaned of scale and sanded to a smooth, clean and uniform surface.

Grey Iron Castings shall comply with ASTM A48, Class 30.

(2) Steel Castings: High strength steel castings shall comply with ASTM A148.

(3) Galvanizing: Galvanizing shall comply with ASTM A123.

(C) Asphaltic Varnish. Asphaltic varnish shall comply with Subsection 1008.03 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

(D) Cast-in-Place Concrete. Section 620

(E) Reinforcing Steel. Section 630

(F) Backfill Material. Section 330

1.2.1 The CONTRACTOR shall have the option of furnishing structures of either cast-in-place concrete or precast concrete units for drainage structures in

undeveloped areas. Shop drawings for precast concrete units shall be submitted to the ENGINEER for approval prior to ordering and installation of precast units. In developed areas, the CONTRACTOR shall use only cast-in-place units for drainage structures in all areas in which existing utilities are present. In developed and undeveloped areas, the CONTRACTOR shall have the option of using solid concrete or masonry units and mortar to construct catch basins in non-traffic areas when catch basins are less than five feet (5') in depth.

- 1.2.2 Mortar shall consist of one (1) part Portland Cement and two (2) parts approved sand and water as required for proper consistency. Mortar shall be used within thirty (30) minutes after mixing.
- 1.2.3 At the OWNER'S discretion, manufacturing plants will be inspected periodically for compliance with specified manufacturing methods, and material samples will be obtained for laboratory testing for acceptance of manufacturing lots.
- 1.2.4 All materials shall be subject to inspection for acceptance as to condition at any time during the work.

### **1.3 CONSTRUCTION REQUIREMENTS.**

- 1.3.1 Manholes, junction boxes, and catch basins shall be constructed in accordance with the following applicable standard details:

CB-01	Single RCB Structures 12 thru 16
CB-02	Double RCB Structures 12 thru 16
CB-03A	Catch Basin Details for CB-18 thru CB-20
CB-03B	CB-2 Standard and Conflict Box
SP-01-B	Street Construction @ Catch Basins and Intersections
IS-01	Catch Basin Detail for CB-22
YD-01	Catch Basin Details for CB-17P & CB-18P
GC-01	Frames, grates and Cover

- 1.3.2 All cast-in-place structures shall be constructed in dry or de-watered areas, unless otherwise directed by the ENGINEER. Logs, stumps, and other undesirable material shall be removed at no additional cost to the City of Alexandria.
- 1.3.3 Concrete construction shall conform to Section 620, "Concrete" of these SPECIFICATIONS. Joints in catch basin masonry units shall be full mortar joints not more than one-half of an inch ( $\frac{1}{2}$ " wide. Both the inside and outside walls of structures shall be plastered with no less than one-half of an inch ( $\frac{1}{2}$ " thick cement-and-mortar. Exposed surfaces of concrete and masonry shall be cured, in accordance with Subsection 805.10 of the Louisiana Standard Specifications for Roads and Bridges, latest edition, for at least forty-eight (48) hours and during this time no backfilling shall be allowed.

- 1.3.4 Precast concrete units shall be cast with the specified number of pipe openings required for the drainage system; however if additional pipe is required during construction for which no openings have been provided, the CONTRACTOR may make such openings provided any damaged units are replaced or satisfactorily repaired. The size of the pipe opening shall be of sufficient diameter to accommodate the size of pipe to be installed in each precast concrete unit.
- 1.3.5 Drainage conduits shall be installed flush with inside face of all drainage structures. Precast units shall be set to established grade as shown on the plans approved by the ENGINEER. Joints for sectional precast units shall be sealed with flexible plastic gaskets complying with Subsection 1006.06(b) of the Louisiana Standard Specifications for Roads and Bridges, latest edition. Gasket material shall be so installed as to form a watertight seal. Flexible plastic gasket material shall be approved products listed in the LA DOTD Qualified Product List 4. The joints for precast units shall be wrapped with geotextile fabric a minimum of eighteen inches (18") on each side of the joint. The ends of the geotextile fabric shall be lapped at least twelve inches (12") and outside edges of cloth shall be secured with Contrax No. 844 strapping (2" plastic strapping with locks) or approved equal. The edges and ends of fabric shall be suitably secured for the entire perimeter of the precast unit.
- 1.3.6 Conduit sections shall be flush on the inside of structure wall and project outside sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around conduit.
- 1.3.7 When grade adjustments of existing structures are specified, frames, covers and gratings shall be removed and walls reconstructed as required. New frames, covers, and grates shall be set at the required elevation. In lieu of adjusting structures by the foregoing methods, the CONTRACTOR may adjust sewer manholes by means of approved metal adjustment rings. Existing adjusted catch basins with masonry walls shall have all interior walls regouted with one-half of an inch ( $\frac{1}{2}$ ") thick non-shrink grout material. Salvageable frames, covers, and grates shall be delivered to the City of Alexandria Street Department.
- 1.3.8 At the time of final acceptance, new structures shall be cleaned of silt, debris or other foreign matter and metal parts of new or adjusted structures shall be coated with asphaltic varnish.
- 1.3.9 After inspection of completed structures and when directed by the ENGINEER, any settlement around structures shall be refilled to required elevations. Backfilling shall conform to requirements in Section 710, "Culvert Pipe" of these SPECIFICATIONS.
- 1.3.10 Excavated material not satisfactory for backfill and surplus material shall be satisfactorily disposed in accordance with all local, state, and federal regulations at an offsite location out of the view of the traveling public.
- 2.1 MEASUREMENT.** New and adjusted junction boxes, manholes and catch basins will be measured per each.

- 2.1.1 Excavation required for installation of each unit will not be measured for payment.
- 2.1.2 The use of excavated suitable native material for backfilling junction boxes, manholes, and catch basins will not be measured for payment, but shall be included in the bid price on other items.
- 2.1.3 Removal and disposal of unsuitable or excess native material will not be measured for payment, but shall be included in the bid price on other items.
- 2.1.4 When the contract contains a pay item for “Red Dirt” or “River Sand”, quantities for backfill material shall be made in accordance with Section 330, “Excavation and Embankment” of these SPECIFICATIONS.
- 2.1.5 Field adjustments of plus or minus (+/-) two feet (2') shall be made in the field with no increase or decrease in the contract unit price.
- 2.1.6 The cost of furnishing and installing reinforcing steel required for the construction of junction boxes, manholes, and catch basins will not be measured for payment, but shall be included in the bid price for each unit installed and accepted.
- 3.1 PAYMENT.** Payment for new and adjusted junction boxes, manholes, and catch basins, will be made at the contract bid price per each unit installed and accepted, which price and payment shall constitute full compensation for furnishing all materials, tools, equipment, labor and incidentals necessary to complete the WORK.
- 3.1.1 The concrete in cast-in-place manholes, junction boxes, and catch basins shall be subject to pay adjustments in accordance with Section 620 “Concrete” of these SPECIFICATIONS.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
720-01-02	CB-2 Standard Installation	Each
720-02-02	CB-2 Conflict Installation	Each
720-01-(type no.)	Single CB-(type no.)	Each
720-02-(type no.)	Double CB-(type no.)	Each
720-01-17	CB-17P Catch Basin	Each
720-01-18	CB-18 Catch Basin	Each
720-02-18	CB-18P Catch Basin	Each
720-01-21	CB-21 Catch Basin (Non-Traffic Area)	Each
720-02-21	CB-21 Catch Basin (Traffic Area)	Each

**SECTION 730 NEW SEWER MANHOLES AND ADJUST VALVE BOXES**

- |                         |                                       |
|-------------------------|---------------------------------------|
| 1.1 Description         | 1.4 General Construction Requirements |
| 1.2 Reference Standards | 2.1 Measurement                       |
| 1.3 Materials           | 3.1 Payment                           |

**1.1 DESCRIPTION.** The CONTRACTOR shall furnish all labor, materials, and equipment necessary for the installation of new sewer manhole frames and covers, and adjustment of the grade, elevation and slope of existing valve boxes to conform to the grade, elevation and slope of the new street pavement or overlay.

**1.2 REFERENCED STANDARDS.** All manhole adjustments shall be in accordance with the following City of Alexandria Standard Detail Drawings:

<i>Number</i>	<i>Sheet Title</i>
SS-01	Standard Detail Precast Sewer Manholes

**1.3 MATERIALS.** Materials shall conform to the following SPECIFICATIONS and Sections of the City of Alexandria Standard SPECIFICATIONS.

**1.3.1 Manhole Frames, Grates and Covers.** New frames for wastewater manholes shall be V-1503 as manufactured by Vulcan Foundry, Inc., Denham Springs, Louisiana or approved equal. New covers for wastewater manholes shall be V-1501 (AS) as manufactured by Vulcan Foundry, Inc., Denham Springs, Louisiana or approved equal.

Metal units shall comply with the following requirements:

(A) Castings. Castings shall be true to pattern in form and dimensions and free from pouring faults, sponginess, cracks, blowholes and other defects in positions affecting their strength and value for the service intended. Castings shall be boldly fitted at angles, and rises shall be sharp and perfect. Castings shall be sandblasted or otherwise effectively cleaned of scale and sanded to a smooth, clean and uniform surface.

Grey Iron Castings shall comply with ASTM A48, Class 30.

(B) Steel Castings. High strength steel castings shall comply with ASTM A148.

(C) Galvanizing. Galvanizing shall comply with ASTM A123.

**1.3.2 Asphaltic Varnish.** Asphaltic varnish shall be composed of hard native asphalts or asphaltites (gilsonite, for example), run (fluxed) and blended with properly treated drying oils, and thinned with suitable solvents with the necessary amount of dryers.

- 1.3.3 Cast-in-Place Concrete. Section 620 "Concrete"
- 1.3.4 Reinforcing Steel. Section 630 "Reinforcing Steel"

**1.4 GENERAL CONSTRUCTION REQUIREMENTS.** The CONTRACTOR shall install new sewer manhole frames and covers, and adjustment of valve boxes to the grade, elevation and slope of the new street pavement or overlay. Installation of new sewer manhole frames and/or adjustment of valve boxes shall be made after installation of the overlay.

1.4.1 Sewer Manholes. The CONTRACTOR shall be solely responsible for the accuracy of the installation to conform to the new overlay. After completion of the overlay procedure and compaction and curing of the asphalt, the CONTRACTOR shall remove a five foot square (5 ft.<sup>2</sup>) of pavement from around the sewer manhole frame, properly reconstruct the walls, and install a new frame and cover to the desired elevation, grade and slope. Pavement cuts for manhole adjustments in asphalt pavement shall be made by use of an air chisel, spade or mechanical saw. Cuts in concrete pavement or base shall be made by jack hammering or mechanical saw cutting. All pavement cuts shall be straight, neat vertical and square. A concrete pad shall be poured around the manhole frame flush with the surface of the new overlay in accordance with the details shown in this Section.

The CONTRACTOR shall furnish and install new manhole rings, frame, and cover as specified above on all affected sewer manholes belonging to the City of Alexandria. The CONTRACTOR shall deliver salvaged sewer manhole frames and covers to the City of Alexandria the Street Department.

1.4.2 Valve Boxes. The CONTRACTOR shall be solely responsible for the accuracy of the adjustment to conform to the new overlay. A concrete pad shall be poured around the valve box flush with the new overlay in accordance with the details shown in this section. After completion of the overlay procedure and compaction and curing of the asphalt, the CONTRACTOR shall remove a 3' foot square of pavement from around the valve box frame and properly extend, or reset the valve box to the desired elevation, grade and slope. Pavement cuts for manhole adjustments in asphalt pavement shall be made by use of an air chisel, spade or mechanical saw. Cuts in concrete pavement or base shall be made by jack hammering or mechanical saw cutting. All pavement cuts shall be straight, neat, vertical and square. A concrete pad shall be poured around the valve box frame flush with the surface of the new overlay in accordance with the details shown in this Section.

1.4.3 Barricades and Traffic Control. Contractor shall provide adequate markers, barricades and traffic control in accordance with the MUTCD, in order to alleviate the hazard to the public and to prevent damage to the WORK.

## **2.1 MEASUREMENT.**

2.1.1 New Sewer Manhole Frame and Cover. New sewer manhole frame and cover furnished and satisfactorily set to grade, elevation and slope and accepted as specified, as shown on the DRAWINGS or as directed by the ENGINEER, will be measured per each of the actual number completed and accepted.

2.1.2 Adjusting Valve Boxes. Existing valve boxes satisfactorily adjusted to grade, elevation and slope, and accepted as specified, as shown on the DRAWINGS or as directed by the ENGINEER, will be measured per each of the actual number completed and accepted.

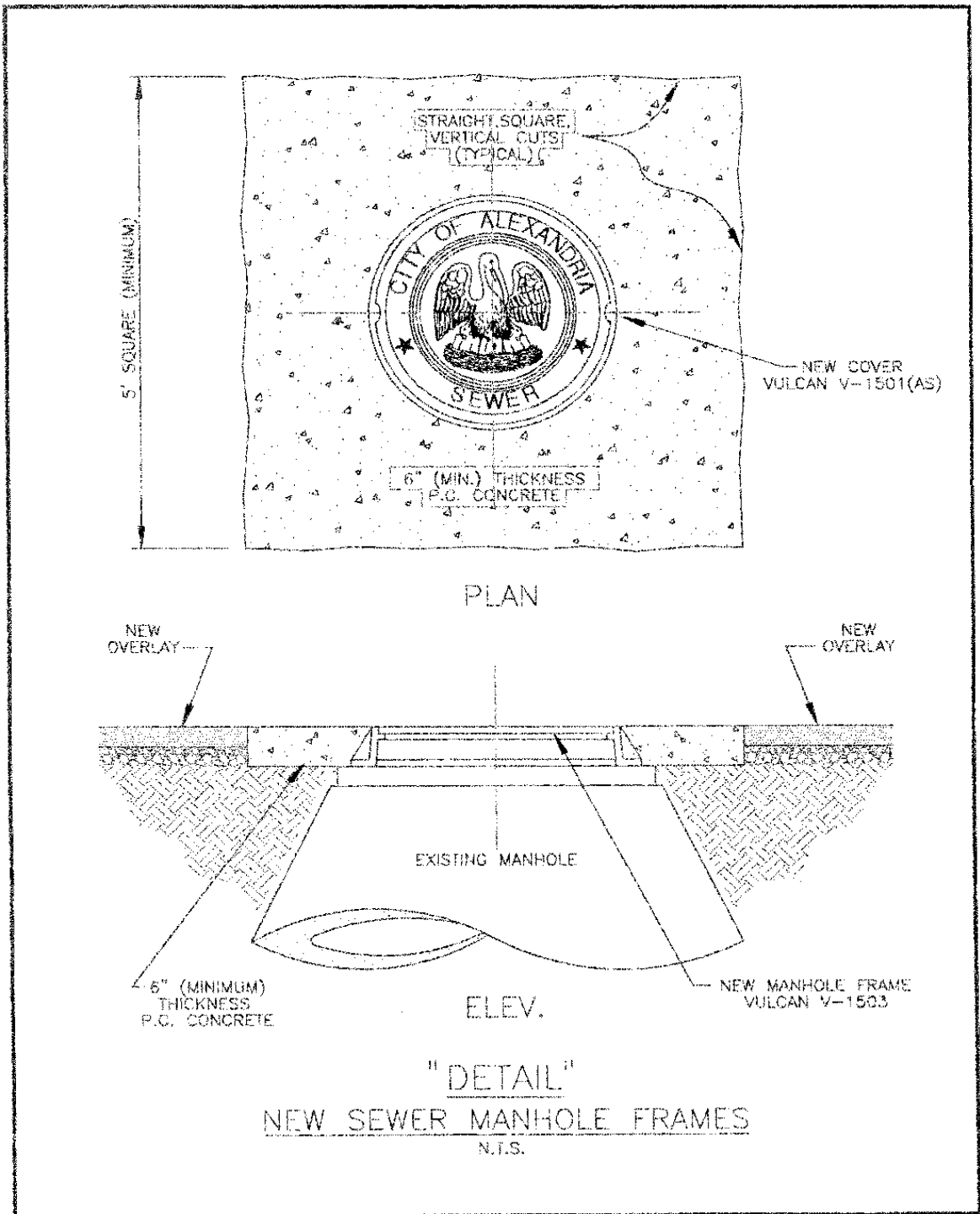
### 3.1 **PAYMENT.**

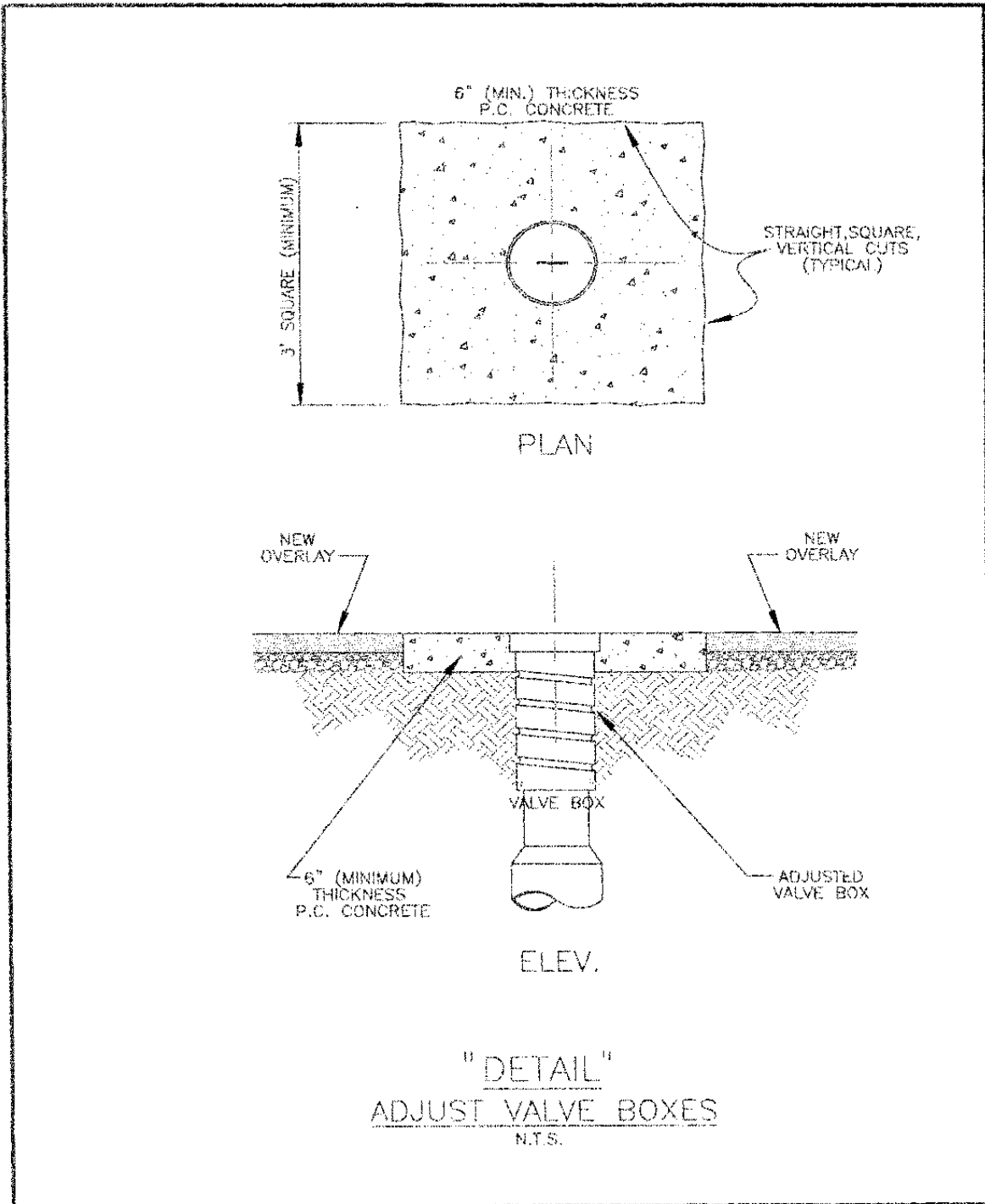
3.1.1 New Sewer Manhole Frame and Cover. New manhole frames and covers furnished and satisfactorily set to grade, elevation and slope, and accepted, measured as provided above, will be paid at the CONTRACT unit price per each, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, traffic control, signs, barricades, safety items and incidentals necessary to complete this item in accordance with the DRAWINGS and SPECIFICATIONS.

3.1.2 Adjusting Valve Boxes. Existing valve boxes adjusted and accepted, measured as provided above, will be paid at the CONTRACT unit price per each, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, traffic control, signs, barricades, safety items and incidentals necessary to complete this item in accordance with the DRAWINGS and SPECIFICATIONS.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
730-01	Adjust Manholes	Each
730-02	Adjust Valve Boxes	Each





**SECTION 810 SEEDING**

- |                                  |                  |
|----------------------------------|------------------|
| 1.1 Description                  | 1.4 Applications |
| 1.2 Materials                    | 2.1 Measurement  |
| 1.3 General Construction Methods | 3.1 Payment      |

**1.1 DESCRIPTION.** This item shall consists of preparing seed beds, furnishing and applying agricultural lime, fertilizer, grass seed, mulch cover, and water in accordance with these specifications at locations shown on the plans or as directed by the ENGINEER. Acceptance of seed, fertilizer, agricultural lime, and mulch shall be contingent on the establishment of a good vegetative cover.

**1.2 MATERIALS.** Materials for vegetative growth shall conform to the following:

**1.2.1 Commercial Fertilizer.** Shall be a commercial type complying with the commercial fertilizer laws in effect as regulated by the Louisiana Department of Agriculture and Forestry. The chemical composition shall be as specified and shall be designated by a three (3) number sequence representing minimum percentages by weight, respectively, of nitrogen (N), available phosphoric acid ( $P_2 O_5$ ) and soluble potash ( $K_2O$ ). Fertilizer supplied in granular, pellet or tablet form shall be packaged in moisture proof containers.

Fertilizer shall be either 8-8-8, 12-12-12, 13-13-13, or 16-16-16.

**1.2.2 Agricultural Lime.** Agricultural lime shall consist of ground limestone or seashells containing at least ninety percent (90%) calcium carbonate equivalent ( $CaCO_3$ ) when tested in accordance with ASTM C 602. The material shall be ground so that a minimum of ninety percent (90%) passes a No. 10 sieve and twenty five percent (25%) passes a No. 100 sieve.

Agricultural Lime shall be delivered in sacks or bulk.

**1.2.3 Seed.** Seed shall comply with requirements of Louisiana Law.

The minimum percentage of pure live seed and the maximum percentage of weed seed permitted shall be in accordance with the following:

**SEED REQUIREMENTS**

Variety	Minimum Percent of Pure Live Seed (Purity Times of Germination Including Hard Seed, by Count)	Maximum Percent Weed Seed, by Count
Hulled Bermuda	83	1
Pensacola Bahia	81	2
Unhulled Bermuda	80	1
Annual Rye	80	1

Each variety of seed shall be furnished and delivered in separate bags or other containers. Each bag or container shall bear an analysis tag which is a minimum No. 6 standard shipping tag having all information required by the Louisiana Seed Law, arranged as shown below:

**SEED ANALYSIS TAG**

KIND & VARIETY		
Where Grown	Net Wt.	Lot No.
Pure Seed %	Germination %	
Inert Matter %	Hard Seed %	
Crop Seed %	Total Germ. & Hard Seed %	
Weed Seed %	Date of Test	
Name & No. of Noxious Weed Seed per lb.		
Name		
Address		

Seed furnished shall be the previous season's crop (the last crop year for the crop kind in question) and the date of analysis shown on each tag shall be within five (5) months (excluding the month in which the test is completed) of the time of delivery to the project.

- (1) Noxious Weeds: Noxious weeds shall be interpreted to mean that list of weeds, except Bermuda, which has been adopted by the Louisiana Seed Commission as being noxious in Louisiana. Noxious weed seeds shall not exceed the limitations prescribed in the regulations and in no case shall they exceed five hundred (500) per pound (lb).
- (2) Test Report: A copy of the laboratory test report of an "official" sample taken and tested for each lot of seed furnished as prepared by the State Seed Analyst of the Louisiana Department of Agriculture and Forestry shall be submitted to the engineer by the contractor. The Department will accept test reports from the Agricultural Departments of other state provided the requirements of these specifications are met. The lot number on the analysis tag shall match the laboratory test report lot number.

1.2.4 Vegetative Mulch. Vegetative Mulch shall consist of pine straw, stems or stalks of oats, rye, rice, or other approved straws. The contractor may also use hay obtained from various legumes and grasses such as lespedezas, clover, vetches, soybeans, Bermuda, Dallis, carpet sedge, fescue or other approved legumes or grasses of any combination thereof. Straw or hay shall be reasonably dry and free from mold, Johnson grass or other noxious weeds.

The minimum allowable vegetation density for source approval of vegetative mulch shall be seventy percent (70%) for clay soils and sixty percent (60%) for sandy soils when evaluated in accordance with the Texas Transportation Institute

(TTI) Field Performance Testing Procedure of Selected Erosion Control Products.

(1) The contractor shall notify the ENGINEER at least seven (7) calendar days in advance of commencing operation so that the mulch can be inspected and approved prior to use.

(2) Vegetative mulch shall be delivered in bales of uniform-size. Storage of mulching materials shall be approved by the ENGINEER prior to stockpiling material. Mulch stockpiles shall be protected from the weather.

1.2.5 Water. Water may be obtained from any source. Chemically contaminated or oily water shall not be used.

### **1.3 GENERAL CONSTRUCTION REQUIREMENTS.**

1.3.1 Dress entire area, grade out eroded areas and unreasonable roughness in the surface and remove all weeds, sticks or other debris from areas to be seeded.

1.3.2 Broadcast lawn starter and growth stimulant fertilizer at specified rates, loosen soil and work into surface by discing thoroughly to a depth of two to four inches (2" - 4").

1.3.3 Drag the entire surface until it is in a smooth and uniform condition and uniformly broadcast the seed mixture at the specified rates, lightly harrow to cover seed and roll out all seeded surfaces.

1.3.4 Mulch shall be placed after fertilizer and seeding, but prior to watering.

1.3.5 Seeded areas shall be watered a minimum of four days after seeding, if there has been insufficient rainfall to promote germination. The contractor shall provide adequate moisture for seed germination, until final acceptance of the project.

**1.4 APPLICATIONS.** The CONTRACTOR shall provide adequate erosion control measures to insure the establishment of a good vegetative cover and prevent loss of disturbed ground on and around the project site. Examples of methods of application are vegetative mulch, erosion control mats, hay, etc. at the CONTRACTOR'S option, unless otherwise described in SPECIAL PROVISIONS or PLANS. Method of erosion control must be approved by ENGINEER prior to placement.

1.4.1 Preparation of Seed Bed. Seed beds shall be prepared by disking, harrowing or other approved methods. Soil shall be thoroughly pulverized to a minimum depth of 3 inches and leveled as directed. Hardpan areas shall be roto-tilled, if necessary, to ensure that soil is in a condition to receive and sprout seed. If the contract requires topsoil, fertilizer or agricultural lime, they shall be incorporated at this time. Slopes shall be smoothed to grade and rolled prior to seeding.

- 1.4.2 Commercial Fertilizer. Fertilizer shall be uniformly broadcast over areas to be fertilized by either hand or machine methods. The rate of fertilizer application shall be as shown below:

**FERTILIZER APPLICATION RATE**

TYPE FERTILIZE	POUNDS PER ACRE
8-8-8	1000
12-12-12	667
13-13-13	615
16-16-16	500

Other balanced fertilizer may be used at the proportional rate. Fertilizer applied after surface dressing shall be thoroughly incorporated into the soil by light disking, harrowing, or roto-tilling during surface dressing. When the surface is dressed by hand, the fertilizer may be applied before final raking and leveling. Fertilizer shall be placed and incorporated into the soil prior to placement of seed.

- 1.4.3 Agricultural Lime. Agricultural lime shall be spread uniformly at a minimum rate of two (2) tons per acre with a spreader. Lime shall be applied prior to seeding, topsoil placement and slab sodding and may be applied in conjunction with fertilizer. After application, the areas shall be disked, harrowed, or roto-tilled to incorporate lime or lime-fertilizer into the top three inches (3") to six inches (6") of soil.

- 1.4.3 Seeding. Seeding shall be uniformly broadcast over areas to be seeded either by hand or machine methods. The rate of seed application shall be as shown below:

SEED MIXES	POUNDS PER ACRE	PLANTING DATES
Rye Grass Unhulled Bermuda	60 40	September – February
Hulled Bermuda Pensacola Bahia	60 50	March – August

- 1.4.5 Vegetative Mulch. Mulching shall follow seeding operations within 48 hours.

Vegetative Mulch shall be distributed uniformly over the seeded area by blowing or by hand placement.

The vegetative mulch shall be loose enough to allow air to circulate, but compact enough to partially shade the ground and reduce the impact of rainfall on the soil

surface. Mulching shall begin at the top of the slopes and extend downward. Blower pipe extensions shall be used where slopes cannot be reached by the blower. During windy conditions, the contractor shall make adjustments in operations to obtain uniform spreading.

Vegetative Mulch shall be applied at a rate of four hundred pounds (400 lbs.) per acre.

- 1.4.6 Watering. When there is an insufficient amount of rainfall to promote seed germination, the CONTRACTOR shall provide adequate moisture for seeded areas.

## 2.1 MEASUREMENT.

- 2.1.1 Seeding. Seeding, fertilizer, mulch, and water for areas requiring vegetation will be measured for payment to the nearest hundredth (0.01) Acre of area requiring seeding.

- 2.1.2 Agricultural Lime. Agricultural Lime will be measure by the ton.

- 3.1 PAYMENT. Payment for seeding will be made at the contract unit price per acre, which price and payment shall constitute full compensation for all materials including seed, fertilizer, mulch, water, labor, equipment and other incidentals necessary to complete this WORK.

Payment for Agricultural Lime will be made at the contract unit price per ton, which price and payment shall constitute full compensation for all materials including agricultural lime, labor, equipment and other incidentals necessary to complete this WORK.

Payment will be made as follows:

Item No.	Pay Item	Pay Unit
810-01	Seeding	Acre

**SECTION 820 HYDRO-SEEDING**

- |                           |                 |
|---------------------------|-----------------|
| 1.1 Description           | 2.1 Measurement |
| 1.2 Bed Preparation       | 3.1 Payment     |
| 1.3 Hydro-Seeding General |                 |

**1.1 DESCRIPTION.** This WORK consists of preparing seed beds and sowing grass seed utilizing hydro-seeding equipment and methods in order to establish a turf grass cover to areas designated on the PLANS or as directed by the ENGINEER.

**1.2 BED PREPARATION.** Seed beds shall be prepared by disking, harrowing or other approved methods. Soil shall be thoroughly pulverized to a minimum depth of three inches (3") and leveled as directed. Hardpan areas shall be roto-tilled, if necessary, to ensure that soil is in a condition to receive and sprout seed. If the contract requires topsoil, fertilizer or agricultural lime, they shall be incorporated at this time. Slopes shall be smoothed to grade and rolled prior to seeding.

**1.3 HYDRO-SEEDING GENERAL.** Hydro-seeding shall consist of mixing and applying seed, commercial fertilizer, water management gel, polyacrylamide tackifier, and mycorrhizal inoculum with wood fiber and water. Seed and commercial fertilizer shall be uniformly spread over the area at the rates specified in Section 810 "Seeding". A minimum of five hundred thirty five pounds (535 lbs.) of wood fiber per acre shall be mixed and applied with the seed. The fiber shall be in addition to straw or mulch when straw or mulch is specified. The Contractor will be permitted to include fertilizer and lime in the seeding slurry for application during hydro-seeding operations.

1.3.1 The application rate for pellet-inoculated seed shall be determined using the seed mass exclusive of inoculate materials.

1.3.2 The materials and the quantities thereof to be mixed with water will be specified. The quantity of water shall be as needed for application.

1.3.3 Mixing of materials for application with hydro-seeding equipment shall be performed in a tank with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous mixture and a discharge system, which will apply the mixture at a continuous and uniform rate. The tank shall have a minimum capacity of nine hundred sixty two (962) gallons. The ENGINEER may authorize use of equipment of smaller capacity if it is demonstrated that the equipment is capable of performing all operations satisfactorily.

1.3.4 A dispersing agent may be added to the mixture provided the contractor furnishes evidence that the additive will not affect germination. Any material considered detrimental, as determined by the ENGINEER, shall not be used.

- 1.3.5 Any mixture containing polyacrylamide tackifier shall not be applied during any rainy weather or when soil temperatures are below forty one degrees Fahrenheit (41° F) or if the wind speed is above twenty miles per hour (20 mph). Pedestrian traffic or equipment shall not be permitted to enter areas where hydro-seeding has been applied.
- 2.1 **MEASUREMENT.** Quantities for hydro-seeding will be measured to the nearest hundredth (0.01) acre.
- 3.1 **PAYMENT.** Payment for hydro-seeding will be made at the CONTRACT unit price per acres, which price and payment shall constitute full compensation for furnishing and placing seed, mulch, tackifier, fertilizer, and water; bed preparation, labor, equipment and other incidentals necessary to complete this WORK.
- 3.1.1 Payment for Agricultural Lime, when required, will be made at the CONTRACT Unit Price per ton, which price and payment shall constitute full compensation for all materials including agricultural lime, labor, equipment and other incidentals necessary to complete this WORK.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
820-01	Hydro-Seeding	Acre

**SECTION 830 SLAB SOD**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 1.6 Rolling     |
| 1.2 Materials                         | 1.7 Watering    |
| 1.3 General Construction Requirements | 2.1 Measurement |
| 1.4 Handling Sod                      | 3.1 Payment     |
| 1.5 Planting                          |                 |

- 1.1 DESCRIPTION.** This WORK consists of furnishing, hauling, planting, rolling, watering, fertilizing and maintaining live grass sod at locations shown on the PLANS or as directed by the ENGINEER.
- 1.2 MATERIALS.** Approved slab sod shall be either field grown grass or nursery grown grass.
- 1.2.1 Field grown grass sod shall be Bermuda grass, carpet grass, or other approved grass native to the sodded area.
- 1.2.2 Fertilizer and agricultural lime shall comply with Section 810, "Seeding".
- 1.2.3 Sod shall be free from noxious weeds or other vegetation.
- 1.2.4 Water may be obtained from any source. Chemically contaminated or oily water shall not be used.
- 1.3 CONSTRUCTION REQUIREMENTS.** Slab soil shall be cut with approved sod cutters. The designated area shall be mowed when necessary. Sod shall be cut to a minimum soil depth of one and one-half inches (1-1/2") for field-grown grass and one inch (1") for nursery grown grass, and to a uniform width and in convenient lengths for handling. Soil shall be retained on roots of sod during excavating, hauling and planting. Slab sod shall match, as close as possible, the type of adjacent grass cover of the area receiving slab sod. If the type of adjacent grass cover can not be determined, ST. Augustine Sod will be the type of Slab Sod used.
- 1.4 HANDLING SOD.** Sod shall be placed flat, grass side up in pallets containing no more than fifty square yards (50 yd.<sup>2</sup>) of sod and hauled covered, to the planting site with soil intact. Pallets shall be off-loaded and placed as close as practical to the planting site.
- 1.5 PLANTING.** Areas to receive slab sod shall be pulverized to a depth of at least three inches (3"), graded and cleared of weeds, grass, stones and other debris. If an item for agricultural lime is included in the contract, liming shall be done when the area is being pulverized. Fertilizer shall be applied in accordance with the type and rates as indicated in Section 810, "Seeding". Approximately ninety percent (90%) of the fertilizer shall be broadcast over the area to receive slab sodding, and the remaining ten percent (10%) shall be broadcast over sod after

placing and rolling. Upon delivery to the planting site, slab sod shall be transferred onto the surface soil. Areas to be added shall be watered as directed. Sod shall be placed with minimum space between slabs. Slabs shall be staggered such as to avoid a continuous seam along the line of flow. Along the edges of such staggered areas, the offset of individual strips shall not exceed six inches (6"). Slabs, which do not fit closely shall be pulled together by hand or with suitable tools and pegged when necessary. River Sand, as defined in Section 330 "Excavation and Embankment", shall be used to fill any unavoidable gaps in the sod.

**1.6 ROLLING.** Slab sod shall be rolled after planting with smooth drum steel wheel rollers or cultipackers. Where rolling is impractical, sod shall be tamped by approved hand methods.

**1.7 WATERING.** Slab sodding shall be watered as directed by the ENGINEER. Slab sod areas shall be kept moist for 30 days after sodding.

**2.1 MEASUREMENT.**

2.1.1 Slab Sodding. Slab sodding will be measured by the square yard along the surface of completed sodding.

2.1.2 Water and Fertilizer. Water and Fertilizer will not be measured for payment, but shall be included in the CONTRACT unit price for Slab Sodding.

2.1.3 Agricultural Lime. Agricultural lime, when required, will be measured for payment in accordance with Section 810, "Seeding".

**3.1 PAYMENT.** Payment for slab sodding will be made at the contract unit price per square yard, which price and payment shall constitute full compensation for furnishing all materials, slab sodding, fertilizer, water, labor equipment and other incidentals necessary to complete this WORK.

Payment will be made as follows:

Item No.	Pay Item	Pay Unit
830-01	Slab Sod	Square Yard

**SECTION 910 PORTLAND CEMENT CONCRETE PAVEMENT**

- |                               |                                      |
|-------------------------------|--------------------------------------|
| 1.1 Description               | 1.11 Transverse Joints               |
| 1.2 Equipment                 | 1.12 Load Transmission Assemblies    |
| 1.3 Materials                 | 1.13 Pouring Joints                  |
| 1.4 Forms                     | 1.14 Consolidating and Finishing     |
| 1.5 Setting Side Forms        | 1.15 Correction of Defective Surface |
| 1.6 Conditioning of Subgrade  | 1.16 Curing of Concrete              |
| 1.7 Placing Concrete          | 1.17 Protection of Concrete          |
| 1.8 Placing Reinforcing Steel | 1.18 Opening of Traffic              |
| 1.9 Forming Joints            | 1.19 Finishing of Adjacent Ground    |
| 1.10 Longitudinal Joints      | 2.1 Measurement                      |
|                               | 3.1 Payment                          |

**1.1 DESCRIPTION.** This item shall consist of a pavement of portland cement concrete, with or without reinforcement as shown on the PLANS, constructed on the prepared subgrade or completed and accepted base course in accordance with these SPECIFICATIONS and in conformity with the lines, grades, thickness and typical cross section shown on the PLANS.

**1.2 EQUIPMENT.** All equipment necessary for the proper preparation of subgrade, mixing concrete, the laying and finishing of the pavement shall be on the PROJECT, in first class working condition, and shall have been inspected and approved by the ENGINEER before concrete operations will be permitted to begin. All equipment shall meet the specific requirements hereinafter set forth and as shown in the Standard Details. The CONTRACTOR shall maintain all equipment in first class working condition throughout the construction of the PROJECT.

**1.3 MATERIALS.**

1.3.1 Portland Cement. Portland cement shall meet the requirements of Section 620 "Concrete" of these SPECIFICATIONS.

1.3.2 High Early-Strength Portland Cement. High-Early-Strength Portland cement shall meet the requirements of Section 620 "Concrete" of these SPECIFICATIONS.

1.3.3 Water. Water for use with cement in mortar or concrete shall meet the requirements of Section 620 "Concrete" of these SPECIFICATIONS.

1.3.4 Fine Aggregate. Fine aggregate shall meet the requirements of Section 620 "Concrete" of these SPECIFICATIONS.

1.3.5 Coarse Aggregate. Coarse aggregate shall meet the requirements of Section 620 "Concrete" of these SPECIFICATIONS.

- 1.3.6 Bar Reinforcement. Bar reinforcement shall meet the requirements of Section 630 “Reinforcing Steel” of these SPECIFICATIONS.
- 1.3.7 Fabric Reinforcement. Wire for fabric reinforcement shall meet the requirements of Section 630 “Reinforcing Steel” of these SPECIFICATIONS.
- 1.3.8 Tie Bars. Tie bars shall be deformed reinforcing steel of the size and length shown on the PLANS and shall meet the requirements of Section 630 “Reinforcing Steel” of these SPECIFICATIONS.
- 1.3.9 Load Transmission Devices. Load transmission devices shall be either dowel bars or cantilever type devices, all as shown on the PLANS.

Dowel bars shall conform to the details on the PLANS and shall meet the requirements of Section 630 “Reinforcing Steel” of these SPECIFICATIONS.

Cantilever type devices shall be fabricated of cast malleable iron conforming to the details shown on the PLANS. The castings forming each of the two sections shall be manufactured of malleable iron complying with ASTM A47 “Standard Specification for Ferritic Malleable Iron Castings”, Grade 35018. Each load transmission unit of the cantilever type shall consist of two identical castings providing a cantilever arm on which the other half of the unit shall bear, and each casting shall have an upper tension anchor and a lower compression anchor, all constructed in accordance with the general dimensions shown on the PLANS. The castings shall be cleaned and ground as necessary in order that each may be in conformity with the required dimensions and shall assemble into a complete unit providing coincidence of bearing on both the vertical and horizontal sliding faces. The castings shall be sufficiently smooth that there will be no interference with smooth sliding operation.

- 1.3.10 Joint filler. Joint filler of the various types shall meet the following requirements:
- (A) Preformed Non-Extruding Expansion Joint Filler Boards. Cane fiber boards impregnated with asphalt, such as Flexcell type V, cork or cotton seed bulbs impregnated with asphalt, such as Kork-Pak, complying with ASTM D545, Type V or AASHTO M153, Type III or approved equal may be used.
  - (B) Wood Fillers. Boards shall be clear heart redwood or clear all heart western red cedar. Occasional medium surface checks will be permitted provided the board is free of defects that will impair its usefulness. No board less than 6 feet long shall be used and separate pieces shall be held securely to form a straight line.
  - (C) Joint Sealers

- (1) Cold Poured Sealant. Cold poured sealant shall meet or exceed all the performance standards of ASTM C 920, Type S, Grade P, Class 25; Federal Specification TT-S-00230C, Type 1, Class A; and Corps of Engineers CRD-C-541-88, Type 1, Class A.

Each lot or batch of sealing compound shall be delivered to the jobsite in the manufacturer's sealed container with labels intact. The label shall include the batch or lot number, expiration date and manufacturer's certification stating that the compound meets the requirements of this SPECIFICATION. Material with an expired date shall not be used.

- (2) Hot Poured Sealant. Hot poured sealant shall meet or exceed all the performance standards of ASTM D 3405 and AASHTO M301.

Each lot or batch of sealing compound shall be delivered to the jobsite in the manufacturer's sealed container with labels intact. The label shall include the batch or lot number, expiration date, safe heating temperature and manufacturer's certification stating that the compound meets the requirements of this SPECIFICATION. Material with an expired date shall not be used. The required joints in the concrete pavement shall be sealed with cold pour type sealant. The sealant shall be a bitumen modified polyurethane; one part, pourable and self leveling. The sealant shall meet the performance requirements of Federal Specification SS-S-00200 E. The sealant shall be Sonomeric Sealant CT 1, as manufactured by Sonneborn Building Products, 7711 Computer Avenue, Minneapolis, Minnesota 55435 or approved equal.

- 1.3.11 Curing Material for Portland Cement Concrete Pavement. Curing material for portland cement concrete pavement shall be an impervious white pigmented membrane curing compound complying with Section 620, "Concrete" of these SPECIFICATIONS.

- 1.4 **FORMS.** No pavement will be poured until all curb and gutter and storm drainage is in place, when there is curb and gutter adjacent to the pavement and the curb and gutter has been backfilled as required.

Side forms shall be made of steel except that, on curbs having radii of three hundred feet (300') or less, wooden forms of approved thickness may be used. Metal forms shall have a minimum length of ten feet (10'). On curves having radii less than one hundred feet (100'), flexible or curbed form of proper radius shall be used. The forms shall be of approved section, straight, free from warp or bends and of sufficient strength when staked to resist the pressure of the concrete and finishing machine or finishing tools without springing, settlement or lateral movement. The depth of forms shall equal the depth of concrete and the base width shall not be less than eight inches (8") for all forms eight inches (8") or more in height. All side forms less than eight inches (8") in height, shall

have a base width of not less than six inches (6"). The steel forms shall not be less than nine (9) gauge (U.S. Standard Gauge 1893) except that a minimum thickness of twelve (12) gauge will be acceptable if the section of the form is trapezoidal and thoroughly welded.

Steel forms shall meet the following minimum weights per linear foot of form exclusive of pedestals, piers, or other fastenings:

Depth of Form (in inches)	Minimum Net Weight (per linear foot)
6	8.0 lbs.
7	8.5 lbs.
8	9.0 lbs.
9	9.5 lbs.

Forms varying more than one-eighth of an inch ( $1/8''$ ) in ten feet (10') from a true line on its upper edge or more than one-fourth of an inch ( $1/4''$ ) from a true line on its inside face shall be rejected.

The method of connection between sections shall be such that the joint thus formed shall be free from movement in any direction and will not allow leakage.

Bent, twisted or broken forms shall be removed from the WORK until satisfactorily repaired and straightened. Repaired forms shall not be used until inspected and approved by the ENGINEER. Built-up forms shall not be used.

The supply of forms shall be sufficient to permit their remaining in place not less than twelve (12) hours after the concrete has been placed or longer, if deemed necessary by the ENGINEER.

- 1.5 SETTING SIDE FORMS.** Forms shall be set so that they rest firmly throughout their entire length upon the thoroughly compacted subgrade. Any subgrade, which at the form line is found below established grade, shall be filled to grade in lifts of one-half inch ( $1/2''$ ) or less for a distance of eighteen inches (18") on each side of the base of the form and thoroughly rerolled or tamped. Imperfections and variations above grade shall be corrected by tamping or cutting as necessary. In exceptional cases, the ENGINEER may require suitable stakes driven to the grade of the bottom of the forms to afford additional firmness. The ENGINEER may require the CONTRACTOR to operate the finishing machine and subgrade over the forms prior to the starting of construction in order to determine whether the forms will remain true to line and grade during the construction of any portion of the pavement. Any weakness or defects that may develop in the forms under this operation will be cause for immediate rejection. The length and number of pins required for each section of forms shall be such as may be required to maintain the form at the correct line and grade at all times, but in no case shall less than three (3) pins for each ten foot (10') section be used and a pin shall be placed at each side of every joint. Conformity of the

alignment and grade elevation of forms with the alignment and grade elevation shown on the PLANS, or designated by the ENGINEER, shall be checked and necessary corrections made by the CONTRACTOR immediately prior to placing the concrete, where any form has been disturbed, or any subgrade becomes unsuitable, the form shall be reset and rechecked. Forms shall be set for at least sixty feet (60') in advance of the point where concrete is being placed. Forms shall be cleaned and oiled each time they are used.

- 1.6 CONDITIONING OF SUBGRADE.** The subgrade shall be properly prepared, shaped, rolled and maintained in accordance with Section 330, "Excavation and Embankment". After the forms have been set and approved, the subgrade shall be tested in advance of the mixer as to crown and elevation by the use of an approved template. The subgrade template shall be so constructed that its lower testing edge will come to a true position of the subgrade when the template is riding on the forms. Testing of the subgrade surface shall be done by moving the template back and forth on the forms without tilting or lifting. Any excess material indicated by this template shall be removed and deposited upon the adjacent shoulders, disposed of, or rolled in place to bring low areas up to the correct elevation. The sub-grade shall be kept in a condition so that it will drain readily.

At the option of the CONTRACTOR, he can provide a subgrade planer for final shaping of the subgrade that shall ride on the forms. The subgrade planer shall have a cutting edge or edges made of steel plates accurately adjustable and shall be of sufficient weight to properly plane off any high spots encountered and shall have such strength and rigidity as will prevent vertical deflection. Any material planed off the subgrade shall be removed before any concrete is placed. The finished subgrade shall be maintained in a smooth, compacted condition until the pavement is placed.

The subgrade shall be in a moist but not muddy condition at the time of placing the concrete. If required by the ENGINEER, it shall be saturated the previous night or not less than six (6) hours before the placing of the concrete. If it subsequently becomes too dry, the subgrade shall be sprinkled, but the method sprinkling shall be such as will not form mud or pools of water.

- 1.7 PLACING CONCRETE.** Concrete shall be placed only on a subgrade prepared and maintained as hereinbefore prescribed and no concrete shall be placed until the subgrade has been approved by the ENGINEER. The concrete shall be deposited on the subgrade in such manner as to require as little handling as possible. It shall be thoroughly spaded against and along the face of the forms and gutter. Necessary hand spreading shall be done with shovels, not with rakes. Workmen shall not be allowed to walk in the green concrete with boots covered with earth. The concrete shall be distributed to such depth and sufficiently above grade that, when consolidated and finished, the required slab thickness will be obtained and the surface will at all points be true to the grade specified for the finished surface.

No concrete shall be placed around manholes or other structures until they have been brought to the required grade and alignment and all structures, or other fixtures such as valve boxes, poles, etc., shall be separated from the concrete by expansion joints constructed as herein after specified and of the material specified in the PLANS or in the SPECIAL PROVISIONS.

Concrete in a longitudinal section shall not be placed until the previously poured adjacent section has attained an age of twenty four (24) hours unless traffic is to be allowed on the paving in which case the concrete must have attained a compressive strength of at least three thousand pounds per square inch (3,000-psi). The junction line shall not deviate from a true line by more than one-half inch ( $\frac{1}{2}$ " ) at any point and shall be tooled to the radius shown on the PLANS.

The concrete shall be well spaded on each side of the center joint and succeeding batches shall be lapped at least twelve inches (12") over the previous batch. Placing shall be continuous between transverse joints without the use of intermediate bulkheads.

No more concrete shall be mixed and placed than can be properly compacted and finished, as hereinafter specified, between sunrise and sunset, without the written consent of the ENGINEER and then only when adequate lighting system satisfactory to the ENGINEER is provided.

- 1.8 PLACING REINFORCING STEEL.** When required by the PLANS, reinforcing steel of the type and size designed on the PLANS shall be placed in the slab. All reinforcing steel must be clean and free from foreign materials that will prevent the proper bond with the concrete. Reinforcing Steel shall comply with Section 630, "Steel Reinforcing" of these SPECIFICATIONS.

Fabric reinforcement shall be handled carefully and kept straight and free from bends and warps. It shall be placed parallel to the finished surface and at the depth shown on the PLANS. At all places where continuity of reinforcement is required, adjacent sheets of fabric shall be properly lapped. Unless otherwise shown on the PLANS, where laps are made along the sides of the sheets, the transverse wires of the fabric shall be lapped not less than twelve inches (12"). If the length of lap as set out herein is insufficient to permit the first wires parallel to the lapped joint of adjacent sheets to overlap, the length of the lap shall be increased so as to permit the overlapping of these wires.

Reinforcing bars shall be placed in the position shown on the PLANS and shall be securely fastened together at each intersection by means of approved spring clips, wire ties, or other approved devices so that they will not be displaced during handling or during depositing and compacting of the concrete. Welding to fasten reinforcing bars together will not be permitted. When bars are spliced, all adjacent ends shall be lapped at least fifty (50) diameters of the bars.

Strike-off boards or templates, designed to ride on the side forms and operated either mechanically or by hand, shall be used to level the concrete and secure the correct elevation for placing the reinforcing steel. Prior to the installation of

the reinforcement, concrete shall be deposited upon the subgrade in sufficient amount so that when leveled by a strike-off board, the surface will be at the elevation specified for the reinforcing steel. After the concrete has been struck off and level to the elevation specified, and before any initial set of the concrete has occurred, the reinforcing steel shall be placed thereon and covered with additional concrete in such quantity and so deposited and distributed that when finished, the pavement shall have the required thickness and crown. Sled, chair and other devices used to suspend reinforcing steel, with the consequent depositing of the concrete through the steel will be permitted. A lapse in time exceeding fifteen (15) minutes between placing the top layer of concrete on the bottom layer will not be permitted.

- 1.9 FORMING JOINTS.** Expansion joints, unless otherwise provided, shall be constructed in accordance with the Plans, SPECIFICATIONS, and as directed by the ENGINEER.

Longitudinal joints and transverse joints shall be constructed in cases where indicated on the PLANS. Longitudinal joints shall be constructed in the manner shown on the PLANS. Transverse joints shall be expansion joints, dummy joints or construction joints. Unless other locations are shown on the PLANS, all longitudinal joints shall be along or parallel to the center line of the pavement and all transverse joints shall be at right angles to the center line and shall extend the full width of the pavement. All joints shall be perpendicular to the surface of the slab and when tested with a straight edge, the surface across any joint shall not vary from a ten foot (10') straight edge by more than one eighth inch (1/8"). Concrete edges at all joints shall be tooled to the radius shown on the PLANS. All joints shall be trimmed and topped out with the prescribed material. Each kind of joint shall be of the type or variety and of the dimensions required by the PLANS or SPECIAL PROVISIONS and shall conform in each case to the appropriate requirements hereinafter set forth.

- 1.10 LONGITUDINAL JOINTS.** The longitudinal joint on the center of the pavement shall not be a keyed construction joint and shall be constructed in accordance with details shown on the PLANS.

Tie bars of the dimensions shown and meeting the requirements of Section 630, "Reinforcing Steel" shall be placed across construction joints as shown on the PLANS. The tie bars shall be held in position, at the spacing shown, perpendicular to the joint and at the correct distance from the surface of the slab, by metal chairs or pins or other supports indicated on the PLANS or approved by the ENGINEER. In lieu of using supports, the tie bars may be floated in place by approved machine methods. In no case shall tie bars be painted, greased or otherwise treated to prevent bonding with the concrete.

Upon completion of the paving operation, the longitudinal construction joint shall be topped with approved joint sealant.

**1.11 TRANSVERSE JOINTS.** Transverse joints shall consist of expansion joints and dummy joints installed at intervals shown on the PLANS or provided herein and constructed in conformity with the details shown on the PLANS and these SPECIFICATIONS.

1.11.1 Expansion Joints. Expansion joints shall be installed at one hundred twenty foot (120') intervals unless otherwise shown on PLANS or directed by the ENGINEER, and constructed in conformity therewith.

Transverse expansion joints shall be formed during the placing of the concrete and such methods of construction shall be employed that joints to the full depth and width of the slab are secured. The finished joint shall be true to the line prescribed within an allowable variation of one-quarter of an inch ( $\frac{1}{4}$ " ) in the width of one traffic lane.

Joint filler for expansion joints shall be three quarters of an inch ( $\frac{3}{4}$ " ) thick. Redwood boards shall be cut to the required width and thickness, and not less than five feet (5') in length, except where the joint for which the filler is intended is less than five feet (5') in length, the length of the piece shall be equal to the entire length of the joint. Where more than one section is allowed and used in a joint, pieces of filler less than one lane-width shall be laced or clipped together and all abutting ends of filler shall fit tightly together, so that no concrete can get into the joints.

When in position, the filler shall be accurately perpendicular to the surface of the pavement. The bottom edge of the filler shall project to or slightly below the bottom of the slab and the top edge, unless otherwise prescribed shall be held one-fourth of an inch ( $\frac{1}{4}$ " ) below the surface of the proposed pavement to provide space for sealing of the joint with a bituminous filler.

In the event dowel bars are used for load transmission devices, holes shall be approximately punched to admit the dowels. All holes for dowel bars shall be accurately spaced as specified on the PLANS and shall be of the same diameter as the bars to be placed therein.

1.11.2 Dummy Joints. Transverse dummy joints or contraction joints shall be placed at the intervals shown on the PLANS and in conformity therewith.

In the event dowel bars are used across dummy joints, the joints shall be formed by impressing in the slab a groove or cleft of the dimension shown on the PLANS. The groove formed in the soft concrete by a suitable tool or device, shall extend across the width of the slab in a straight line and shall extend vertically downward from the surface to the depth shown. The groove shall be filled with asphaltic mineral filler in the manner specified under pouring joints. Dowel bars of the prescribed size shall be installed and accurately spaced as provided by the PLANS.

- 1.12 LOAD TRANSMISSION ASSEMBLIES.** Placing of load transmission assemblies shall conform to the following requirements:

Load transmission assemblies must be dowel assemblies as shown on the PLANS. They shall be prepared and placed across all transverse joints when called for on the PLANS.

Dowels. The dowel bars shall be held in position, parallel to the surface and center line of the slab, by an approved device that shall be left in the pavement. Each dowel bar placed in an expansion joint shall be provided with an approved close fitting, closed end metal sleeve, of the dimensions indicated, with suitable flange or other approved device to hold the end of the sleeve from the end of the bar during placing of the concrete so that a space of not less than the proposed thickness of the joint will be provided for subsequent movement of the bar in the sleeve. The type of metal sleeve to be used on dowel bars for expansion joints must meet the approval of the ENGINEER. The dowel bars in expansion joints shall be completely coated on alternate opposite sides of the wood or preformed asphaltic board fillers with an approved heavy grease, applying it to that half of the bar with the capped end. Petroleum oils shall not be used for this purpose.

The dowel bars shall be of smooth round steel of a diameter and length shown on the PLANS and shall be placed as shown on the PLANS. The dowel shall be burred at one end.

- 1.13 POURING JOINTS.** Prior to the acceptance of the project and before the pavement is opened to traffic, all expansion joints shall be sealed and all dummy and construction joints, cracks and fractures shall be filled with the bituminous material specified for "Joint Filler". All joints, cracks and fractures shall be filled immediately after the curing operation is completed and all joints, cracks and fractures, together with any new cracks or fractures, shall be filled and kept filled with the specified asphalt mineral filler until the entire project is completed and accepted by the ENGINEER. Prior the sealing of expansion joints, the top of the joint shall be thoroughly cleaned and the top edge of the joint filler shall not be less than one-fourth inch ( $\frac{1}{4}$ " ) below the surface of the pavement. All joints shall be clean and dry before being poured. The asphalt mineral filler shall be heated to such temperature that it will satisfactorily penetrate to the full depth and width of the joint. In pouring, the opening shall first be poured part full, allowed to settle and then completely filled. Any material spilled over the surface of the adjacent pavement, curbs or structures shall be immediately and completely removed by the CONTRACTOR at his expense. After the pavement is opened to traffic, and prior to final acceptance, all filler in joints that extends above the surface of the pavement shall be trimmed flush with the pavement as directed by the ENGINEER and to his satisfaction.
- 1.14 CONSOLIDATING AND FINISHING.** The sequence of operations shall be, first, the strike off and consolidation; second, longitudinal floating, transverse floating and the removal of laitance, followed by straight-edging and brooming. The

machine method of strike-off and consolidation shall be employed. Compacting and finishing by hand will be allowed.

- 1.14.1 Strike-off and Consolidation. The concrete as soon as placed, shall be accurately struck off and screeded, with approved equipment, to the crown and cross section shown on the PLANS and to an elevation slightly above grade so that, when properly consolidated and finished, the surface of the pavement shall be at the exact grade indicated by the PLANS and free from porous places.

The machine equipment shall be of the screeding and troweling type, designed and operated both to strike off and to consolidate by vibrating. The machine shall go over each area of pavement as directed and as many times and at such intervals as required to take advantage of the conditions of the concrete, to give the proper compaction and to leave a surface of uniform texture, true to grade and contour. At least two trips will be required. Prolonged operation over a given area, however, shall be avoided. The last trip for a given area shall be a continuous run of approximately thirty feet (30'). The top of the forms shall be kept free from accumulations by an effective device attached to the machine and the travel of the machine on the forms shall be maintained true without lift, wobbling or other variations tending to affect the precision of the finish. The machine shall be of ample strength to withstand severe use and shall be fully and accurately adjustable to the correct crown or for derangement due to wear.

- 1.14.2 Hand Methods for Strike-Off and Consolidation. When the hand method is permitted, concrete as soon as placed, shall be struck off and screeded to the crown and cross section shown on the PLANS and to an elevation above grade so that, when consolidated and finished, the surface of the pavement shall be at the exact grade elevation indicated by the PLANS. The entire surface shall then be tamped and the tamping operation continued until the required compaction and reduction of surface voids is secured. Concrete, during and immediately after depositing, shall be thoroughly consolidated. Consolidation shall be done by mechanical vibration in accordance with Section 620 "Concrete" of these SPECIFICATIONS. A strike or tamping template shall be provided on the WORK. It shall be durably constructed of three (3") or four (4") inch lumber steel shod, or of steel of channel cross section two feet (2') longer than the proposed width of pavement slab and sufficiently strong and rigid to retain its shape under all working conditions. In making the strike-off above mentioned, the template shall be moved forward with a combine longitudinal and transverse shearing motion, moving always in the direction in which the WORK is progressing and so manipulated that neither end is raised from the side forms during the striking off process. All templates shall be subject to the approval of the ENGINEER and shall be discarded when adjudged unfit for use.

- 1.14.3 Finishing Tools. After the concrete has been struck off, the CONTRACTOR shall provide and use as hereinafter provided and directed by the ENGINEER the following name finishing tools: Longitudinal Float, Transverse Float, Straightedge Float, Bow Belt, Long Handle Float, Hand Float and Edging Tools.

The continued use of tools other than those specifically provided for will not be permitted unless same are found to be as effective for the purpose used. Any and all tools and equipment necessary for the finishing and checking of the pavement surface shall be furnished and used by the CONTRACTOR as directed by the ENGINEER. Tools or equipment adjudged by the ENGINEER as unfit for use shall be immediately discarded by the CONTRACTOR.

- 1.14.4 Longitudinal Floating. In this operation, a longitudinal float shall be worked with a sawing motion while held in floating position parallel to the road center line and passed gradually from one side of the pavement to the other. Movements ahead along the center line of the pavement shall be in successive advances not more than one-half ( $\frac{1}{2}$ ) the length of the float. The float may be operated from foot bridges resting on the side forms and spanning but not touching the concrete or from the sides of the pavement when provided with suitable handles.
- 1.14.5 Transverse Floating. After the concrete has been floated with the longitudinal float and all depressions and high spots have been removed, it shall be floated with a transverse float. A long sweeping stroke shall be used for one time over. If required, an additional transverse float may be used ahead of the longitudinal float.
- 1.14.6 Straight-Edging. While the concrete is still plastic, the slab surface shall be tested for true-ness with a straightedge. The straightedge shall be held in successive positions parallel to the pavement center line in contact with the surface and the whole area gone over from one side of the slab to the other, as necessary. Advance along the road shall be in successive stages of not more than one-half ( $\frac{1}{2}$ ) the length of the straightedge. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated and refinished. The straightedge testing and refloating shall continue until the entire surface is found to be free from observable departures from the straightedge and the slab has the required grade and contour.
- 1.14.7 Finished Surface. The finished surface shall be free from porous spots, irregularities, depressions and small pockets or rough spots and shall have a brushed or broomed finish. The edges of the slab shall be carefully finished with an edger of the radius required by the ENGINEER at the time the concrete becomes hard and non-plastic and the pavement edge left smooth and true to line.
- 1.15 CORRECTION OF DEFECTIVE SURFACE.** After the concrete has hardened and not later than 10:00 A.M. following the placing of the concrete, the surface of the pavement shall be again tested with a ten (10') foot straightedge or device that shall be operated as previously described, so as to reveal any and all irregularities. Any portion of the pavement, which shows a variation or departure from the testing edge of more than one-eighth of an inch ( $\frac{1}{8}$ ") and has not been satisfactorily corrected by rubbing or other approved methods shall be removed and replaced by and at the expense of the CONTRACTOR, any area or section

so removed and replaced by and at the expense of the CONTRACTOR, any area or section so removed shall be not less than twelve feet (12') in length and for the full width of the section under construction. Where approved by the ENGINEER, low places or imperfections shall be corrected by gluing with an approved epoxy glue such as Sika epoxy patching compound applied as recommended by the manufacturer.

**1.16 CURING OF PORTLAND CEMENT CONCRETE PAVEMENT.** Curing of Portland cement concrete pavement shall comply with the impervious membrane method as defined in Section ST-104 "Concrete" of these SPECIFICATIONS.

**1.17 PROTECTION OF CONCRETE.** The CONTRACTOR shall erect and maintain suitable barricades and employ watchmen, if required by the ENGINEER, to exclude traffic from the newly constructed pavement for the period herein prescribed. When it is necessary to provide for traffic across the pavement, the CONTRACTOR shall, at his expense, construct suitable and substantial crossings to bridge over the concrete that will be adequate for the traffic and satisfactory to the ENGINEER. When bridges or ramps are required by property holders, the CONTRACTOR shall be required to construct same in the following manner: If it is necessary for trucks, tractors or similar heavy vehicles to cross the highway, a timber bridge shall be constructed without bearing on the pavement. If a crossing is required for automobiles, the CONTRACTOR may bridge as specified above or construct an earth ramp, by first placing twelve inches (12") of earth on the pavement and covering same full length with two inch (2") planks placed parallel to the center line. However, no earth ramp shall be constructed until the pavement is at least twenty-four (24) hours old, and then only in a manner as specified above.

Any part of the pavement damaged by traffic or other causes occurring prior to its final acceptance shall be repaired or replaced by and at the expense of the CONTRACTOR in a manner satisfactory to the ENGINEER. The CONTRACTOR shall protect the pavement against both public traffic and the traffic caused by his own employees and agents. All ditches and drains shall be maintained by the CONTRACTOR in such condition as to provide effective drainage.

**1.18 OPENING TO TRAFFIC.** Traffic shall be excluded from newly constructed pavement, constructed with standard Portland cement, for a period of time required to allow the concrete to achieve a minimum compressive strength of three thousand pounds per square inch (3,000-psi) or longer if, in the opinion of the ENGINEER, weather or other conditions make it advisable to extend the time. The pavement shall be cleaned and the joints filled and trimmed before the pavement shall be opened to traffic. The joint of line of separation between adjacent strips or slabs of concrete, when the pavement is constructed in lanes or strips, shall be cleaned and filled with bituminous material herein prescribed for the purpose.

**1.19 FINISHING ADJACENT GROUND.** The final dressing of the shoulders and slopes shall follow the completion of the pavement as closely as practicable. Final dressing shall not injure, mar, and/or scrape the finished surface, edge, and/or joints of the pavement.

**2.1 MEASUREMENT.** Portland cement concrete pavement of the thickness shown on the PLANS will be measured by the square yard, complete in place. The width for measurement will be the width from outside of completed pavement, as constructed in accordance with the PLANS or as directed by the ENGINEER. The length will be the actual center line length measured along the riding surface.

Steel reinforcement including dowel bars, ties bars, transmission devices, dowel and reinforcement bars insertions, etc. will not be measured for payment, but shall be included in the contract unit price per square yard for "Portland Cement Concrete Pavement"

**3.1 PAYMENT.** The number of square yards of completed and accepted pavement, measured as provided above, shall be paid for at the contract unit price per square yard for "Portland Cement Concrete Pavement" complete in place, which price and payment shall constitute full compensation for preparing the subgrade, shaping the shoulders, and for furnishing and placing all materials including tie bars, dowel bars, dowel insertions into existing concrete pavement, welded wire fabric, curing of concrete, and joint material required by the PLANS and these SPECIFICATIONS for the completion of the pavement slab, for the furnishing of all forms, equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the items, and for all royalties and payments whatsoever for patents covering processes or equipment used in constructing the item.

If the portland cement concrete pavement does not comply with the compressive strength requirements, payment shall be made at an adjusted unit price in accordance with Section 620 "Concrete" of these SPECIFICATIONS.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
910-(thick)	Portland Cement Concrete Pavement (thick)	Square Yard

**SECTION 920 CONCRETE CURB & CURB AND GUTTER**

- |                            |                          |
|----------------------------|--------------------------|
| 1.1 Description            | 1.4 Construction Methods |
| 1.2 Proportions and Mixing | 2.1 Measurement          |
| 1.3 Materials              | 3.1 Payment              |

**1.1 DESCRIPTION.** This item shall consist of the construction of any of the types of curbs, and curb and gutters in conformity with the lines, grades, dimensions and typical sections indicated on the DRAWINGS and in accordance with these SPECIFICATIONS.

**1.2 PROPORTIONING AND MIXING:** All concrete for curb and/or gutter shall be the same as provided for the pavement and proportioned and mixed in accordance with Section 620, "Concrete".

**1.3 MATERIALS.** Cement, Sand, Coarse Aggregate, Water and Prefomed Joint Fillers shall meet the requirements of Section 620, "Concrete".

**1.4 GENERAL CONSTRUCTION REQUIREMENTS.**

**1.4.1 Subgrade.** The subgrade shall be shaped to the required depth below the finished surface in accordance with the dimensions shown on the PLANS and shall be compacted to a firm, even surface. When possible, the subgrade shall be shaped and compacted at the same time and in the same manner as the subgrade for the pavement slab. All soft and yielding spots or any unsuitable material encountered shall be removed and replaced with suitable material.

**1.4.2 Forms.** Forms for curbing and gutter shall be of the material as listed below:

- Lip of gutter form - metal or wood
- Back of curb form - wood or metal
- Face form of vertical curbs - wood or metal
- Face or gutter line form of Drive-in and Park Type Curb – metal

(A) The forms for curbing or gutter shall be of wood or metal, straight, free from warp and of sufficient strength when staked, to resist the pressure of the concrete without springing. At least three (3) stakes shall be provided for each ten feet (10'). Metal forms shall be of approved section. Forms shall be of a depth equal to the depth of the curbing or gutter, so designed as to permit their secure fastening together at the top. The outside form shall be straight from top to bottom. The inside form shall have a batter from the top of the curbing to the finished surface line of the pavement as shown on the PLANS, and shall be straight from this line to the bottom. All forms shall be cleaned thoroughly and greased or soaped before concrete is placed against them. Forms that have become worn, bent or broken shall

not be used until satisfactorily repaired and straightened. Repaired forms shall not be used until inspected and approved by the ENGINEER.

- (B) At the intersection of the streets where curved returns are used, the form shall be built to the exact curvature shown on the DRAWINGS. Factory built steel forms may be used; however, if the CONTRACTOR elects to use wood forms, the inside face shall be built to a true curvature so as to form a smooth face. A lining of steel, plywood or masonite shall be acceptable.
- 1.4.3 Joints. Joints shall be formed in the curb and gutter to correspond with dummy and expansion joints in the pavement. All expansion joints shall extend entirely through the curb section and shall be finished with pre-moulded filler. Both edges of dummy joints and expansion joints shall be finished with a one-fourth inch ( $\frac{1}{4}$ " ) radius edging tool. All lips of gutter shall be keyed construction joint as shown on the Standard Detail Sheets.
- 1.4.4 Depositing Concrete. The concrete shall be placed on the prepared subgrade, struck off and compacted to the required thickness. All concrete shall be vibrated with a power driven vibratory screed sufficiently to eliminate all voids and to bring the mortar to the surface, after which it shall be finished smooth and even with a wooden float. All edges shall be rounded with an approved finishing tool to the radius shown on the PLANS.
- 1.4.5 Finishing. The front forms shall not be removed in less than two (2) hours and shall not be left in place more than six (6) hours. The back forms shall not be removed until the front face of the curb has been finished and shall not be allowed to remain in place longer than twenty-four (24) hours. Upon removal of the back form, minor honeycombed placed and other minor defects shall be filled with mortar composed of Portland Cement and sand, mixed in the same proportion as provided for the concrete. Plastering will not be permitted on the faces of the curbing or gutter and all rejected curb and gutter shall be removed and replaced without additional compensation. The top and face of the curb and gutter shall be finished while the concrete is still green, by rubbing with a wood block until all voids are filled and then given a rough finish with all strokes in the same direction.
- 1.4.6 After inspection, if approved by the ENGINEER, broken places or imperfections may be repaired by gluing with an approved epoxy glue such as Sika epoxy patching compound applied as recommended by the manufacturer.
- 1.4.7 The finished curb shall show a true, straight face and top of uniform width, free from humps, sags or inequalities. When a ten foot (10') straight edge is laid upon the top of the curb, it shall not vary more than one-fourth inch ( $\frac{1}{4}$ " ) from the straight edge, except at curbs or grade changes.
- 1.4.8 Curing. After finishing, the curb or gutter shall be cured in the same manner as provided for Portland Cement concrete pavement.

- 1.4.9 Backfilling. Immediately upon removal of the back form the area between the back of the curb and the property line (or sidewalk, if in place) shall be backfilled and sloped as shown on the DRAWINGS. The backfill shall be tamped in layers of not more than six inches (6") until firm and solid. All backfilling shall be completed before any concrete pavement is poured.
- 1.4.10 Cleaning, Gutter, Curb and Gutter, and Slab. All grout and surplus concrete spilled on curb and gutter, existing pavement or sidewalks shall be cleaned immediately upon completion of each pour.
- 1.4.11 Repairs and Replacements. The CONTRACTOR shall repair curb, sidewalk and gutter damaged by him during construction of the curb. Repairs to curb shall be made by removing and replacing the curb to the nearest sound, unfractured curb section. If approved by the ENGINEER, repairs may be made by using an approved epoxy glue applied in accordance with manufacturer's recommendations.
- (A) Reconstruction of curb or curb and gutter shall be made between the limits shown on the PLANS.
  - (B) Cuts in existing curb shall be made to neat, plane faces normal to the curb line. The new WORK shall match the appearance of the existing improvements as nearly as practicable.
  - (C) In the preparation of the subgrade for concrete pavement, the stabilization of the soil cement base, or the application of the asphaltic concrete, the CONTRACTOR shall be responsible for any damages done to the finished curb and gutter by machinery. Any damaged curb shall be replaced or relined as directed by the ENGINEER at the CONTRACTOR'S expense.
  - (D) Where motor patrols are used, an added safeguard shall be provided to prevent the end of blade from striking the gutter.
- 1.4.12 Gutters. Concrete gutters, unless otherwise specified, or shown on the PLANS, shall have a width of eighteen inches (18") and a thickness of six inches (6") and shall be composed of concrete as specified in these SPECIFICATIONS, the surface being accurately finished to line and grade, troweled, edges rounded and the work marked off with dummy joints, two inches (2") deep and one-fourth ( $\frac{1}{4}$ ") inch wide, in blocks having a length not to exceed fifteen feet (15') in curb and gutter sections. The work shall be protected by covering with wet burlap or curing compound and kept moist for such time as may be necessary to insure proper setting, not less than three (3) days, unless otherwise directed by the ENGINEER.
- 1.4.13 Catch Basins. Curb in blocks where catch basins are specified, shall not be constructed prior to the construction of the catch basins and drainage structures.

That portion of the curb, either standard or depressed, within the limits of a catch basin without curb opening shall be constructed monolithic with the catch basin.

Payment for this curb shall be made according to the unit price set forth in the contract for a catch basin complete in place.

1.4.14 Driveways. When existing driveways are to be removed and replaced or new driveways constructed on existing Portland Cement Concrete Paved streets, Concrete Curb shall be removed and replaced as shown on Standard Detail SD-01-B, "Driveway Construction on Existing Roadway". No portion of any driveway, commercial or residential, shall be constructed within five feet (5') any existing ornamental lighting standard without prior permission of the Superintendent of Power and Light Department of the City of Alexandria.

- (A) The fall across the curb at driveways shall be not less than three-fourths inch ( $\frac{3}{4}$ " ) inch. The length of the driveway depressions shall be nine feet (9'), exclusive of side slopes, except where property owners request otherwise, but shall not exceed thirty feet (30') in length. The distance between two (2) driveways lying in front of one (1) lot shall be not less than ten feet (10') in addition to the side slopes. The height of the curb between two (2) driveways shall be the same as that on either side of the driveway and elsewhere on the street in the same block. Driveway depressions shall not be left in curb returns within the limits of the property lined produced.
- (B) A driveway, or its side slope, intended for one lot shall not be extended in front of an adjoining lot, unless the sidewalk adjoins the curb, or unless a written waiver is secured from the owner of the said adjoining lot, the entire driveway and side slope shall be confined to the right angle frontage at the curb instead of to the frontage of the curb line with the properly lined produced. When driveways are intended for two (2) adjoining lots and so located that three feet (3') of curb cannot be constructed on the curb grade between the two (2) driveways, the two (2) depressions shall be merged into one (1).
- (C) Depressions in the curb for driveways twenty feet (20') or more in length in front of business property shall be constructed one-half ( $\frac{1}{2}$ ) at a time upon request of the owner or occupant. The second half of the curb across the depressions shall not be constructed prior to the expiration of the curing period of the first half.

1.4.15 Openings in Curb. Opening shall be provided in new curb for existing roof drains or yard drains. A section of schedule 80 PVC Pipe of sufficient length and diameter shall be left for each property owner on curbs over seven and one-half inches ( $7\frac{1}{2}$ " ) high. These shall be located as directed by the ENGINEER.

2.1 **MEASUREMENT**. Curb and/or combination curb and gutter will be measured by the linear foot along the face of the curb for computing length indicated on the PLANS. Where existing curb or curb and gutter is to be removed and replaced or new driveways constructed on existing Portland Cement Concrete Streets, saw cutting and removal of existing curb shall be included in other items.

- 3.1 PAYMENT.** Curb and/or combination curb and gutter placed and accepted, measured as provided above, shall be paid for at the contract price per linear foot of "Curb", and "Curb and Gutter", complete and accepted in place, which price and payment shall constitute full compensation for all necessary excavation, preparation of subgrade, backfilling; and for the furnishing of all materials, forms, equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item. Saw cutting and removal of existing curb or curb and gutter shall be included in other items.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
920-01	4" Barrier Type Curb	Linear Foot
920-02	6" Barrier Type Curb	Linear Foot
920-03	Mountable Type Curb	Linear Foot
920-04	4" Monolithic Barrier Curb and Gutter	Linear Foot
920-05	4" Barrier Type Curb and Gutter	Linear Foot
920-06	6" Monolithic Barrier Curb and Gutter	Linear Foot
920-07	6" Barrier Type Curb and Gutter	Linear Foot
920-08	Monolithic Mountable Type Curb and Gutter	Linear Foot
920-09	Mountable Type Curb and Gutter	Linear Foot

**SECTION 930 CONCRETE SIDEWALKS AND DRIVEWAYS**

- |     |                           |     |             |
|-----|---------------------------|-----|-------------|
| 1.1 | Description               | 2.1 | Measurement |
| 1.2 | Materials                 | 3.1 | Payment     |
| 1.3 | Construction Requirements |     |             |

**1.1 DESCRIPTION.** This item consists of Portland Cement Concrete Sidewalks and Driveways constructed in one course on a prepared subgrade in accordance with these SPECIFICATIONS and in conformity with the lines, grades, thickness and typical cross sections shown on the PLANS or as directed by the ENGINEER.

**1.2 MATERIALS.** All materials shall meet the requirements specified in Section 620, "Concrete".

Concrete for sidewalks and driveways shall contain a minimum of six (6) sacks of cement per cubic yard. The minimum compressive strength of the concrete when tested at twenty eight (28) days shall be three thousand five hundred pounds per square inch (3,500 psi). The minimum cement content may be increased and the quantities and proportions of fine and coarse aggregate may be reduced from the theoretical amounts as necessary to produce the required compressive strength and workability but the water/cement ratio shall in no case exceed the minimum allowed in the table of proportions.

Expansion joint filler shall be redwood or pre-molded bituminous fiber board of the non-extruding resilient type as specified. Joint sealants will not be required.

Reinforcement, if required by the PLANS, shall be 6" by 6" welded steel wire fabric of the gage shown on the PLANS or SPECIAL PROVISIONS and conforming to SPECIFICATIONS set forth in Section 630 "Reinforcing Steel."

**1.3 CONSTRUCTION REQUIREMENTS.**

**1.3.1 Subgrade Preparation.** Excavation for the subgrade of the sidewalk shall be made true to the lines and grades shown on the PLANS or as established by the ENGINEER, and the entire subgrade area shall be rolled or tamped until it is hard and solid, prior to the placing of any concrete. If required, the subgrade shall be sprinkled with water to aid in securing thorough compaction. Any soft, spongy or other unsuitable material encountered shall be excavated as directed by the ENGINEER and replaced with suitable material, and thoroughly tamped in place. The top six inches (6") of native subgrade shall be compacted to a minimum ninety percent (93%) maximum dry weight density. When "Red Dirt" backfill material is required it shall comply with Section 330, "Excavation and Embankment" of these SPECIFICATIONS.

**1.3.2 Forms.** Either wood or metal forms may be used.

The lumber used for wood forms shall be dressed, free from bulges or warp, of uniform width, and sound and free from loose knots.

Metal forms shall be of approved sections, shall present a smooth surface and have a flat surface on top.

Forms shall be of sufficient strength to withstand the weight of the concrete placed against them without bulging and shall be securely staked, and braced sufficiently tight to prevent leakage of mortar and held firmly to the required line and grade. They shall be of a depth at least equal to the depth of the sidewalk section and shall be cleaned thoroughly before concrete is placed against them.

- 1.3.3 Placing Concrete. Immediately before placing the concrete, the subgrade shall be tested with a template cut true to cross section of the proposed construction, all irregularities corrected and compacted, and the entire subgrade sprinkled with water.

Immediately after mixing, the concrete shall be deposited in a single layer on the moist subgrade to such depth that after finishing it shall be to the full thickness required. The edges and sides and joints shall be thoroughly spaded, and the surfaces tamped sufficiently to compact the concrete and bring mortar, for finishing, to the surface.

- 1.3.4 Finishing. The concrete shall be struck-off with a transverse template resting upon the side forms, and shall be floated with an approved float, in such a manner that excess water, laitance, or other inert material shall be removed from the surface. Where additional concrete is necessary, it shall be added and floating operations continued until the entire surface of the concrete is uniform in texture.

When the surface of the concrete is free from water and before it obtains its initial set, it shall receive a broom finish so as to create a non-skid surface.

No plastering will be permitted. The longitudinal surface variations shall be not more than one-quarter inch ( $\frac{1}{4}$ " ) inch under a ten foot (10') straightedge, nor more than one-eighth inch ( $\frac{1}{8}$ " ) on a five feet (5') transverse section. The surface of the concrete shall be finished so as to drain completely at all times.

The edges of the sidewalks and drives shall be carefully finished and rounded with an edging tool having a radius of one-half inch ( $\frac{1}{2}$ " ). The expansion joints shall be edged with an edger having a radius of one-quarter inch ( $\frac{1}{4}$ " ).

The surface of the sidewalk shall be divided into blocks with an approved grooving tool and the groove shall have a depth of not less than one inch (1"). Where the width of the sidewalk does not exceed six feet (6'), the grooves shall be spaced at intervals equal to the approximate width of the sidewalk. When the sidewalk exceeds six feet (6') in width, the grooves shall be spaced at intervals equal to approximately one-half ( $\frac{1}{2}$ ) the width of the sidewalk and in addition, a

longitudinal groove shall be provided along the center line of the sidewalk. All edges of the grooves shall be carefully finished and edged with an edger having a radius of one-quarter inch ( $\frac{1}{4}$ "), after which, all marks caused by edging, or otherwise, shall be removed with a wetted brush or wood float so as to give the surface a uniform texture and finish.

- 1.3.5 Expansion Joints. Joint filler shall be three-quarter inch ( $\frac{3}{4}$ ") thick Redwood or pre-moulded bituminous as specified in Section 910, "Portland Cement Concrete Pavement". The Redwood expansion joint material shall be cut to the full transverse width and depth of the concrete sidewalk.

Expansion joints shall be installed at all points where the sidewalk joins the curb or where the sidewalk contacts driveways, walls or other rigid structures. Castings or grating frames in the sidewalk area shall be surrounded by expansion joints.

Expansion joints shall be installed along the right-of-way or servitude line, at all points where the driveway joins the curb or where the driveway contacts a sidewalk, walls or other rigid structures.

- 1.3.6 Protection and Curing. Immediately after finishing the concrete, it shall be protected and cured in accordance with the impervious membrane method as defined in Section 620, "Concrete" of these SPECIFICATIONS.

Any section, which is damaged before final acceptance of the WORK, shall be removed and reconstructed by the CONTRACTOR without extra compensation.

- 1.3.7 Backfilling and Clean Up. When the concrete has set sufficiently, the forms shall be removed, and the sides of the sidewalk shall be backfilled to the required elevation with suitable material, which shall be tamped in layers of not more than six inches (6") until firm and solid. All surplus material shall be disposed of as directed, and the completed WORK and site shall be left in a neat and presentable condition.

- 2.1 **MEASUREMENT.** The area of completed and accepted Concrete Sidewalk or Driveway will be measured by the square yard, using the neat dimensions shown on the PLANS, and, unless otherwise ordered in writing by the ENGINEER, such dimensions shall not exceed those shown on the PLANS.

Subgrade preparation and the furnishing and installation of steel reinforcement will not be measured for payment, but shall be included in the bid price for concrete sidewalk.

- 3.1 **PAYMENT.** This item will be paid for at the contract unit price bid per square yard of Concrete Sidewalk or Concrete Driveway, completed in place including reinforcement if required; which price shall be full compensation for all fine grading, backfilling and disposal of surplus material; for curing concrete; and for all material, forms, equipment, tools, labor and incidentals necessary to complete the WORK.

If the Concrete Sidewalk or Driveway does not comply with the compressive strength requirements, payment shall be made at an adjusted unit price in accordance with Section 620 "Concrete" of these SPECIFICATIONS.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
930-01-(thick)	Concrete Sidewalk (thick)	Square Yard
930-02-(thick)	Concrete Driveway (thick)	Square Yard

**SECTION 940 HANDICAP RAMPS**

- |     |                                   |     |             |
|-----|-----------------------------------|-----|-------------|
| 1.1 | Description                       | 2.1 | Measurement |
| 1.2 | Materials                         | 3.1 | Payment     |
| 1.3 | General Construction Requirements |     |             |

**1.1 DESCRIPTION.** This item consists of Portland Cement Concrete Handicap Ramps associated with sidewalks constructed in one course on a prepared sub-grade in accordance with these SPECIFICATIONS and in conformity with the lines, grades, thickness and typical cross sections shown on the PLANS. The slope of the handicap ramp shall be no steeper than twelve to one (12 to 1) (horizontal or vertical). Handicap ramps shall be constructed as shown on Standard Detail HR-01, "Handicap Ramp".

**1.2 MATERIALS.** All materials shall meet the requirements specified in Section 620, "Concrete".

1.2.1 Concrete for Handicap Ramp shall be a mixture containing a minimum cement content of six (6) sacks per cubic yard. The minimum compressive strength of the concrete when tested at twenty eight (28) days, shall be three thousand five hundred pounds per square inch (3,500 psi). The minimum cement content may be increased and the quantities and proportions of fine and coarse aggregate may be reduced from the theoretical amounts as necessary to produce the required compressive strength and workability but the water/cement ratio shall in no case exceed the minimum allowed in the table of proportions.

1.2.2 Expansion joint filler shall be redwood or pre-molded bituminous fiber board of the non-extruding resilient type as specified. Joint sealants will not be required.

1.2.3 Reinforcement, if required by the PLANS, shall be welded steel wire fabric of the gauge shown on the PLANS and conforming to SPECIFICATIONS set forth in SECTION 630, "Reinforcing Steel."

1.2.4 Paver Units: Paver units shall meet all the requirements of ADA Accessibility Guidelines. Prefabricated Mat (inlaid) will not be allowed. Paving units have an average compressive strength of 8000 psi with no unit under 7000 psi. Paver units shall have an average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C140. Four by eight inch pavers shall be laid out in a 2'x2' basket weave pattern. Twelve by twelve inch pavers shall be laid out in a block pattern. Paver units shall have top surface for detectable warning to pedestrians. Paver units shall be saw cut only and any cut unit shall not be less than 25% of a full unit.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.**

- 1.3.1 Subgrade Preparation. Excavation for the sub-grade of the handicap ramps shall be made true to the lines and grades shown on the PLANS or as established by the ENGINEER, and the entire sub-grade area shall be rolled or tamped until it is hard and solid, prior to the placing of any concrete. If required, the sub-grade shall be sprinkled with water to aid in securing thorough compaction. Any soft, spongy or other unsuitable material encountered shall be excavated as directed and replaced with suitable material, thoroughly tamped in place.

The top six inches (6") of the sub-grade shall be compacted to a minimum of ninety percent (90%) of maximum dry weight density. Maximum dry weight density will be determined in accordance with LA DOTD designation TR 415 or TR 418. When "Red Dirt" is required as a base material, it shall be compacted and meet the requirements as set forth in Section 330 "Excavation and Embankment".

- 1.3.2 Forms. Either wood or metal forms may be used.

- (A) The lumber used for wood forms shall be dressed, free from bulges or warp, of uniform width, and sound and free from loose knots.
- (B) Metal forms shall be of approved sections, shall present a smooth surface and have a flat surface on top.
- (C) All forms shall be of sufficient thickness to withstand the weight of the concrete placed against them without bulging and shall be securely staked, and braced sufficiently tight to prevent leakage of mortar and held firmly to the required line and grade. They shall be of a depth at least equal to the depth of the sidewalk section and shall be cleaned thoroughly before concrete is placed against them.

- 1.3.3 Placing Concrete. Immediately before placing the concrete, the sub-grade shall be tested with a template cut true to cross section of the proposed construction, all irregularities shall be corrected and compacted, and the entire sub-grade sprinkled with water.

Immediately after mixing, the concrete shall be deposited in a single layer on the moist sub-grade to such depth that after finishing it shall be to the full thickness required. The edges and sides and joints shall be thoroughly spaded, and the surfaces tamped sufficiently to compact the concrete and bring mortar, for finishing, to the surface.

- 1.3.4 Finishing. The concrete shall be struck-off with a transverse template resting upon the side forms, and shall be floated with an approved float, in such a manner that excess water, laitance, or other inert material shall be removed from the surface. Where additional concrete is necessary, it shall be added and floating operations continued until the entire surface of the concrete is uniform in texture.

- (A) When the surface of the concrete is free from water and before it obtains its initial set, it shall receive a broom finish so as to create a non-skid surface.
- (B) No plastering will be permitted. The longitudinal surface variations shall be not more than one-half ( $\frac{1}{2}$ " ) inch under a ten foot (10') straightedge, nor more than one-eighth inch ( $\frac{1}{8}$ " ) on a five foot (5') transverse section. The surface of the concrete shall be finished so as to drain completely at all times.
- (C) The edges of the handicap ramp shall be carefully finished and rounded with an edging tool having a radius of one-half inch ( $\frac{1}{2}$ " ). The expansion joints shall be edged with an edger having a radius of one-quarter inch ( $\frac{1}{4}$ " ).

- 1.3.5 Expansion Joints. Joint filler shall be three-quarter inch ( $\frac{3}{4}$ " ) thick Redwood as specified in Section 910, "Portland Cement Concrete Pavement". The Redwood expansion joint material shall be cut to the full transverse width and depth of the concrete sidewalk.

Expansion joint shall be installed at all points where the handicap ramp joins the curb or where the handicap ramp contacts driveways, walls or other rigid structures.

- 1.3.6 Protection and Curing. Immediately after finishing the concrete, it shall be protected and cured in accordance with the provisions and requirements of Section 910, "Portland Cement Concrete Pavement".

Any section, which is damaged before final acceptance of the WORK, shall be removed and reconstructed by the CONTRACTOR without extra compensation.

- 1.3.7 Backfilling and Cleaning-Up. When the concrete has set sufficiently, the sides of the handicap ramp shall be backfilled to the required elevation with suitable material, which shall be tamped in layers of not more than six inches (6") until firm and solid. All surplus material shall be disposed of as directed, and the completed WORK and site shall be left in a neat and presentable condition.

- 2.1 **MEASUREMENT.** Handicap Ramps shall be measured per each constructed and accepted.

- 3.1 **PAYMENT.** This item will be paid for at the CONTRACT unit price bid per each handicap ramp, complete in place, which price and payment shall constitute full compensation for furnishing reinforcement if required; for all fine grading, backfilling, disposal of surplus material; and for all material, forms, equipment, tools, labor and incidentals necessary to complete the WORK.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
940-01	Handicap Ramps	Each

**SECTION 950 JOINT AND CRACK SEALING IN CONCRETE PAVEMENT**

- |                       |                 |
|-----------------------|-----------------|
| 1.1 Description       | 1.5 Application |
| 1.2 Joint Preparation | 2.1 Measurement |
| 1.3 Backer Material   | 3.1 Payment     |
| 1.4 Sealant Material  |                 |

**1.1 DESCRIPTION.** This WORK shall consist of removing existing materials, cleaning and sealing existing longitudinal and transverse joints and random cracks in accordance with the following requirements and as directed by the ENGINEER.

**1.2 JOINT/CRACK PREPARATION.** Pavement on which this WORK is to be performed shall have all standing water removed and be thoroughly dried prior to beginning joint/crack preparation and sealing operations.

Joints/cracks to be sealed shall be mechanically cleaned by sandblasting or mechanical wire brushing to provide an acceptable surface for application of sealant material. If mechanical wire brush is used, any areas brushed to the extent of leaving a metal glaze on the pavement surface shall be sandblasted to ensure adhering of sealant.

Joints/cracks that are one inch (1") wide or larger shall be plowed out or otherwise cleaned to remove all materials to a depth specified in these SPECIFICATIONS.

Joint/crack faces and adjacent concrete pavement surfaces for at least one inch (1") on each side, shall be cleaned by sandblasting or wire brushing and blown free of sand and/or debris by compressed air and dried with a heat lance prior to sealing joints and cracks. The air compressor shall be equipped with an approved oil and water trap.

Joints/cracks shall be clean and moisture free prior to sealing and shall be sealed within 24 hours of preparation. Any contamination shall be removed and if any moisture is present along sides or bottom of joints/cracks, they shall be dried with a heat lance prior to application of sealant.

Any areas damaged by plowing or cleaning of joints/cracks shall be repaired by CONTRACTOR using an approved epoxy grout, at no direct pay.

(A) Longitudinal construction joints, and dummy joints. Joints/cracks shall be cleaned by specified methods to a depth of one inch (1") and sealed. If additional depths are achieved during cleaning operation, approved backer material of sufficient size and quantity shall be installed to provide a reservoir for the sealant equal to the width of the joint/crack.

(B) Expansion Joints. Expansion joints shall be cleaned to full depth of concrete

pavement. If dowel rods are encountered, the joints shall be cleaned to a minimum depth of two inches (2"). They shall then be filled with backer material leaving a sealant reservoir equal to the width of the joint.

- (C) Random Cracks. Longitudinal, Transverse, and Diagonal Cracks shall be cleaned by sandblasting or mechanical wire brushing. The backer material for random cracks shall conform to the following dimensions:

WIDTH	BACKER MATERIAL (INCH)
3/8"	W + 25%
1" – 3"	W + 25%

- 1.3 BACKER MATERIAL.** Backer material shall be of sufficient size to provide a snug fit against the faces of the concrete pavement. It shall be inserted to provide a non-adhesive lower face for the seal leaving a sealant reservoir of specified depth.

Backer material shall conform to Subsection 1005.02 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

- 1.4 JOINT SEALANT MATERIAL.** Material shall conform to the following SPECIFICATIONS:

- (A) Cold Poured Sealant. Cold poured sealant shall meet or exceed all the performance standards of ASTM C 920, Type S, Grade P, Class 25; Federal Specification TT-S-00230C, Type 1, Class A; and Corps of Engineers CRD-C-541-88, Type 1, Class A. Cold Poured Sealant shall be Sonomeric 1, self-leveling polyurethane sealant or approved equal.

Each lot or batch of sealing compound shall be delivered to the jobsite in the manufacturer's sealed container with labels intact. The label shall include the batch or lot number, expiration date and manufacturer's certification stating that the compound meets the requirements of this SPECIFICATION. Material with an expired date shall not be used.

- (B) Hot Poured Sealant. Hot poured sealant shall meet or exceed all the performance standards of ASTM D 3405 and AASHTO M301.

Each lot or batch of sealing compound shall be delivered to the jobsite in the manufacturer's sealed container with labels intact. The label shall include the batch or lot number, expiration date, safe heating temperature and manufacturer's certification stating that the compound meets the requirements of this SPECIFICATION. Material with an expired date shall not be used.

**1.5 APPLICATION.** Joints/cracks shall be inspected by the ENGINEER for proper width, depth and preparation prior to the installation of the sealant. Upon approval, sealant shall be installed in accordance with the manufacturer's recommendations, these SPECIFICATIONS and within 24 hours of completing cleaning operations.

1.5.1 Sealant material shall be applied uniformly and solid from bottom to top and without formation of entrapped air or voids. Joints/cracks shall be heated using a heat lance to achieve required application temperature and until joints/cracks are moisture free. The level of the sealant material in a completed joint/crack shall be at or slightly below the concrete pavement surface. Sealant material shall not be allowed to pour over the street surface or run out of the joints/cracks and traffic shall not be allowed on pavement until sealant material has dried tack-free. Any runs, drips, stains, spilled or tracked material shall be removed and cleaned by the CONTRACTOR at no additional cost to the City of Alexandria.

(A) Cold poured material shall be applied using a mechanical applicator or approved pouring device to allow for a uniform distribution free of air pockets or voids. The pavement surface shall be 70°F or greater before sealant may be applied.

(B) Hot poured material shall be applied using an approved pressure feed wand applicator capable of filling the joint/crack free of air pockets or voids. Pavement surface shall be 50°F or greater before sealant may be applied.

A mobile heated double-walled, agitator-type kettle with suitable oil medium in the outer space for heat transfer capable of maintaining a sealant temperature of 380°F to 410°F will be required. Kettles shall have easy access to facilitate cleaning and they shall be thoroughly cleaned of foreign substances of previously used compounds. A direct connecting pressure-type extruding device with nozzles shaped for insertion into the joint/crack shall be provided and shall be so designed that sealant material may be re-circulated in the inner kettle when not in use.

**2.1 MEASUREMENT.** Joints/cracks sealed on existing concrete pavement, completed and accepted, as specified, as shown on the DRAWINGS and/or as directed by the ENGINEER will be measured by the linear foot.

**3.1 PAYMENT.** Joints/cracks sealed on existing concrete pavement measured as provided above will be paid at the CONTRACT unit price per linear foot per type joint measured as indicated on the BID PROPOSAL.

Payment will be made as follows:

Item No.	Pay Item	Pay Unit
950-01	Joint and Crack Sealing in Conc. Pavement	Linear Foot

**SECTION 1010 TEMPORARY SIGNS AND BARRICADES**

- |  |                 |
|--|-----------------|
| 1.1 Description  | 2.1 Measurement |
| 1.2 Requirements for Temporary Signing and Barricading | 3.1 Payment     |

**1.1 DESCRIPTION.** This WORK consists of furnishing, installing, maintaining, and removing temporary construction barricades and signs; providing flaggers; and complying with all other requirements regarding the protection of WORK, workers and safety of the public. Signs, barricades, channelizing devices, etc., shall comply with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition and these SPECIFICATIONS. Temporary signs and barricades identifying the Construction Zone to localized vehicle traffic in and around the City of Alexandria property, right-of-ways and servitudes shall be maintained during the length of the Project and are to be removed at its completion. All Temporary Signing and Barricading provided shall conform to the Manual on Uniform Traffic Control Devices (MUTCD), latest edition. All Temporary Signing and Barricading that may be necessary for the safety of the public and construction crews shall be the sole responsibility of the CONTRACTOR and shall not relieve him of any liability in connection thereof. All additional Temporary Signing and Barricading specific to a Project shall be provided by the CONTRACTOR and conform to the Manual on Uniform Traffic Control Devices (MUTCD), latest edition at no additional cost to the City of Alexandria.

**1.2 REQUIREMENTS FOR TEMPORARY SIGNING AND BARRICADING.** Signs, barricades, channelizing devices, and arrangements thereof, shall comply with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition. Appropriate signs for special condition shall be furnished and installed by the CONTRACTOR at no additional cost to the City of Alexandria. Requirements for proper signs, barricades, channelizing devices, or other safety precautions promulgated by the CONTRACTOR'S insurers are not negated by these SPECIFICATIONS. These SPECIFICATIONS shall not be construed to relieve the CONTRACTOR of responsibilities for the safety of the public, for liability in connection therewith, or compliance with STATE and local laws or ordinances.

1.2.1 Traffic control devices will be accepted based on a visual inspection as to their effectiveness and condition. Traffic control devices that are unsuitable shall be removed from the project and replaced with approved devices.

1.2.2 Used signs, vertical panels, barricades, drums, and advanced warning arrow panels will be allowed provided such devices are in good condition. When these devices are determined by the ENGINEER to be no longer performing as intended, the CONTRACTOR at no additional cost to the City of Alexandria shall promptly replace the devices.

- 1.2.3 Any existing signs in conflict with lane closures and/or other Construction Signs shall be covered or temporarily taken down as required, at no additional cost to the City of Alexandria.
- 1.2.4 CONTRACTOR shall notify the City of Alexandria Traffic Department within a minimum of seventy-two (72) hours prior to commencement of WORK to allow ample time for notification of the General Public.
- 1.2.5 Prior to the start and at the end of each day's operation the CONTRACTOR shall verify that all construction signs are erected and in good working condition. Failure to maintain construction signs will be cause for immediate suspension of all WORK, until construction signs are properly installed.
- 2.1 **MEASUREMENT.** Temporary Signs and Barricades shall be measured on a lump sum basis, which shall include the furnishing, erecting, maintaining and subsequent removal of temporary construction signs, barricades and related devices in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition.
- 3.1 **PAYMENT.** Payment for signing and barricading will be made at the Lump Sum CONTRACT UNIT Price of Temporary Signs and Barricades installed and accepted. Payment for signing and barricading will be made at forty percent (40%) of the CONTRACT BID amount upon completing the erection of the minimum of all signing and barricading required. The remaining sixty percent (60%) of the CONTRACT BID amount will be paid to the CONTRACTOR after the PROJECT has been completed, accepted, and all signs and barricades are removed from the project.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
1010-01	Temporary Signs and Barricades	Lump Sum

**SECTION 1020 TRAFFIC SIGNS AND DEVICES**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Material                          | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** The WORK consist of furnishing and installing traffic signs, dead end installations, markers and delineators, with accessories and posts of the specified materials, sizes, shapes, weights and design.  
In general, the work and materials shall comply with the MUTCD, latest edition as modified by these specifications or as shown on the plans.  
Signs shall be manufactured in an approved plant  
The term "legend" shall mean border strip, letters, numerals and symbols which convey the message on signs.

**1.2 MATERIAL.** Material shall be new stock conforming to the following:  
**(a) Sign and Marker Sheeting:** Sheeting material for sign panels, delineators, barricades and other markers shall comply with Section 1015 of the Louisiana Department of Transportation Standard Specifications, Latest Edition. All permanent signs shall meet the requirements of ASTM D4956, Type III, except as follows:  
Reflective Sheeting for the permanent signs listed in the following table shall meet the requirements of ASTM D 4956, Type IX.

Sign	MUTCD Number
Stop	R1-1
Yield	R1-2
4-Way	R1-3
All Way	R1-4
Do Not Enter	R5-1
Wrong Way	R5-1a
End Road Marker	OM4-3
Type 3 Object Marker	OM3(Right or Left)

**(b) Ferrous Metal:** Ferrous Metals shall conform with Subsection 1012.02(a) of the Louisiana Department of Transportation Standard Specifications, Latest Edition. Ferrous metal shall be galvanized in accordance with Section 811 of the Louisiana Department of Transportation Standard Specifications, Latest Edition.

**(c) Aluminum:** Aluminum alloys for structural members shall conform to Subsection 1015.02(b) of the Louisiana Department of Transportation Standard Specifications, Latest Edition. Aluminum sign panels shall conform with Subsection 1015.04(a) of the Louisiana Department of Transportation Standard Specifications, Latest Edition.

**(d) Fittings:** Structural bolts, nuts, washers and miscellaneous hardware shall conform to Subsection 1015.02 of the Louisiana Department of Transportation Standard Specifications, Latest Edition.

- (e) **Guard Rail:** Guard rail material for dead end road installations shall conform with Section 1010 of the Louisiana Department of Transportation Standard Specifications, Latest Edition.
- (f) **Timber:** Timber for barricades in dead end road installations shall conform to Section 1014 of the Louisiana Department of Transportation Standard Specifications, Latest Edition.
- (g) **Concrete:** Concrete shall conform to Section 620 of these Specifications.
- (h) **U-Channel Post:** U-channel posts shall comply with Subsection 1015.02(a)(3) of the Louisiana State Department of Transportation Standard Specifications, Latest Edition.

### 1.3 **GENERAL CONSTRUCTION REQUIREMENTS.**

- (a) **Fabrication of Sign Panels and Markers:** Sign panels and markers shall be fabricated in accordance with Section 729.04 of the Louisiana State Department of Transportation Standard Specifications, Latest Edition.
- (b) **Sign Location:** Sign support locations will be as shown on the plans or as directed. Sign location, after initial staking by the contractor, must be approved by the Engineer. Sign locations which are obviously improper because of topography, existing appurtenances or other conflicting conditions will be adjusted to the closest desirable location. The contractor shall then determine elevations for post length determination at the established sight support location. The contractor shall be responsible for orientation, elevation, offset and leveling of signs.
- (c) **Sign Positioning:** Vertical and Horizontal positioning shall be in accordance with the MUTCD, latest edition.

### 2.1 **MEASUREMENT.**

- (a) **Sign Panels:** Sign panels shall be measured by the design areas in square feet. Design quantities will be adjusted if the engineer makes changes to adjust to field conditions. Material used in blanks and backing incidental to the sign face will not be measured for payment. In determining the area of sign faces, no deductions are made for corner radii or mounting holes.
- (b) **U-Channel Post:** U-Channel posts will be measured per each unit installed when not part of an assembly.
- (c) **Dead End Road Installation:** Dead end road installation will be measured per each installed unit.
- (d) **Clearing and Tree Trimming:** Any clearing or tree trimming required by this section which is not provided for elsewhere in the contract will be included in the contract unit price for signs.

### 3.1 **PAYMENT.** Payment for Traffic Signs and Markers shall be made as follows:

- (a) **Signs Faces:** Payment for Sign Faces will be made at the contract unit price per square foot which includes furnishing, fabricating and installing the signs and furnishing all necessary attaching devices.
- (b) **U-Channel Post:** Payment for U-Channel Post will be made at the contract unit price per each regardless of length, which shall include all labor, equipment,

tools, materials, and incidentals necessary to complete the work, including splicing of posts.

**(c) Dead End Installation:** Payment for Dead end Installation will be made at the contract unit price per each type specified. The Unit Price shall include all necessary labor, equipment, tools, materials and incidentals necessary to complete the work including signs, object markers, footing, post, guardrail and guardrail accessories, concrete pad and any other item shown on the plans necessary to complete the work.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Units</b>
1020-01	Signs	Square Foot
1020-02	U-Channel Post	Each
1020-03	Dead End Installation (Type 1)	Each
1020-04	Dead End Installation (Type 2)	Each

**SECTION 1110 CHAIN LINK FENCE**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Materials                         | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** This work consists of furnishing and erecting chain link fence and gates in accordance with these specifications, and in conformity with the lines, and grades shown on the PLANS or established by the ENGINEER.

**1.2 MATERIALS.** Materials shall comply with the following:

1.2.1 Prior to installation of the chain link fence, the CONTRACTOR shall furnish certification from the manufacturer, to the ENGINEER, stating that all fencing materials comply with the requirements set forth in this Item.

Materials used shall be new and shall meet the requirements for the class and type of material specified. The same type of chain link fencing shall be used throughout the project.

1.2.2 Chain Link Fabric. Woven Wire fabric for fencing shall be nine (9) gauge, two inch (2") mesh, and 1.2 ounce galvanized steel with knuckle and knuckle selvage. Knuckle and twist or twist and twist selvage may be used on wire for security fencing purposes. Mesh size shall be two inch (2")  $\pm$  one-eighth inch (1/8") between parallel wires and such that in a vertical dimension of twenty three inches (23") along the diagonals of the openings there shall be at least seven (7) meshes. The overall height of the fence when erected shall be the height above grade as shown on the PLANS. Except as provided herein, the chain link fence shall conform to the SPECIFICATIONS of ASTM A116 and Subsection 1010.02 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

Between posts, the wire fabric shall be fastened at twelve inch (12") intervals to a top rail and a bottom tension wire. On gate frames, the fabric shall be fastened to top and bottom of the gate frame at all twelve inch (12") intervals. Fasteners such as wire ties, fabric ties, and hog rings shall comply with Subsection 1010.07 of the Louisiana Standard Specifications for Roads and Bridges, latest edition.

1.2.3 Posts. Steel posts furnished for line, end, corner, and bracing posts shall be of types shown on the City of Alexandria Standard Detail 62-4A "Standard Detail of 6' Chain Link Fence Construction with/without Barb Wire".

Excessive bows, camber, twist, or other injurious defects in posts shall be considered cause for rejection of such posts.

(A) Gate Posts. All gateposts shall be furnished with malleable iron caps. The fabric shall be attached to the gateposts by means of steel stretcher bars and stretcher bar bands fitted with carriage bolts and nuts of the size and spacing shown on the PLANS.

- (B) Post Caps. For top rails shown on the PLANS, post caps shall have an opening for the top rail. All post caps shall have a two inch (2") skirt for rigidity.

1.2.4 Gates. Design of metal gates shown on the PLANS is of a type acceptable to the ENGINEER. Gates of any other design may be furnished if prior approval is obtained from the ENGINEER.

- (A) The CONTRACTOR, prior to erecting gates, shall submit to the ENGINEER for approval, SPECIFICATIONS covering design and fabrication of the type gates he contemplates furnishing, if other than the type shown on the PLANS.
- (B) Gate frames shall be fabricated from round sections and shall be fabricated from pipe of the size and weight as shown on the PLANS. Fabric on gates shall be the same as that specified for fencing. The following accessories shall be furnished for each gate:
  - (1) Corner and tee fittings of malleable iron or pressed steel shall have a means for attaching diagonal bracing members.
  - (2) Hinges of malleable iron providing for a full one hundred eighty-degree (180°) swing with bottom hinges to be ball and socket type. Hinges shall not twist or turn under the action of the gate, shall be so arranged that a closed gate cannot be lifted off the hinges to obtain entry and shall be easily operated by one person.
  - (3) All gates shall be equipped with a positive stop which will not permit any portion of the gate to swing over an adjacent traffic lane and shall be equipped with a positive means of maintaining the gate in a closed position.
  - (4) Diagonal braces shall consist of three-eighths inch (3/8") diameter truss rods with turnbuckles, two (2) to each gate frame. Vehicle gates shall have a vertical pipe brace, of the size and weight shown on the PLANS, at the center of each gate leaf.
  - (5) Latches of malleable iron or steel for single gates shall have a single fork latch with padlock eye and double leaf gates shall have two fork latches mounted on a center plunger rod with a padlock eye.
  - (6) Holdbacks shall be provided for each leaf of vehicular gates, employing a semi-automatic holdback catch to be anchored at least twelve inches (12") into a twelve inches (12") diameter by twenty-four inch (24") deep concrete footing.

- (7) A malleable iron center rest, designed to receive the plunger rod, to be anchored as shown on the PLANS, shall be provided for all double leaf gates.
- (8) The top of all gate frames shall align with the fencing top rail. If curbs are shown on the plans, vehicular gates shall be provided which are greater in overall height than the adjacent fencing by the height necessary to extend to within two inches (2") of pavement between the curbs.
- (E) Top Rail. Top rail, when shown on the PLANS, shall be a round one and five-eighths inch (1-5/8") O.D. steel pipe, sch-40, weighing 2.27 lb./ft. Top rail shall be furnished in random lengths, not less than eighteen feet (18') per section, and shall be joined with outside steel sleeve couplings not less than six inches (6") long and having a wall thickness of not less than 0.70 inch. The couplings shall be designed to allow for expansion movement of the top rail.
- (F) Tension Wire. Unless otherwise shown on the plans, tension wire shall be furnished for the bottom edge of all fence fabric. Tension wire shall conform to Subsection 1010.07(a)(2) of the Louisiana Standard Specifications for Roads and Bridges, latest edition.
- (G) Trussed Bracing and Top Rails. Trussed bracing and top rails shall be furnished for each panel adjacent to a terminal, pull, corner or gate post. The compression member shall be one and five-eighths inch (1-5/8") O.D. pipe as specified for top rail material. Tension members shall be three-eighths inch (3/8") diameter steel truss rods with turnbuckles.
- (H) Barbed Wire. Barbed wire, when specified on the plans, shall be twelve and one-half (12-1/2) gauge wire, twisted with four point fourteen (14) gauge barbs spaced approximately five inches (5") apart and shall conform to ASTM A121.
- (I) Barbed Wire Support Arms. Barbed wire support arms shall be at an angle of forty-five degrees (45°) from vertical and shall have clips for attaching three (3) strands of barbed wire to each support arm. Each support arm shall be of sufficient strength to support a two hundred pound (200 lb.) weight applied at the outer strand of barbed wire.
- (J) Stretcher Bars. Stretcher bars shall be no less than one-quarter inch (1/4") by three-quarters of an inch (3/4") flat steel and not more than two inches (2") shorter than the fabric height. One (1) stretcher bar shall be provided for each gate and end post. Two (2) stretcher bars shall be provided for each corner and pull post. Stretcher bars shall be attached to terminal posts with one inch (1") x one-eighth inch (1/8") flat steel bands with three-eighth inch (3/8") carriage bolts at intervals not exceeding fifteen inches (15").

- (K) Miscellaneous Fittings and Fasteners. Miscellaneous fittings and fasteners shall be furnished in sufficient quantities to erect all fencing materials in accordance with the PLANS and these SPECIFICATIONS.
- (L) Galvanizing and Aluminum Coating. All materials used in "Chain Link Fence" shall be hot-dip galvanized to meet the following requirements, except fabric, tension wire and barbed wire which may be aluminum-coated.

The uniformity and quality of the coating shall be determined by visual inspection. Excessive roughness, blisters, sal ammoniac spots, bruises and flaking, if present to any considerable extent, shall provide a basis for rejection.

Metal parts, which are protected by galvanizing, are not to be painted. After erection is completed, all construction under this item will be inspected, and all parts of fences, gates, etc., (including bolts and nuts) from which the galvanizing has been abraded so that the base metal is exposed, shall be spot painted with an approved paint. Painting of aluminum surfaces will not be required.

- (1) Fabric. The fabric shall be either hot-dip galvanized in accordance with ASTM A392, Class I (1.20 oz./sq. ft.) or aluminum coated in accordance with ASTM A491 (0.40 oz./sq. ft.).
- (2) Posts, Braces and Gates. All posts, except for thin-wall, high-strength pipe posts, braces, frames and gates shall be hot-dip galvanized inside and outside in conformance with ASTM F1083 (1.8 oz./sq. ft.).

Thin-wall, high-strength pipe posts shall be externally hot-dip galvanized with a minimum weight of coating of 0.90 oz./sq. ft. After galvanizing, thin-wall, high-strength pipe posts shall also be externally chromated by total immersion followed by application of clear polyurethane finish. Internally, thin-wall, high-strength pipe posts shall have either a hot-dip galvanized coating, a zinc base coating with thickness 0.5 mil plus or minus 0.2 mil. The coating shall be ninety four percent (94%) zinc powder by weight.

All tubular posts, rails and braces shall comply with the following salt spray performance requirements when tested in accordance with ASTM B117.

Exterior - 1250 hours to maximum five percent (5%) red rust  
Interior - 650 hours to maximum five percent (5%) red rust

- (3) Fittings, Bolts and Other Miscellaneous Hardware: All fittings, bolts and miscellaneous hardware shall be galvanized in conformance with these SPECIFICATIONS.
- (4) Tension Wire. Zinc coated tension wire shall have a minimum coating of 0.80 oz./sq. ft. and aluminum coated tension wire shall have a minimum coating of 0.30 oz./sq. ft.
- (5) Barbed Wire. Barbed wire shall be either steel or aluminum alloy and shall be 12 ½ gage.
  - (a) Steel barbed wire shall comply with ASTM A121. Zinc coating shall be a minimum of 0.80 oz./sq. ft.
  - (b) Aluminum alloy barbed wire shall comply with ASTM B211, Alloy 5052-0 for line wire and Alloy 5052-H38 for barbs. Aluminum coating shall be a minimum of 0.30 oz./sq. ft.
- (6) Pull Cable. Pull cable shall have a minimum coating of 0.80 oz./sq. ft. of uncoated individual-wire surface when tested in conformance with ASTM A116.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.** The chain link fence shall be erected to the lines and grades established by the ENGINEER in accordance with the details shown on the PLANS. The fence shall be true to line, taut and shall comply with the best practice for fence construction of this type.

1.3.1 Height of fence, gauge and mesh of fabric, gauge of tension wire, type and dimensions of line post, corner post, pull post, top rail, gate post, gate framing, gate opening and all other miscellaneous items required to make up the fence shall be as shown on the PLANS or specified herein.

1.3.2 CONTRACTOR is to supply sample of materials for testing in accordance with ENGINEER'S instructions. All materials will be subject to inspection for acceptance as to condition at any time during the WORK.

- (A) Clearing and Grading. The CONTRACTOR shall perform all clearing of brush, rocks and debris necessary for the installation of fencing.

Unless otherwise shown on the PLANS, the CONTRACTOR shall stake and the ENGINEER will verify the locations for corner posts and terminal posts in this installation. The fencing panels between corner and terminal posts shall generally follow the finished ground elevations. However, the CONTRACTOR shall grade off minor irregularities in the path of the fencing.

(B) Erection of Posts. Posts shall be set plumb and permanently positioned and anchorages firmly set before fabric is placed. Steel posts furnished for line, end, corner, and bracing posts shall be of types shown on the PLANS.

- (1) Post Spacing. Maximum spacing for line posts shall be ten feet (10'). Pull posts shall be located not more than three hundred feet (300') apart and at each change in direction exceeding twenty degrees (20°) vertically.

Corner posts shall be placed at each horizontal angle point. Corner and pull posts shall have braces as specified above and as shown on the PLANS. Runs of fencing over three hundred feet (300'), but less than six hundred feet (600') shall have a pull post in the center of the run.

- (2) Postholes. Holes for concrete footings for all posts shall be to the dimensions as shown on the PLANS.

If the ground is firm enough to permit excavation of the posthole to neat lines, the concrete may be placed without forms by completely filling the hole. Under these conditions the earth coming in contact with the concrete shall be moistened to a depth of at least two inches (2") prior to placing concrete.

Where the ground cannot be satisfactorily excavated to neat lines, forms shall be used for footings. Under these conditions, when the soil is not moist, not less than one gallon of water shall be poured into each hole and as soon as this water has been absorbed, the concrete shall be placed. The forms shall remain in place for a minimum of at least 24 hours. As soon as each form is removed, the footing shall be backfilled, with moistened material, and thoroughly tamped.

(C) Concrete for Footings. Concrete for footings shall be constructed of a 4 cement sack mix with a minimum one thousand eight hundred pounds per square inch (1800-psi) average compressive strength at twenty eight (28) days. When required by the ENGINEER, samples of concrete for compression test, as prescribed in the ASTM C31, shall show a minimum compressive strength of one thousand eight hundred pounds per square inch (1800-psi) in 28 days. If the concrete tests for cylinders do not meet the compressive strength requirements, the deficient concrete will be removed and replaced at the CONTRACTOR'S expense.

All concrete footings shall be cast up to finish grade and crowned one inch (1") to shed water. Excess concrete not used in the footings, and any other construction debris, shall be removed from the site.

Concrete footings shall not be less than the dimensions shown on the PLANS. Posts shall be approximately centered in their footings. All

concrete shall be placed promptly and compacted by tamping or other approved methods.

- (D) Erection of Fabric. After all posts have been permanently positioned and anchorages firmly set, with the cables drawn taut with the turnbuckles, the fabric shall be placed by securing one end and applying sufficient tension to the other end to remove all slack before making attachments. Unless otherwise shown on the PLANS, the fabric shall be cut and each span shall be attached independently at all corner posts and pull posts.

Fastening to end, pull, corner and gateposts shall be with stretcher bars, which shall be secured to the posts with stretcher bar bands at intervals not exceeding fifteen inches (15").

Fence fabric shall generally follow the finished contour of the site with the bottom edge of fabric located approximately two inches (2") above the grade. In uneven areas the ground shall be graded so that the maximum distance between bottom of fabric and ground is limited to four inches (4").

Any necessary backfilling required, in order to comply with these provisions, will be done at no direct pay.

- (E) Electrical Grounds. Each one thousand feet (1,000') of fence shall be provided with a ground located near the center of the run. At least one (1) electrical ground shall be provided for each fence installation and/or each independent fence section that terminate at a gate and is less than one thousand feet (1,000') in length.

In addition a ground shall be provided directly under the point where a power line passes over the fence.

The ground shall consist of a copper weld rod eight feet (8') long and a minimum of five eighths inch (5/8") in diameter driven, or drilled in, vertically until the top of the rod is approximately six inches (6") below the top of the ground. A No. six (6) solid copper conductor shall be connected to the rod and to the fence in such a manner that each element of the fence is grounded.

- 2.1 MEASUREMENT.** Chain Link Fence will be measured by the linear foot of fence measured at the bottom of the fabric along the centerline of the fence from center to center of terminal posts, excluding gates. Gates will be measured per each gate, installed and accepted in place.

- 3.1 PAYMENT.** The WORK performed and materials furnished in accordance with this Item and measured as provided under Measurement will be paid for at the CONTRACT unit price for Chain Link Fence. This price shall be full compensation for furnishing and installing all fencing materials, except gates, including all miscellaneous fittings, pull cables, braces, post caps, line wires, connection clips or wires; for digging post holes and grouting in rock where required; for furnishing

and placing concrete for setting posts; excavation; for furnishing and installing all electrical grounds; for all hauling and handling charges; for all cleaning and grading including backfilling and disposing of surplus material; and for all manipulations, labor, tools, equipment and incidentals necessary to complete the WORK.

- 3.1.1 Gates. Gates will be paid for at the CONTRACT unit price for each "Pedestrian Gate" or "Vehicular Gate", of the type, height and width of opening specified. This price shall be full compensation for furnishing all materials; for fabricating, preparation, hauling, handling and erecting, including all miscellaneous fittings, braces, latches, gate hinges, stops and center anchorages; and for all manipulations, labor, tools, equipment and incidentals necessary for a complete gate installation.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
1110-01-(Height)	Chain Link Fence (Height)	Linear Foot
1110-02-(Height)	Chain Link Pedestrian Gates (Height) (Width)	Each
1110-03-(Height)	Chain Link Vehicular Gates (Height) (Width)	Each

**SECTION 1120 WOODEN FENCING**

- |                               |                 |
|-------------------------------|-----------------|
| 1.1 Description               | 2.1 Measurement |
| 1.2 Materials                 | 3.1 Payment     |
| 1.3 Construction Requirements |                 |

**1.1 DESCRIPTION.** This WORK covered by this section consists of furnishing all paint, labor, equipment, appliances and materials, and in performing all operations in connection with the installation of fencing WORK complete in strict accordance with the PLANS and SPECIFICATIONS or as directed by the ENGINEER.

**1.2 MATERIALS.**

1.2.1 Pickets. Pickets shall be a nominal size of one inch (1") thick by six inches (6") wide x six feet (6') long. They shall be #1 Western Red Cedar or #2 Pressure Treated Pine lumber free of knot holes and notched on each side at top of Picket. The treated pine picket shall be treated in accordance with AWWA Standard C2 with a retention of 0.40 pounds per cubic foot using CCA preservative intended for soil contact use.

1.2.2 Wood Fence and Gates.

- (A) Height of fence, type of pickets, type and dimensions of line post, corner post, pull post, wood rails, gate post, gate framing, gate opening and all other miscellaneous items required to make up the fence shall be as shown on the PLANS or specified herein.
- (B) Excessive warp or twist shall be grounds for rejection of wood pickets and rails.
- (C) All materials will be subject to inspection for acceptance as to condition at any time during the WORK.

1.2.3 Posts. Steel posts furnished for line, end, and corner post; shall be of types shown on PLANS.

Posts shall be supplied with necessary galvanized pressed steel or malleable iron caps. Steel posts shall be furnished in the lengths shown on the PLANS and shall conform to ASTM A702.

Steel posts shall be galvanized. All steel posts furnished for the PROJECT shall have the same finish. Galvanizing of steel posts shall conform to the requirements of ASTM A123.

Excessive bow, camber, twists, or other injurious defects in posts shall be considered cause for rejection of such posts.

Weights of steel posts are to be as follows:

<b>Schedule 40 Pipe</b>	
4"	9.11 lbs./ft.
2½"	3.65 lbs./ft.
2"	2.72 lbs./ft.
1"	2.27 lbs./ft.

- 1.2.4 Wood Rails. Rails shall be a nominal size of two inches (2") thick by four inches (4") wide and shall be #2 pressure treated pine free of knotholes. There shall be three (3) rails per post as shown on PLANS. They shall be treated in accordance with AWPA standard C2 with a retention of 0.25 pounds per cubic foot using CCA Preservative intended for above ground use.
- 1.2.5 Metal Hardware and Fasteners. All hardware and fasteners for steel posts and gates shall be pressed steel and factory painted black using exterior primer and paint. Brackets used for wood rail installation may be galvanized steel.
- 1.2.6 Gates. Design of metal framed, wood picket gates shown on the PLANS is of a type acceptable to the ENGINEER.

The CONTRACTOR, prior to erecting gates, shall submit to the ENGINEER for approval, SPECIFICATIONS covering design and fabrication of the type gates he contemplates furnishing, if other than the type shown on the PLANS.

### **1.3 CONSTRUCTION REQUIREMENTS.**

- 1.3.1 Concrete Post Anchorage. Posts shall be anchored in cast-in place concrete footings. All concrete for footings shall be constructed of a four (4) cement sack mix with a minimum one thousand eight hundred pounds per square inch (1,800-psi) average compressive strength at twenty eight (28) days.

Hand mixing of concrete will be permitted for cast-in-place concrete where small quantities are to be mixed and when done to the satisfaction of the ENGINEER. No hand-mixed batch shall exceed one-half (½) of a cubic yard. All batches exceeding one-half (½) of a cubic yard shall be machine-mixed.

Concrete footings shall be carried down to at least the depth, and shall not be less than the dimensions, shown on the PLANS. The top of all footings and aprons shall extend slightly above the ground line and shall be steel troweled to a smooth finish and having enough slope to drain water away from the post. Posts and other units shall be centered in their footings.

After mixing, the concrete shall be placed promptly, expeditiously, and without segregation after mixing. The CONTRACTOR shall be required to consolidate and compact the concrete satisfactorily by tamping or vibrating. Exposed edges shall be tooled. All excess excavation from footings shall be disposed of in a manner satisfactory to the ENGINEER.

- 1.3.2 Erection of Wood Picket Fence. The fence shall be erected to the established lines and grades. The fence shall be true to lines and shall comply with the best practice for fence construction.

Posts shall be spaced in line of fence not further apart than eight foot (8') centers. At locations where breaks in a run of fencing are required, or at intersections with existing fencing, appropriate adjustments in post spacing shall be made to conform to the requirements for the type of closure indicated. Each post shall be erected plumb and the posts shall line up longitudinally with the specified alignment with no perceptible variation.

Pickets shall be nailed or screwed to wood rails using an approved weather resistant fastener that will not streak with weathering. A minimum of six (6) fasteners per picket shall be required and neither nails nor galvanized fasteners will be allowed for use on pickets unless prior approval has been obtained from the ENGINEER. The pickets shall be placed perpendicular to the ground and shall be side butted tightly and level at the top. There shall be approximately two inches (2") of clearance from the bottom of the picket to the ground unless otherwise approved by the ENGINEER due to the contour of the terrain.

The 2"x4" wood rails for the picket fence shall be parallel with the ground, run in line from end to end and there shall be three (3) rails per post. The 2"x4" wood rails shall be attached to the post by inserting galvanized carriage bolts through drilled holes in each post. The bolts shall be five-sixteenths ( $\frac{5}{16}$ " ) inches in diameter and four and one-half inches ( $4\frac{1}{2}$ " ) in length for two and three-eighths ( $2\frac{3}{8}$ " ) inch line post and six inches (6") in length for four inch (4") gate and corner post. The carriage bolts will be place through the 2"x4" wood rails and fastened to steel posts. Carriage bolts will be tightened until the head of the carriage bolt is flush with the outside face of the 2"x4" wood rail. The head of carriage bolts shall not hinder wood pickets from being installed flush with 2"x4" wood rails. Excess threads, from bolts, protruding through tightened nuts shall be cut off flush with corresponding nut. Excess threads shall be removed after installation of wooden fence.

The end joints of the wood rails shall be off set so that no two joints will be within two feet (2') of each other measured horizontally, the joints shall be connected to each other using galvanized butt joint brackets attached with galvanized exterior wood screws.

- 1.3.3 Erection of Gates. The gate installation shall include gate frames, wood rails, pickets, fasteners, latches, stops, locking device, hinges, gate posts with braces, caps, and any fittings on details for gates and gate posts, all as specified and as shown on the PLANS and as required to make a complete installation. All gate metal frames are to be of welded construction.

All gates shall be carefully aligned with posts vertical. Where clamps are used for attaching hardware, they shall be made up tight. The bottom of each gate shall clear the ground by at least two inches (2") at all points in its swing. The CONTRACTOR shall, when directed, modify the existing grade within the area of swing to meet this requirement. Direction of swing and location of gates will be as indicated on the PLANS or as otherwise directed by the ENGINEER. Hold-backs, stops with latches, or other approved means for holding the gate open, shall be provided for all gates where indicated on the PLANS and so placed as to prevent damage to the gate or fence by over swing. Stops shall be provided also to arrest the swing of a closed gate at the centerline of the fence and to securely hold drop rod and latch assembly in place.

- 1.3.4 Weld Constructed Joints. Weld constructed joints are to be ground free of slag and painted with an approved galvanizing paint.
- 1.3.5 Paints and Painting. Metal parts, which are protected by galvanizing, are not to be painted. After erection is completed, all construction under this item will be inspected, and all parts of fences, gates, etc., (including bolts and nuts) from which the galvanizing or paint has been abraded so that the base metal is exposed, shall be spot painted with an approved paint. Painting of aluminum surfaces will not be required.

- 2.1 **MEASUREMENT.** New wooden fence will be measured by the linear foot between outside of end posts for each continuous run of fence, exclusive of gates. Gates for new wooden fence will be measured per each single panel.

This shall constitute full compensation for clearing area, furnishing, hauling, installing complete, excavation, grading, compaction, concrete, backfill, tools, equipment, labor, clean up and all items and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

- 3.1 **PAYMENT.** Payment of new wooden fence shall made at the CONTRACT unit price per linear foot of wooden fence installed and accepted, which price shall constitute full compensation for clearing area, furnishing, hauling, installing complete, excavation, grading, compaction, concrete, backfill, tools, equipment, labor, clean up and all items and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. Payment of wooden fence gates shall made at the CONTRACT unit price per each single panel installed and accepted.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
1120-01-(height)	Wood Fence (height)	Linear Foot
1120-02-(height)(width)	Wood Fence Pedestrian Gate (height)(width)	Each
1120-03-(height)(width)	Wood Fence Vehicular Gate (height)(width)	Each

The (height) will be the height of the wood fence gate, i.e. 4' gate will be 4, 6' gate will be 6, etc. The width will be a letter designation for the width of the gate in the Pay Item,

Example:

1120-02-4A	Wood Fence Pedestrian Gate (4')(10' wide)
1120-02-6B	Wood Fence Pedestrian Gate (6')(8' wide)

**SECTION 1130 WOVEN WIRE OR BARBED WIRE FENCE**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.3 Description                       | 2.1 Measurement |
| 1.4 Materials                         | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** This work consists of furnishing and erecting Woven Wire, Barbed Wire or combination of Woven Wire and Barbed Wire fence and gates in accordance with these specifications, and in conformity with the lines, grades and details shown on the PLANS or established by the ENGINEER.

**1.2 MATERIALS.** Materials shall comply with the following:

- (a) Portland Cement Concrete Shall comply with Section 620 of these Specifications.
- (b) Barbed Wire shall meet the requirements of the Louisiana State Department of Transportation Standard Specification, Latest Edition, Section 1010.01.
- (c) Woven Wire shall meet the requirements of the Louisiana State Department of Transportation Standard Specifications, Latest Edition, Section 1010.02.
- (d) Posts and Braces for Field and Line Type Fences shall meet the requirements of the Louisiana State Department of Transportation Standard Specifications, Latest Edition, Section 1010.03.
- (e) Staples and Nails shall meet the requirements of the Louisiana State Department of Transportation Standard Specifications, Latest Edition, Section 1010.04.
- (f) Metal Fasteners for Steel Posts shall meet the requirements of the Louisiana State Department of Transportation Standard Specifications, Latest Edition, Section 1010.05.
- (g) Gates for Field and Line Type Fence shall meet the requirements of the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 1010.06.
- (h) Timber Preservatives shall meet the requirements of the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 1014.03.
- (i) Ground Rod Assemblies shall meet the requirements of the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 1018.05.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.** The woven wire or barbed wire or combination woven wire and barbed wire fence shall be erected to the lines and grades established by the ENGINEER in accordance with the details shown on the PLANS. The fence shall be true to line, taut and shall comply with the best practice for fence construction of this type.

1.3.1 CONTRACTOR is to supply sample of materials for testing in accordance with ENGINEER'S instructions. All materials will be subject to inspection for acceptance as to condition at any time during the WORK.

- (A) The Contractor shall perform all clearing and grubbing in accordance with Section 310 of these SPECIFICATIONS.
- (B) Unless otherwise shown on the PLANS, the CONTRACTOR shall stake and the ENGINEER will verify the locations for corner post and terminal posts in this installation. The fencing panels between corner and terminal post shall generally follow the finished ground elevations. However, the CONTRACTOR shall grade off minor irregularities in the path of the fencing.
- (C) Where breaks in a run of fencing are required, and at intersections with existing fences, appropriate adjustment in post spacing shall be made for the type of closure indicated.
- (D) Wood Post shall be placed with small end up. Tops of post shall be set to required grade and alignment. Cutting of wood post tops will be allowed only when approved by the ENGINEER. Cut ends shall be treated with 2 applications of the same type preservative used for post treatment.
- (E) Electrical Grounds. Each one thousand feet (1,000') of fence shall be provided with a ground located near the center of the run. At least one (1) electrical ground shall be provided for each fence installation and/or each independent fence section that terminate at a gate and is less than one thousand feet (1,000') in length.

In addition a ground shall be provided directly under the point where a power line passes over the fence.

The ground shall consist of a copper weld rod eight feet (8') long and a minimum of five eighths inch (5/8") in diameter driven, or drilled in, vertically until the top of the rod is approximately six inches (6") below the top of the ground. A No. six (6) solid copper conductor shall be connected to the rod and to the fence in such a manner that each element of the fence is grounded.

**2.1 MEASUREMENT.** Woven Wire Fence, Barbed Wire Fence or Combination of Woven Wire and Barbed Wire Fence will be measured by the linear foot of fence

measured at the bottom of the fabric along the centerline of the fence from center to center of terminal posts, excluding gates. Gates will be measured per each gate, installed and accepted in place.

**3.2 PAYMENT.** The WORK performed and materials furnished in accordance with this Item and measured as provided under Measurement will be paid for at the CONTRACT unit price for Woven Wire, Barbed Wire or a combination of Woven Wire and Barbed Wire Fence of the type and height specified. This price shall be full compensation for furnishing and installing all fencing materials, except gates, including all miscellaneous fittings, pull cables, braces, line wires, connection clips or wires; for digging post holes and grouting in rock where required; for furnishing and placing concrete for setting posts where required; excavation; for furnishing and installing all electrical grounds; for all hauling and handling charges; for all cleaning and grading including backfilling and disposing of surplus material; and for all manipulations, labor, tools, equipment and incidentals necessary to complete the WORK.

**3.1.1 Gates.** Gates will be paid for at the CONTRACT unit price for each "Pedestrian Gate" or "Vehicular Gate", of the type, height and width of opening specified. This price shall be full compensation for furnishing all materials; for fabricating, preparation, hauling, handling and erecting, including all miscellaneous fittings, braces, latches, gate hinges, stops and center anchorages; and for all manipulations, labor, tools, equipment and incidentals necessary for a complete gate installation.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
1130-01	Woven Wire Fence	Linear Foot
1130-02	Barbed Wire Fence	Linear Foot
1130-03	Combination Woven Wire and Barbed Wire Fence	Linear Foot
1130-04	Woven Wire Gates	Each

**SECTION 1210 GAS DISTRIBUTION SYSTEM**

- |                             |                             |
|-----------------------------|-----------------------------|
| 1.1 Description             | 1.8 Applicable Publications |
| 1.2 Location of Lines       | 2.1 Materials               |
| 1.3 Layout of Work          | 3.1 Construction Methods    |
| 1.4 Operator Qualifications | 4.1 Measurement             |
| 1.5 LA DOTD Permit          | 5.1 Payment                 |
| 1.6 Parish Permit           | 5.2 Payment Items           |
| 1.7 Rail Road Permit        |                             |

- 1.1 DESCRIPTION.** This item shall consist of gas pipe, including service lines to a point shown on the PLANS, and fittings, together with valves, valve boxes, regulators, and other appurtenances necessary to construct the gas distribution system project. Included shall be the furnishing and installation of all materials, testing, purging, and odorizing at such places as are designated on the PLANS or by the ENGINEER, in accordance with these SPECIFICATIONS and in conformity with the lines and grades given.

This item shall include, in the bid prices per unit requested, the cost of common excavation and backfill, the cost of furnishing and installing all trench bracing and dewatering, and the material for and the making of all joints.

- 1.2 LOCATION OF LINES.** The approximate location of lines, valves, regulators and other appurtenances has been indicated on the PLANS as being within the bounds of street, highway or easement rights-of-ways. Final location of the various items of construction shall be approved in the field by the ENGINEER. All costs not specifically listed, as a pay item shall be included in the price bid for the item of which the costs are a part.

- 1.2.1 LOUISIANA ONE CALL.** R.S. 1749.13 requires excavators and demolishers are to notify a Regional Notification Center of their excavation activity. Telephonic notice must be given to the Notification Center at least 48 hours, but no more than 120 hours, in advance, excluding weekends and holidays. The owner/operator of an underground facility must mark the location or provide information to enable an excavator or demolisher using reasonable means to determine the location of the underground facility. Contact Louisiana One Call (1-800-272-3020) prior to digging. Locate existing underground utilities by careful probing and hand excavation. Where utilities are to remain in place, protect them from damage during construction operations.

- 1.2.2** Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the ENGINEER immediately for directions prior to proceeding. All uncharted or incorrectly charted piping or other utilities that are encountered, by the CONTRACTOR, shall be denoted on the Record DRAWINGS with the type and location of the piping or utilities found. In the event that the CONTRACTOR damages uncharted or incorrectly charted

pipng or other utility, the CONTRACTOR shall contact the affected piping or utility company for repairs.

- 1.3 LAYOUT OF WORK.** The CONTRACTOR shall, at his own expense, layout the WORK. The CONTRACTOR shall coordinate his activities with the ENGINEER, and the location of all lines, structures, etc. shall be subject to his concurrence prior to beginning construction.

- 1.4 OPERATOR QUALIFICATIONS.** All operators shall meet qualification requirements as set forth in the U.S. Department of Transportation (DOT) Office of Pipe Line Safety, 49 CFR Part 192, Subpart N Section 192.801 through 192.809.

The CONTRACTOR shall comply with the drug testing regulations of the U.S. Department of Transportation (DOT) Title 49, Code of Federal Regulations (CFR) Part 40 and Part 199, latest revision.

All gas WORK performed on private property shall be done by a licensed bonded person as per the City of Alexandria Gas Code.

- 1.5 LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT PERMIT.** The CONTRACTOR shall secure any necessary permit from the Louisiana Department of Transportation and Development for laying these lines, and installing driveways and culverts. Permits shall be obtained in the name of the OWNER; however, any refundable deposit for the permits shall be made by the CONTRACTOR. After completion of the project, deposits will be returned to the CONTRACTOR subject to any limitations of the permits not complied with by the CONTRACTOR.

- 1.6 PARISH PERMIT.** The CONTRACTOR shall secure any necessary permit from the Parish. Permits shall be obtained in the name of the OWNER; however, any refundable deposit for permits shall be made by the CONTRACTOR. After completion of the project, deposits will be returned to the CONTRACTOR subject to any limitations of the permits not complied with by the CONTRACTOR.

- 1.7 RAILROAD PERMIT.** The CONTRACTOR shall secure any necessary railroad permits. The permits shall be obtained in the name of the OWNER; however, the permit bond or deposit or special insurance required during construction shall be made by the CONTRACTOR.

After completion of the project, deposits will be returned to the CONTRACTOR subject to any limitations of the permits not complied with by the CONTRACTOR. Any annual or reoccurring rental charge will be paid by the OWNER.

- 1.8 APPLICABLE PUBLICATIONS.** The transportation of natural gas by pipeline shall conform to the Natural Gas Pipeline Safety Act of 1986. The Act required

the U.S. Department of Transportation (DOT), Office of Pipeline Safety (OPS) to develop and enforce minimum safety regulations for the transportation of natural gas by pipeline. These regulations became effective in 1970 and are published in Title 49, Code of Federal Regulations, Parts 190, 191, and 192. Other publications (latest revisions), listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references.

1.8.1 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRAFFIC OFFICIALS (AASHTO) SPECIFICATIONS.

Designation: Bituminous Coated

M 190 Corrugated Metal Culvert Pipe and Pipe Arches

1.8.2 AMERICAN GAS ASSOCIATION (A.G.A.) PUBLICATIONS.

A.G.A. Plastic Pipe Manual for Gas Service, February, 1985.

1.8.3 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS.

ANSI B1.20.1 Pipe Threads, General Purpose (Inch)

ANSI B16.3 Malleable Iron Threaded Fittings,  
Class 150 and 300

ANSI B16.5 Steel Pipe Flanges and Flanged Fittings

ANSI B16.9 Factory Made Wrought Steel Butt weld Fittings

ANSI B16.33 Manually Operated Metallic Gas Valves for use in Gas  
Piping Systems Up to 125 psig

ANSI B31.8 Gas Transmission and Distribution Piping  
Systems, 1989 Edition

ANSI B31.8a 1990 Addenda to ANSI B31.8

1.8.4 THE AMERICAN PETROLEUM INSTITUTE (API) SPECIFICATIONS.

5L Specification for Line Pipe

5LE Specification for Polyethylene Line Pipe

6D Pipeline Valves, End Closures, Connectors and Swivels

Standard 1104 Standard for Welding Pipelines and Related Facilities  
 1.8.5 AMERICAN RAILWAY ENGINEERING ASSOCIATION (A.R.E.A.)  
 SPECIFICATIONS.

A.R.E.A. Manual for Railway Engineering (Fixed Properties), Volume I.

1.8.6 AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)  
 PUBLICATIONS:

ASME Boiler and Pressure Vessel Code and Interpretation: Section IX, Welding  
 Brazing Qualifications, 1983.

1.8.7 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD  
 SPECIFICATIONS.

A53 Black and Hot-Dipped, Zinc-Coated, Welded and Seamless  
 Steel Pipe

A181 Carbon Steel Forgings for General Purpose Piping

A216 Carbon Steel Castings Suitable for High Temperature  
 Service

A234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for  
 Moderate and High Temperature Service

D1598 Test Method for Time-to-Failure of Plastic Pipe Under  
 Constant Internal Pressure

D2513 Thermoplastic Gas Pressure Pipe, Tubing, and Fittings

D3350 Polyethylene Plastics Pipe and Fittings Materials

1.8.8 LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES,  
 Latest Edition.

1.8.9 MANUFACTURES STANDARD SOCIETY (MSS) OF THE VALVE AND  
 FITTINGS INDUSTRY PUBLICATIONS.

SP-25 Standard Marking System for Valves, Fittings, Flanges and  
 Unions

SP-44 Steel Pipe Line Flanges

SP-84 Steel Valves – Socket Welded and Threaded Ends

1.8.10 NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE) STANDARDS.

- |          |  |
|----------|--|
| RP-01-69 | Recommended Practice – Control of External Corrosion on Underground or Submerged Metallic Piping Systems |
| RP-02-74 | Recommended Practice – High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation     |
| RP-02-75 | Application of Organic Coatings to the External Surface of Steel Pipe for Underground Service            |

1.8.11 NATIONAL ASSOCIATION OF PIPE COATING APPLICATORS (NAPCA) SPECIFICATIONS.

- |                   |   |
|-------------------|---|
| Bulletins 1-65-91 | Pocket Edition of NAPCA Specifications through 15-83-90 and Plant Coating Guide |
|-------------------|---|

1.8.12 U.S. AMERICAN STANDARDS (USAS) INSTITUTE SPECIFICATIONS:

- |        |  |
|--------|--|
| B 16.3 | Malleable – Iron Screwed Fittings, 150 and 300 Pound Class |
| B 16.5 | Steel Pipe Flanges and Flanged Fittings                    |
| B 31.8 | Gas Transmission and Distribution Piping Systems           |

1.8.13 U. S. DEPARTMENT OF TRANSPORTATION (DOT), OFFICE OF PIPELINE SAFETY (OPS).

- |  |              |
|--|--------------|
| Title 49 Code of<br>Federal Regulations (CFR),<br>PARTS 40 and 199 | Drug Testing |
|--|--------------|

**2.1 MATERIALS.** Pipe and other materials shall be of the type called for on the PLANS, and shall be in accordance with the following appropriate requirements.

Wherever it is necessary to join two pipes of dissimilar metals together, a method of insulating against the passage of electric current shall be provided and shall be approved by the ENGINEER.

2.1.1 PIPE SHIPPING AND DELIVERY. The pipe manufacturer shall take the necessary steps in handling and shipping the pipe as not to injure the pipe, coating, or lining. Each joint of new steel and/or polyethylene gas pipe shall be individually stacked on the truck or railroad car bed with adequate support under each joint of pipe and adequate support and protection between each layer of pipe stacked on the vehicle.

The entire stack shall be adequately and securely fastened to the truck or rail bed to prevent unnecessary vibrations, movements and stresses in the pipe during transportation.

Steel gas pipe shall be stacked using the timber supports, which were used in transporting the pipe. Polyethylene gas pipe shall be stacked into bundles (sized that the contractor can unload one bundle at a time) and the bundle shall be securely banded together with adequate wood boards around the bundle to protect it during shipment. The bundles shall then be stacked on the truck or rail bed for shipment to the job site. The load of bundles shall be securely attached to the shipping bed to prevent unnecessary stresses during transportation.

- 2.1.2 HANDLING OF ALL PIPE. The CONTRACTOR shall handle all pipes with handling and hauling equipment as not to injure the pipe, pipe lining, or pipe coating. Any pipe pushed off the truck bed will be rejected. Adequate equipment shall be used by the CONTRACTOR to remove the pipe from the truck bed and string it along the trench location.

If the pipe is to be stock piled before it is strung along the trench, the CONTRACTOR shall stack the pipe on a level site in neat stacks. Steel gas pipe shall be stacked using the timber supports, which were used in transporting the pipe. Polyethylene gas pipe shall be stacked in the bound bundles that the pipe was shipped in and the bundles shall not be broken until the stringing operation is started.

- 2.1.3 STEEL PIPE, JOINTS, FITTINGS.

- (A) Steel Gas Pipe. Steel gas pipe shall be new and conform to the requirements of ASTM A53, Grade B, Type E or S; or API Specifications 5L, Grade B, line pipe, seamless or electric-resistance welded, black; wall thickness as required to meet ANSI B31.8. New steel pipe shall be in lengths, not less than 20 feet long, with plain ends beveled for welding.

The exterior of the pipe shall have 11 mil minimum thickness "Scotchkote," type 3M 206N, Fostercoat, or approved equal, plant applied fusion bonded epoxy coating meeting the SPECIFICATIONS contained in NAPCA Bulletin 12-78-90, and subsequent revisions thereto.

Each length of steel pipe shall be marked in accordance with API Specifications 5L, namely to show name or mark of the manufacturer; pipe size (outside diameter) in inches; weight per foot; grade; API Monogram; pipe length; process of manufacturer; type of steel; heat treatment and hydrostatic test pressure.

All steel gas pipe shall be of domestic manufacture and shall be standard schedule 40, with a weight and wall thickness as follows:

Size (Inch)	Weight (lbs./L.F.)	Wall Thickness (Inches)
10	40.48	0.365
8	28.55	0.322
6	18.97	0.28
4	10.79	0.237
3	7.58	0.216
2	3.652	0.154
1-1/2	2.717	0.145
1	1.678	0.133

- (B) JOINTS. Joints for steel gas pipe shall be butt-welded to develop a joint that will result in complete fusion throughout the entire wall thickness of the pipe. All butt-welds shall be full penetration single butt-welds in accordance with D.O.T. Part 192 and API Standard 1104. Welded joints shall satisfactorily hold any pressure that the line will be subjected to in testing or during operations at maximum design pressure.

Mitre joints shall be limited to pipe connections where commercially fabricated welding fittings cannot be used and then shall be made in segments limiting the deflection in each section to angles agreed upon by the ENGINEER.

All threaded pipe, nipples, fittings, union, and couplings shall be made up tight to valves, regulators, meters using Rector Seal No. 5 pipe dope, graphite joint sealing compounds for gas service listed in Underwriters Laboratories, Inc. Gas and Oil Equipment Director, Class 20 or less, polytetraful-oroethylene tape, which conforms to Military (Mil.) Specifications (Spec.) Mil-T-27730, or approved equal.

- (C) FITTINGS. Steel gas pipe threaded fittings shall conform to ANSI B16.3 or B16.11, black. Steel gas pipe butt-welded fittings shall conform to ANSI B16.9 and shall be commercially fabricated steel fittings of pressure rating equal to or greater than ANSI Class 150 standards. All pipe bends shall be long radius type.

The exterior of all bends and fittings shall have the same coating as the pipe. Where reduction of size in pipes occur concentric swage fittings shall be used. Steel gas pipe flanged fittings shall conform to ANSI B1.20.1.

- (1) P.E. to Steel Transition Fitting. The P.E. to steel transition fitting shall be manufactured by the same manufacturer of the P.E. piping supplied for the system.

The P.E. ends of the fitting shall conform to paragraph 2.1.4(C) of these SPECIFICATIONS. The fitting shall be manufactured by Wayne Manufacturing, Central Plastics, or approved equal.

Upon completion of welding operations for the transition fitting, the steel ends of the fitting shall be thoroughly coated as specified in paragraph 3.1.13(E) of these SPECIFICATIONS. The cost for installation of each such transition fitting shall be included in the unit price bid for associated items of work.

- (2) Stopple Fitting. Stopple fittings (short stop) shall be manufactured by T. D. Williamson, Inc., Mueller Co., or approved equal, and consist of a pipe cap, completion plug, and a shaped steel nipple.

The CONTRACTOR shall be required to provide all the necessary tapping and plugging equipment required to install the stopple.

Unless shown otherwise on the PLANS, all stopple fittings shall be welded connections. Where indicated, the stopple shall be mechanically fitted.

The cost for installation of each stopple fitting and the cost of any required tapping and plugging equipment shall be included in the unit price bid for hot tap connections, per each.

- (3) Three Way Tee Fitting. Three way tee fitting (3-way tee) shall be manufactured by T. D. Williamson, Inc., Mueller Co., or approved equal, and consist of a forged steel blind flange with gaskets, nuts and bolts; a cast iron completion plug, and a cast steel fitting meeting ASTM A216 Grade WCB for 4" and larger sizes and consist of a pipe cap, completion plug, and three way tee with external pipe threads, shaped to fit the pipe for 3" and smaller sizes. The fitting shall be designed to conform to ANSI Class 150 standards. The three-way tee shall be used to connect new lines to the existing steel lines that are to remain in service.

The CONTRACTOR shall be required to provide all the necessary tapping and plugging equipment required to install the three way tee fitting.

Unless shown otherwise on the PLANS, all three way tees shall be welded connections. Where indicated, the tees shall be mechanically fitted.

The cost for installation of each three way tee and the cost of any required tapping and plugging equipment shall be included in the unit price bid for hot tap connections, per each.

- (D) BOLTS, NUTS, ETC. Bolts shall be as specified by the USAS B31.8 specifications for bolted joints or as recommended by the pipe manufacturer; all subject to approval of the ENGINEER. All bolts on flanged pipe installed underground shall be made from a non-corrosive metal subject to the approval of the ENGINEER.

#### 2.1.4 THERMOPLASTIC GAS PRESSURE PIPE, JOINTS, FITTINGS.

- (A) Polyethylene (P.E.) Plastic Pipe. All thermoplastic gas pressure pipe furnished shall be polyethylene (P.E.) plastic pipe and shall conform in all respects to ASTM D2513.

Polyethylene plastic pipe shall be manufactured from a virgin polyethylene plastic compound material which meets ASTM D2513 for use with natural gas, and has the primary physical properties which are identified by cell classification P.E. 355434C in accordance with ASTM D3350 and has been listed by the Plastic Pipe Institute (P.P.I.) as a P.E. 3408 designated compound.

All P.E. pipes shall be of a single manufacturer. All P. E. plastic pipes shall be SDR 11, unless otherwise specified. The pipe must be furnished in the Iron Pipe Size (IPS).

All P. E. pipes shall have the manufacturer's name or trademark, the nominal pipe size, the PPI plastic pipe designation code, and the Standard Dimensional Ratio (SDR) or wall thickness conspicuously marked at intervals of not more than 2 feet.

- (B) Joints. Joints shall be made using butt heat-fusion equipment and instructions provided by or recommended by the pipe manufacturer.

Buss heat-fusion joints will require the use of a jointing device that holds the heater element square to the ends of the piping, can compress the heated ends together, and holds the piping in proper alignment while the plastic hardens.

- (C) Fittings. All polyethylene gas pipe fittings shall conform to ASTM D2513 and paragraph 2.1.4(A) of these SPECIFICATIONS.

P. E. to steel transition fittings shall be as specified in paragraph 2.1.3(C)(1) of these SPECIFICATIONS.

(D) Polyethylene Plastic Pipe. Polyethylene plastic pipe shall be manufactured by Phillips Driscopipe, Inc. – Driscopipe 8100.

2.1.5 SERVICE LINE. All gas service line (pipe) shall be a minimum of one-inch (1”) diameter and shall conform to Paragraph 2.1.4(A) of these SPECIFICATIONS. All service line(s) shall extend from the gas main to, and including, the point of delivery. The point of delivery is the service meter stop. Service line shall be coated and wrapped from bottom of the service meter stop or from a point at least one foot (1’) above ground level to a point at least one foot (1’) below the ground level.

2.1.6 WELDED STEEL CASING PIPE. Steel casing pipe shall be new and conform to the requirements of ASTM A53, Grade 13, Type E or 5; or API Specification 5L, Grade B., line pipe, seamless or electric-resistance-welded, black. Steel casing pipe shall be in lengths, not less than 20 feet long, with plan ends beveled for welding. The size and wall thickness shall be as specified on the PLANS.

The interior and exterior of all casing pipe shall be cleaned, primed and lined with two coats of asphalt to achieve 0.05 inch minimum coating thickness, in accordance with AASHTO M190, Type A. All steel casing shall be butt-welded and all welds shall be full penetration single butt-welds in accordance with API Standard 1104.

2.1.7 STEEL VALVES.

(A) General. All steel valves shall be new and manufactured to conform to ASTM A216, Grade WCB. All steel valves furnished shall be from the same manufacturer. All steel valves shall operate so that the valve will open when turning the operating nut in a counterclockwise direction. All steel valves buried underground shall have butt weld ends and be factory coated with 11 mils minimum thickness Scotchkote 306 by the 3M Company, Fostercoat, or approved equal. Each steel valve buried underground shall be installed with a high head extension, a non-rising stem with a two-inch (2”) square shank adapter wrench nut and cast iron valve box. The extension shall bring the operating nut and sealant fittings to within 6” of the ground surface. The CONTRACTOR shall furnish the OWNER with one (1) valve wrench to fit the operating nut furnished. All steel valves, for above ground installations, shall have raised face type flange ends and shall be installed with factory made locking devices. Suitable flanges for attaching above ground valves to pipe shall be furnished. Raised face flanged fittings shall be installed with a full face, neoprene-phenolic faced, type E gasket. The gasket shall fully seal the annular space between fitting faces to eliminate flange corrosion. Unless otherwise specified in the plans or the Proposal Form, all steel valves shall conform to ANSI Class 150 standards.

After installation, all valves will be furnished with the type and amount for the initial lubrication recommended by the manufacturer for natural gas service.

(B) Valve Requirements.

- (1) 4" and Smaller Distribution System Steel Valves. The 4" and smaller above ground steel valves shall be Rockwell Nordstrom carbon steel plug valves, or Kerotest gate valve model EV-11, wrench operated, or approved equal.

The 4" and smaller steel valves buried underground shall be Rockwell-Nordstrom carbon steel plug valves, figure 1925 ½, wrench operated, or Kerotest gate valves, Model M-1, wrench operated, or approved equal.

- (2) Six Inch Distribution System Steel Valves. The 6" above ground steel valves shall be Rockwell Dynamic Balance plug valves, figure 1945, wrench operated, or Kerotest gate valves, Model EV-11, wrench operated, or approved equal. The 6" steel valves buried underground shall be Rockwell Nordstrom plug valves, figure 4185 ½, wrench operated, or Kerotest gate valves, Model M-1, wrench operated, or approved equal.

- (3) Pressure Reducing Assemblies, Regulator Stations, Etc. Valves for special assemblies shall be as specified on the PLANS and shall have a sufficient rating to withstand the maximum line and test pressures.

- (C) Valve Flanges. All companion flanges shall be raised face type. Companion flanges for ANSI Class 150 standard valves shall be forged steel slip-on or welding neck conforming to USAS 16.5.

2.1.8 POLYETHYLENE (P.E.) VALVES.

- (A) General. All polyethylene (P.E.) valves shall be manufactured to conform to ASTM D-2513 and D-1598. All P.E. valves furnished shall be from the same manufacturer. All P. E. valves shall operate so that the valve will open when turning the operating nut in a counterclockwise direction.

All P. E. valves buried underground shall have a non-rising stem with built-in position indicator – standard 2" square adapter with deflector cone on top and a valve box made of cast iron collar and plastic bottom.

The CONTRACTOR shall furnish the OWNER with one (1) valve wrench to fit the P.E. valve operating nut. All P.E. valves shall have 18" length

pipe stub ends which can be butt heat-fused to the pipe or other fittings, and be wrench operated.

All P.E. valves shall be made of cell classification P.E. 355434C, SDR 11 material, and shall be designed for an allowable service pressure of 100 pounds per square inch in a Class 4 location.

(B) Valve Requirements.

(1) 2", 3", 4", 6" & 8" Size Distribution System P.E. Valves. Distribution system P. E. valves shall be Kerotest Ply Plug Valves, Rockwell Poly Valves, Figure No. 8311, or approved equal, for 2" size; Kerotest Poly Plug Valves, Rockwell Poly Valves, Figure No 83211, or approved equal, for 3" and 4" sizes; and Rockwell Poly Valves, Figure No. 83211, Kerotest Poly Plug Valve, or approved equal, for 6" and 8" sizes.

(2) Pressure Reducing Assemblies, Regulator Stations, Etc. Valves for special assemblies shall be as specified on the PLANS or on the Proposal Form.

2.1.9 SERVICE ASSEMBLIES. Materials, to complete the various types of service assemblies as detailed on the PLANS, shall meet the following SPECIFICATIONS:

(A) SERVICE TAPS. Service taps on steel pipe distribution system mains shall be made using a Mueller Welding Inlet No-Blo valve tee #H-17650, Rockford Eclipse, or approved equal. Service taps on polyethylene pipe distribution system mains shall be made using appropriate sized service saddles and tapping tees as shown on the PLANS, which conform to ASTM D2513, and which are made of cell classification P.E. 355434C material. The service saddle and tapping tee shall be joined to the system main by heat fusion as specified in Paragraph 2.1.4(B) of these SPECIFICATIONS.

(B) PROTECTIVE SLEEVES. All P.E. service tap outlets will be fitted with the appropriate protective P.E. sleeve to fit snugly over the pipe-fitting juncture and extend at least 12 inches over the pipe to limit pipe bending and exposure to mechanical damage at the joint.

(C) CURB STOPS. The curb stop shall be made using a 1" size P.E. Kerotest Kerotite Service Valve, Part No. CS-1315, Rockwell Polyvalve, Figure No. 83211, plug valve, or approved equal, for 1" size service line. For 2", 3", and 4" size P.E. service lines, the curb stop shall be made using the appropriate sized P.E. valve as specified in paragraph 2.1.8(B) of these SPECIFICATIONS. For 1" size P.E. service lines only, the curb stop shall

have a minimum inside diameter of three inches (3"), and the remaining SPECIFICATIONS contained in paragraph 2.1.10 (B) shall apply.

The curb stop boxes shall be manufactured by Handley Industries, Inc., P. O. Box 863, Jackson, Michigan, Mueller Co., or approved equal.

- (D) **CURB STOP BOX.** The curb stop box for 2", 3", and 4" size P.E. service lines shall be manufactured the same as for a P.E. valve box, as specified in paragraph 2.1.10 (B) of these SPECIFICATIONS. For 1" size P.E. service lines only, the curb stop box shall have a minimum inside diameter of three inches (3"), and the remaining specifications contained in paragraph 2.1.10 (B) shall apply.

The curb stop boxes shall be manufactured by Handley Industries, Inc., P. O. Box 863, Jackson Michigan, Mueller Co., or approved equal.

- (E) **METER STOPS.** Meter stops furnished shall be from the same manufacturer and shall be of the permanently lubricated iron body type. Meter stops on all types of service pipe shall be Mueller No. H11175, galvanized finish, with lock wing, Rockford Eclipse, or approved equal.
- (F) **GAS SERVICE METERS.** Meters for gas service shall be aluminum case, aluminum painted Rockwell, as specified below, shall have a standard direct reading meter index and shall be capable of accurately measuring 0.6 specific gravity natural gas with pressure losses and capacities as specified below. Capacities indicated are at four (4) ounce base. Large capacity meters will be as detailed in the PLANS and/or as called for by the SPECIAL PROVISIONS. Prior to ordering any new meters, the CONTRACTOR shall ascertain from the Owner's Gas Superintendent the new meter numbers to be assigned to each new meter for stamping by the manufacturer.

<b><u>PRESSURE LOSE</u></b>	<b><u>(SIZE SPUD)</u></b>	<b><u>CUBIC FEET/HOUR</u></b>	
#275	1/2"	20 Lt.	275
#415	1/2"	20 Lt	415
#750	1/2"	45 Lt	750
#1,600	2"	45 Lt	1,600
Large Capacity	2"	2", 3" or 4"	3,000-10,000

All gas meters with capacities greater than 800 CFH shall be Dresser Root Rotary Meters – size as specified on the PLANS.

- (G) **INSULATED METER SWIVELS AND FLANGES.** Insulated meter swivels and/or insulating flanges shall be installed as shown on the PLANS.

- (H) METER RISERS OR NON-CORRODIBLE METER RISERS. Meter risers or non-corrodible meter risers for P.E. service pipe shall be joined to the type service pipe using the method described in paragraph 2.1.4 (B) of these SPECIFICATIONS for P.E. pipe. Each meter riser shall be 24" long horizontally and 24" long vertically. Meter or non-corrodible meter risers shall have a 10" radius bend if P.E. pipe and a (1) 90° ell if pipe and then be coated and wrapped as necessary to provide built-in cathodic protection at least one (1) foot below ground level and at least one (1) foot above ground level or to the bottom of the existing or new meter stop, regulator or meter fitting.

Meter or non-corrodible meter rise outlets shall be threaded with male I.P.S. threads to fit existing or new meter stop, regulator or meter fitting.

Pipe size of meter or non-corrodible meter risers shall be determined by I.P.S. of pipe required to fit to the existing or new meter stop, regulator or meter fitting.

- (I) COSTUMER CONNECTIONS. Customer connections shall be installed as shown on the PLANS. The pipe size of adapter, coupling, fittings, etc., shall be determined by the I.P.S. of the pipe required to fit to the existing or new customer piping.
- (J) FITTINGS. Fittings for service assemblies shall be installed as shown on the PLANS. The pipe size of the meter bars, meter stops, nipples, street ells, couplings, fittings, etc., shall be determined by the I.P.S. required to fit to the existing or new regulator and/or meter fittings.
- (K) PRESSURE GAUGE. A pressure gauge shall be installed on certain service assembly set-ups as shown in the PLANS.
- (L) PROTECTIVE RAILINGS. Protective railing shall be installed for certain service assembly set-ups as shown on the PLANS.

#### 2.1.10 VALVE BOXES.

- (A) For Steel Pipe. Valve boxes for welded steel pipe mains shall be made of cast iron and shall be of the heavy roadway typed with an inside diameter of no less than 5 inches. The valve boxes shall be adjustable for elevation range of 24" to 36" and shall be of the three-piece screw type.

The top of the valve box shall be installed flush with the ground surface or street surface and shall be supported by a 24 inch diameter round or square concrete foundation as shown on the PLANS.

The valve box shall be # H-10360, manufactured by Mueller Co., Decatur, IL 62525, Handley Industries, Inc., or approved equal.

- (B) For Polyethylene Pipe. Valve boxes for polyethylene pipe mains shall be made of cast iron collar and plastic bottom and shall be of the heavy roadway type with an inside diameter of not less than 5 inches. The valve boxes shall be adjustable for elevation range of 24" to 36" and shall be of the three-piece slide type.

The top of the valve box shall be installed flush with the ground surface or street surface and shall be supported by a 24 inch diameter round or square concrete foundation as shown on the PLANS.

The valve box cover shall be cast iron with the word "GAS" embossed on the topside and shall be of the bolt-down type. The valve box shall be manufactured by Handley Industries, Inc., P. O. Box 863, Jackson, Michigan 49204, Mueller Co., or approved equal.

- 2.1.11 PIPE LINE CROSSING MARKER SIGNS. Pipe line crossing marker signs shall be fabricated as shown on the PLANS and be installed by the CONTRACTOR as detailed on the PLANS in close proximity to all casing vents, canal or bayou crossings, field crossings, public road crossings, railroad crossings, and other locations as directed by the ENGINEER. Each crossing shall be provided with two (2) signs each.

Pipe line crossing marker signs shall be mounted on rigid flanged, vinyl coated channel type steel posts with drilled or punched 3/8" diameter holes centered at 1" intervals along its entire length. The vinyl coating shall be impregnated with high intensity yellow color and ultraviolet inhibitors to resist fading. The posts shall be 7 feet long, 2" wide channel type steel post with 2.5 feet minimum embedment, and weight 2.5 pounds per linear foot. The post shall be as distributed by Phillips Engineering Company, Inc., Clearwater, Florida (1-831-461-7711), Handley Industries, Inc. or approved equal.

Pipeline crossing marker signs shall be constructed of 0.090" thick fiberglass sheeting, 8" width x 12" height. The signs shall have a yellow and black lettering as detailed on the PLANS. The sign shall be secured to the post with 1/4" x 2" length round head steel stove bolts, washers and nuts as detailed on PLANS. The signs shall be as distributed by Phillips Engineering Co., Inc., Clearwater, Florida (1-800-237-9861), Handley Industries, Inc., or approved equal.

Under this contract no special payment will be made for furnishing and installation of pipeline crossing marker signs. Cost shall be included in the pipeline crossing bid item, if applicable, or in the unit price bid per foot of pipe under paragraph 5.1.2.

2.1.12 VALVE WRENCHES. CONTRACTOR shall provide the Owner with one (1) each heavy tee handle 2" square socket wrench, Rockwell-Nordstrom Part No. 37213, Mueller Co., or approved equal. Valve wrenches for pressure reducing assemblies, regulator stations, etc., shall be provided as detailed in the PLANS or as called for by the SPECIAL PROVISIONS.

2.1.13 NON-CORROSIVE METALLIC WIRE OVER P.E. GAS PIPE. Non-corrosive metallic wire shall be installed directly over and on the center of all P.E. gas mains and service lines for detection purposes. This wire shall be continuous on all P.E. mains and service lines and shall be connected to all fixtures, appurtenances and pipe as detailed on the PLANS.

The non-corrosive metallic wire shall be Type TW, A.W.F. #10 gauge, insulated, stranded copper wire. Wire splices shall be made using splice kits similar or equal to Model DBR by 3M.

No special payment shall be made for installation of the wire. The cost of such shall be included in the unit price bid for gas pipe.

2.1.14 CORROSION PROTECTION. When indicated on the PLANS, the CONTRACTOR shall provide adequate cathodic protection to protect the facilities against corrosion. The CONTRACTOR shall furnish all items for the cathodic protection. The price for cathodic protection shall be included in other items of WORK. The cathodic protection shall have design life of 20 years and be installed in accordance with the National Association of Corrosion Engineers (NACE) Publication RP-01-69. The following minimum SPECIFICATIONS shall apply:

(A) Anodes and Leads. Each location where cathodic protection is to be installed shall be provided with a seventeen (17) pound packaged magnesium anode with a high efficiency backfill material for its cathodic protection. The anode and backfill material is to be manufactured by Allied Corrosion Industries, Inc., 6180 Atlantic Blvd., Suite O, Norcross, Georgia 30071, Telephone No. 1-800-241-0809; Harco Corporation, or approved equal.

Each anode shall be provided with a minimum 2 foot long, unspliced, Type TW insulated, A.W.G. #10 gauge solid copper connecting wire (lead). Each connecting wire shall be factory installed with the place of emergence from the anode in a cavity sealed flush with a dielectric sealing compound.

(B) Lead Bonding. Connection of the anode lead to the facilities shall be by use thermal welding equal to Calweld process. After the connection has been made, inspected and approved, the damaged area of the facilities

and the metal portion of the connection shall be thoroughly coated as specified by NACE Specifications RP-01-75.

- 2.1.15 SERVICE LINE INSERTIONS. Where indicated on the PLANS, the CONTRACTOR shall insert new P.E. service line into existing steel service line. All new service line insertions shall be -.090" wall copper tubing size (CTS) P.E. gas service line.

All service line insertions shall maintain an annular space clearance of 10% between the outside diameter (O.D.) of the new service line inserted and the existing service line inside diameter (I.D.). The size of new service line inserted shall be as follows:

Existing Steel Service Line	New Service Line Insertion (O.D.)
2"	1 ¼"
1 ½"	1"
1"	¾"

Each service line insertion shall be provided with appropriate fittings to allow for meter reconnections to main with and/or without meter relocation.

Each service line inserted will be paid for at the contract price per lineal foot for service line inserted in the various sizes, types and classifications, which price and payment shall constitute full compensation for furnishing, hauling, installing and inserting complete, including furnishing fittings, testing the pipe; for excavation, preparation of bed and backfilling, compaction and removing excess earth; and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with these SPECIFICATIONS.

- 2.1.16 CONCRETE. Concrete shall comply with Section ST-104 "Concrete" of these SPECIFICATIONS.

- 2.1.17 PAINTING. All steel pipe, valves, and equipment (Including service assemblies, protective railings, pressure reducing assemblies, meter/regulator stations, etc.) installed above ground shall be painted with an aluminum finish paint as manufactured by Pratt-Lambert, Tnemec, or approved equal, as follows:

Manufacturer:	Pratt-Lambert	Tnemec
Preparation: Cleaning	SSPC-SP 1 & 2	Solvent & Hand tool
First Coat:	Zinc Chromate Primer	77
Second Coat:	Aluminum Enamel	Aluminum Enamel

Curb stop box covers, valve box covers, terminal box lid and associated pads shall be painted "safety yellow" with a good grade of exterior concrete paint. Under this contract, no special payment will be made for painting.

Cost will be included in the contract unit price of the item being painted.

### **3.1 CONSTRUCTION METHODS**

- 3.1.1 General. This part of the work includes installation of gas mains, fittings, valve, valve boxes and appurtenances; excavation and backfill of trenches; cutting and replacing walks and roadway surfacing; and other miscellaneous items necessary to complete and make ready for operation a complete gas distribution system.
- 3.1.2 COOPERATION WITH UTILITY OFFICIALS. This work will be performed in the close proximity of existing utilities, streets, drainage structures, etc. The CONTRACTOR shall at all times cooperate with the various utility and street officials and shall notify the appropriate personnel prior to excavation in areas where known utilities are located.
- 3.1.3 CLEARING OF RIGHT OF WAY. The CONTRACTOR shall clear the right-of-way provided for the main of all objectionable debris and obstructions that will interfere with the installation of the mains. Wooded areas shall be cleared and grubbed and surface obstructions to remain shall be protected in accordance with paragraph 2.1.18 of these SPECIFICATIONS.
- 3.1.4 EXCAVATION OF TRENCH AND BACKFILL. Excavations, preparation of trenches, and backfill shall be in accordance with USAS B31.8, except where amended by these SPECIFICATIONS. Excavation shall be such that the pipe will have no less than 30 inches of minimum cover (measured from top of trench to top of the barrel of the pipe). Trench bedding and standard backfill shall be as specified for each individual pipe material and detailed on the PLANS.
- 3.1.5 OBSTRUCTION OF STREETS, PREMISES, ETC. All material shall be placed so as to interfere as little as possible with public travel. At street crossings and other points as directed by the ENGINEER, trenches shall be bridged in a manner so as to prevent any serious interruption of public travel; the closure of both sides of a double roadway to vehicular traffic will not be permitted except by special permission. Special care must be taken to give free access at all times to all fire hydrants, water valves, fire alarm boxes and Police Department and Fire Department driveways.

In case the CONTRACTOR shall fail to keep open streets, sidewalks, approaches to premises, etc., and shall refuse or neglect to open them within twelve (12) hours after written notification by the Owner; or shall the

CONTRACTOR fail to afford proper and necessary access to fire hydrants, water valve, fire alarm boxes or Police Department or Fire Department driveways, and shall neglect or refuse to afford such access within one (1) hour of receiving oral or written notice to do so, the Owner shall be and is hereby authorized and empowered to put on such force as may be necessary and to do this WORK, deducting the actual cost thereof from any money which may be due or may become due the CONTRACTOR.

3.1.6 CONFLICT WITH SURFACE OBSTRUCTION. All shade trees, shrubbery, utility poles, etc., within the right-of-way provided shall be protected and any building or structure, which may be endangered during the WORK, shall be shored up and otherwise protected. Any properties disturbed or damaged by the CONTRACTOR shall be restored to original condition. No additional compensation will be made for corrective WORK.

3.1.7 CONFLICT WITH SUBSURFACE OBSTRUCTION. The CONTRACTOR shall anticipate all underground obstructions such as water lines, gas lines, sewer lines, utility lines, concrete and debris.

Any such lines or obstructions indicated on the PLANS show only the approximate location and must be verified in the field by the CONTRACTOR. Neither the Owner nor the ENGINEER implies or guarantees the exact location of any existing underground utility; however, the Owner and ENGINEER will endeavor to familiarize the CONTRACTOR with all known underground obstructions.

The CONTRACTOR shall take the necessary precautions not to injure any gas or water pipe, sewer, drain or service pipes connected therewith or conduits or other underground structures, and the CONTRACTOR must repair or have repaired immediately, at his own cost, any public or private structure or pipe damaged by or in the course of his WORK. Should the CONTRACTOR fail to repair or have repaired such damage of injury within a reasonable time, the Owner may after 24 hours written notice, have such repairs made and deduct the cost thereof from any amounts due or to become due the CONTRACTOR.

The CONTRACTOR shall assume all risks and be responsible for all expense and damage attending the presence or proximity of any gas or water pipes, sewers, drains, conduits, or other underground structures where such pipes or other structures cross the trench or appear in the trench in such a manner as not to demand their rearrangement or realignment. The CONTRACTOR'S risks and responsibilities shall also apply to such structures as are approximately parallel with or adjacent to but outside of said trench.

The CONTRACTOR shall uncover known subsurface obstructions in advance of construction so that the method of avoiding same may be determined before pipe laying reaches the obstructions.

Should any pipe or other obstruction (so located as to interfere with the WORK) be encountered, the CONTRACTOR shall at once notify the ENGINEER of the locality and circumstances and the place shall be passed over until satisfactory arrangements are made.

Should the obstruction parallel the trench the ENGINEER may require the CONTRACTOR to offset or re-align his pipeline to miss the obstruction. This realignment may be made by the use of fittings, pipe deflection and/or valves as the case may dictate.

When the pipeline is offset, or to miss an obstruction, no claim for damages or extra compensation shall accrue to the CONTRACTOR from the presence of such pipe or other obstruction or from any delay due to its presence. However, should there be a change in quantity of any established pay item due to this relocation, the CONTRACTOR shall be paid for these changes at the unit price bid.

Where the minimum cover cannot be obtained the CONTRACTOR will be required to lay the pipe under the obstruction and maintain a 6-inch cushion between the top of the pipe and the bottom of the obstruction. No additional payment will be made for additional depth or over depth mains, required to miss an obstruction.

Should the location or position of such obstruction within the limits of the trench be such, in the opinion of the ENGINEER, as to require removal, realignment or change of the obstruction in order that the work may proceed, such removal realignment or change shall be without expense to the CONTRACTOR. When, however, such obstruction shall come within the limits of the excavation for the work as located by the ENGINEER, such pipe, conduit, or other obstruction shall be stripped or uncovered by the CONTRACTOR, at his own expense, as constituting a part of his WORK in excavating. No claim for damages or extra compensation shall accrue to the CONTRACTOR for any delay due to the presence and adjustment of the obstructions.

The ENGINEER will in all cases render decisions on the necessity or expediency of any change or rearrangement of any underground structures, which may interfere with the construction of the WORK under this contract.

### 3.1.8 SPECIAL CROSSING.

- (A) GENERAL. Special crossings for which drawings have been made and on which a special price has been asked, whether a lump sum bid or otherwise, will be paid for according to the special specifications governing said crossings. Otherwise, no additional compensation will be paid for the construction of any utility line because of its crossing under or over any

natural or man-made obstacle provided the route of the gas line as bid has not been changed so as to produce a crossing not to be anticipated by the bidder.

- (B) PERMITS. The CONTRACTOR shall secure the necessary permit from the controlling agency for laying these lines. The permit shall be obtained in the name of the Owner; however, the CONTRACTOR shall make the refundable deposit for the permit.  
After completion of the project, the deposit will be returned to the CONTRACTOR subject to any limitations of the permit not complied with by the CONTRACTOR.
- (C) COOPERATION WITH CONTROLLING AGENCY: The CONTRACTOR shall submit to the ENGINEER and the representative of the controlling agency, all details concerning the method of construction and materials and shall have them approved prior to beginning construction.
- (D) COOPERATION WITH CONTROLLING AGENCY: The CONTRACTOR shall submit to the ENGINEER and the representative of the controlling agency, all details concerning the method of construction and materials and shall have them approved prior to beginning construction.

- 3.1.9 HANDLING AND DISPOSAL OF WATER. The CONTRACTOR shall pump, bail, or otherwise remove any water, which may be found or may accumulate in the excavations, trenches, etc., and shall perform all WORK necessary to keep them clear of water while the work is in progress.

The cost of removing water by pumping or otherwise shall be included in the prices bid for the various item of the WORK; unless a specific bid item is asked for such. The CONTRACTOR shall keep his completed WORK reasonably free of water and shall completely remove all of it for the purpose of installations, inspections, etc.

The CONTRACTOR shall prevent any of his work from obstructing any drainage ditch, canal, etc., unless special permission is obtained.

- 3.1.10 SHEETING AND BRACING. Wherever necessary for protection of workmen, for security of adjacent utilities or structures, for stability of trench, or for proper installation and operation of gas pipe, the CONTRACTOR shall secure the trench to his satisfaction, to the extent of requiring close sheeting, or sheet piling and suitable bracing, including all nails, spikes and other fastenings.

Where the sheeting for a pipe is driven no lower than the top of the pipe, such sheeting may be withdrawn, provided that no sheeting is withdrawn until the

trench has been refilled as hereinafter provided to a point not less than two (2) feet above the crown of the pipe.

Where it is necessary to drive sheeting below the top of the pipe, such sheeting shall be driven down to a point not less than two (2) feet below the bottom of the pipe and properly braced. Bracing above the pipe shall be placed as to allow at least one (1) foot clear space between the bottom of the bracing and the top of the pipe. Sheeting and bracing driven below the crown of the pipe shall be cut off two (2) feet above the crown before removal. Sheeting and bracing may be removed after the trench has been backfilled at least two (2) feet above the top of the pipe.

### 3.1.11 LOCATION OF EXISTING GAS SYSTEMS.

- (A) GENERAL. The attention of the CONTRACTOR is directed to the fact that existing gas mains or service lines may have to be tapped, cut, "killed", relocated, tied together and otherwise adjusted to completely perform all required work.

The CONTRACTOR shall not be permitted to indiscriminately shut off service. The CONTRACTOR shall cooperate with the Owner in order that lack of service will be reduced to a minimum. The CONTRACTOR shall arrange with representatives of the Owner and the ENGINEERS for a mutually acceptable time when service can be discontinued in the various sections of the system.

The CONTRACTOR shall place a "Gas Cut-Off Notice", furnished by the Owner, on the door of any customer whose gas service is interrupted.

The general location, size and type of existing utilities have been taken from existing maps and/or surveys. The size of pipe indicated is the nominal diameter and the CONTRACTOR shall be responsible for obtaining the correct outside diameter of the pipe before ordering any valves, fittings, tapping sleeves, etc., to assure a proper fit.

- (B) LOCATION OF EXISTING UTILITIES. The approximate location of known existing utilities has been shown on the drawings and the final location of all tie-ins, taps, etc. shall be approved by the ENGINEER. The CONTRACTOR shall be responsible for physically locating all existing pipe and appurtenances. No additional compensation shall be paid for such WORK, but shall be included in the unit price bid per foot of pipe.

### 3.1.12 INSTALLING STEEL PIPE. All steel gas pipe installations shall be made in accordance with USAS B31.8-841.2, "American Standard Code for Pressure Piping". "Installation of Steel Pipe lines and Mains", except as amended by these SPECIFICATIONS.

The CONTRACTOR shall protect all coated pipe from exposure to the weather prior to backfilling. Coated pipe shall be handled at all times with equipment designed to prevent damage to the coating. The CONTRACTOR shall not string pipe in excess of the amount, which, in the opinion of the ENGINEER, may not be installed within 7 days.

The use of pinch bars, chain slings, or other pipe handling equipment found to be injurious to the coating will not be allowed. Sections of coated pipe being tied into the line shall not be dragged or pulled into position, and the length of such sections shall be regulated to allow their handling without damage to the coating. At stream crossings, or at any other locations where it may be necessary to pull, drag, or jack and bore sections of pipe into place, the coated pipe shall be protected as directed by the ENGINEER.

“Type 1 Standard Pipe Foundation” as detailed on the PLANS shall be used for the installation of all steel gas mains, unless otherwise specified on the PLANS.

3.1.13 WELDING AND FIELD COATING PROCEDURE FOR STEEL PIPE. Welding shall be in accordance with USAS B31.8, API Standard 1104, and ASME Section IX, except as modified herein.

(A) Welding Process. Prior to performing any welding, the CONTRACTOR’S welding procedure SPECIFICATIONS shall be presented in writing and qualified to demonstrate that suitable sound welds can be made by each procedure required. The quality of each weld at every joint shall be determined by mechanical or radiographic testing, as appropriate.

Certification of each acceptable written procedure and performance qualification test shall be made by a qualified testing laboratory and the results recorded. Evidence of recent experience making acceptable hot taps (taps on a pipe line under pressure) is also required.

The CONTRACTOR shall bear all of the costs associated with qualifying each welding procedure specification, performing each procedure qualification test, recording of the welding data and test results, certifications and retests and renewal of qualifications.

The CONTRACTOR shall furnish the necessary equipment and personnel to cut out and test welds. For such tests, the entire weld shall be cut from the line, cutting the pipe 4” back on each side of the weld. Coupons cut from this weld shall be tested for tensile strength, ductility and penetration.

Where welds are cut for testing, the line shall be tied back together with either a single weld, or by use of a piece of new pipe not less than 2 feet in length. The entire cost of testing such welds and repairing the line where they were cut out to be borne by the CONTRACTOR.

Pipe shall be butt-welded to develop a joint that will result in complete fusion throughout the entire wall thickness of the pipe. The welded joint shall satisfactorily hold any pressure that the line will be subjected to in testing or during operation at maximum design pressure. At no time shall the pipe be rolled or turned during welding. Any defective joints resulting from poor welding technique, overlaps, under-cuts, convexity, or any other reason shall be cut out and replaced with a satisfactory joint.

Mitre joints shall be limited to pipe connections where commercially fabricated welding fittings cannot be used, and then shall be made in segments limiting the deflection in each section to angles agreed upon by the ENGINEER.

Where welding fittings are required, the welding fittings shall be commercially fabricated ASTM A234 steel fittings of pressure rating equal to or greater than ANSI Class 150 Standards. All bends shall be long radius type. Where reduction of size in pipes occurs swage fittings shall be used. Ninety degree saddle welding one pipe into another will not be permitted, except in special cases when prior approval of the ENGINEER has been obtained.

Each welder shall be furnished a stencil, a record being kept thereof, and each welder shall stencil all welds made by him. The CONTRACTOR shall furnish and use only such types and sizes of welding rods as are approved by the ENGINEER.

- (B) Equipment. All pipe shall be electric welded by the "shielded Metal-Arch" process. Welding machines and appurtenances thereto shall be of size and type suitable for the work, and shall be maintained in such conditions as to insure acceptable welds, continuity of operation, and safety of personnel.

Welding machines shall be direct current and shall have reversed polarity, work negative and electrode positive, and shall be operated within the amperage and voltage ranges recommended for each size and type of electrode.

- (C) Materials. The filler metal for the shielded metal arc process shall be according to API Standard 1104 and shall be 5/32 inch or 3/16 inch in size.
- (D) Procedure Details. Surfaces to be welded shall be free from loose scale, slag, heavy rust, grease, paint, cement and other foreign material except tightly adherent mill scale.

A light film of linseed oil primer or spatter film compound may be disregarded. Joint surfaces shall be smooth, uniform and free from fins, tears and other defects, which adversely affect proper welding.

The number of filler beads should be such that the completed weld will have a reinforcement of not less than 1/32 inch and not more than 1/16 inch. After the root bead has been completed, the second and third beads shall be added immediately. There shall be not less than three beads.

Two beads shall not be started at the same location. The surface pass shall be substantially central to the seam and all surface passes shall be reasonable smooth and free from depressions. The face of the completed weld should be approximately 1/8-inch greater than the width of the original groove.

The completed weld shall be thoroughly brushed and cleaned. Peening of weld layers or passes may be used to prevent undue distortion. Surface layers and the first pass in groove welds shall not be peened. Peening, when required, shall be performed with light blows of a hammer, using a blunt nosed tool. Any chipping at the root of welds and chipping of welds to remove defects shall be performed with a round nosed tool or by gas gouging.

All field welds and test coupons must be clearly marked by stencils to identify the welder and the tests for which the coupons are intended. The CONTRACTOR shall keep a record of all symbols and numbers. All welds must present a neat and clean appearance free of cracks, inadequate penetration, burn through or other obvious defects. Undercutting adjacent to the final bead shall not exceed 1/32 inch.

Coupons for all tests may be flame cut from the weld, but all necessary notching and machining of coupons shall be done in the testing laboratory.

The use of water for quenching any weld is prohibited.

The CONTRACTOR shall, at his expense, cut welds from the line, as directed by the ENGINEER, for the purpose of testing. After welds are removed from the line, coupons will be cut around the circumference of the pipe and tested as outlined in paragraph 3.1.13(A) above. The CONTRACTOR shall bear the cost of replacing defective welds discovered by test or radiographic inspection.

- (E) Field Coating of Welded Joints and Repair of Damaged Coating Areas. The field coating procedure for welded steel pipe, fittings, associated appurtenances, and joints installed underground shall be the procedure contained in NAPCA Bulletin 6-69-90-5, and any subsequent revisions

thereto, using heat shrinkable materials, such as 3M “Scotchkote” Brand 206P hot melt patch compounds, or Raychem WPCT Thermofit, or approved equal; or a cold-applied coating in 3” wide tapeform, such as Tapecoat CT, manufactured by the Tapecoat Company, Evanston, Illinois 60204, Grace Servi-Wrap, or approved equal; or the following:

- (1) The pipe and weld shall be cleaned of any scale, dirt or foreign matter. All charred and damaged coating areas shall be abraded by hand filing or use of carborundum cloth.
- (2) A two part, 100% solids, liquid epoxy compound specified by the manufacturer of the coating material shall be applied to the abraded areas. Application shall be made to a minimum thickness of 25 mils and shall overlap undamaged area a minimum of 0.5 inches.
- (3) The liquid patch compounds shall not be applied when the pipe temperature is below 50°F unless provisions are made for heat curing the patch material using methods and temperatures in accordance with the procedures recommended by the coating manufacturer.
- (4) The CONTRACTOR shall furnish low-pulse electronic Holiday Detectors of a type approved by the ENGINEER, and shall check all coating applications with the detector prior to lowering pipe into the trench. All holidays found shall be repaired and such repairs shall again be tested with the detector to make sure the repairs are effective.

The ENGINEER, at his discretion, will inspect both visually and with a Holiday Detector, the coating and repair areas. Any coating showing defects of “Holidays” shall be repaired according to the foregoing SPECIFICATIONS for repairing damaged coating areas.

3.1.14 INSTALLING P.E. PIPE. All P.E. gas mains shall be installed in strict accordance with the manufacturer’s recommendation.

The manufacturer of the type of pipe furnished shall furnish a qualified factor representative for a minimum of three full working days to train, observe and qualify the CONTRACTOR’S personnel on the proper method of joining and installing every size of pipe and the associated fittings to be used on the job in accordance with applicable Department of Transportation (DOT) regulations.

The CONTRACTOR and the factory representative shall coordinate these days in order to assure that the representative is on the job at the start of the laying of each different size pipe by the CONTRACTOR.

On P.E. service lines and mains, each valve will be supported by an 80-pound bag of "Sackrete" concrete mix.

Heat fused P.E. pipe shall be snaked in the trench. Backfill shall not be placed on any plastic pipe while it is in a heated condition. Cooling of the pipe by an approved method will be required by the ENGINEER, if necessary.

Set time for newly assembled heat fused joints shall be as follows:

10	Minutes minimum	@	60°F to 90°F
11	Minutes minimum	@	40°F to 60°F
12	Minutes minimum	@	25°F to 40°F

3.1.15 FIELD CUTTING OF PIPE. Field cutting of all pipes shall be accomplished by a method approved by the ENGINEER. Any section of pipe, which is damaged during the cutting cooperation, will be rejected.

3.1.16 SETTING OF VALVES AND FITTINGS. Settings of valves and fittings shall be in accordance with USAS B31.8, except as modified for P.E. pipe in Paragraph 3.1.14 of these SPECIFICATIONS.

3.1.17 INSTALLING SERVICE ASSEMBLIES. All essential details of construction of the service assemblies to be installed are indicated on the PLANS; these DRAWINGS shall be followed carefully. The labor, materials and equipment required to be furnished by the CONTRACTOR for each service assembly shall depend on the installation size, type and meter setting.

The CONTRACTOR shall set each service assembly where shown on the PLANS or as directed by the ENGINEER. The PLANS will indicate whether the existing meter and/or regulator in the proposed service assembly are to be refitted and used at the relocation point.

Existing meters and regulators, not to be refitted, used again or relocated, shall be delivered to the City of Alexandria Gas Department, accompanied by a "Gas Service Ticket", furnished by the CONTRACTOR, detailing the location from which it was removed, old meter number, new meter number, etc. All existing gas service lines, which are not to be re-used, shall be cut and capped below natural ground surface.

The CONTRACTOR shall not set the service assemblies until all the mains have been cleaned, tested, purged and approved by the ENGINEER.

(A) SERVICE ASSEMBLY TYPE I. Service Assembly Type I as detailed on the PLANS shall be for those instances where an existing service assembly with a 275, 415, 750 and/or 1600 cubic feet per hour (CFH) meter setting is to be refitted, relocated, and/or replaced.

The CONTRACTOR shall disconnect and dismantle the existing service assembly. The CONTRACTOR shall furnish the materials; install the Owner's existing or new meter, regulator, and service assembly as shown on the PLANS.

Prior to ordering new meters, the CONTRACTOR shall ascertain from the City of Alexandria Gas Superintendent the new meter numbers to be assigned to each new meter for stamping by the manufacturer.

The Scope of Work for "Service Assembly Type I" shall include all the necessary labor, materials and equipment, field taps, tapping tees, saddles, curb stops, curb stop boxes, riser, regulator, or other incidental devices required to connect the service line to the distribution main; disconnect, refit and/or relocate, reassemble and connect the service assembly to the service line; and connect the customer's piping to the service line. All new service line required to complete the installation shall be paid for separately. Should a new meter be required, the new meter shall be measured the number of meters required and shall be included in the pay items for Gas Service Meters.

- (B) SERVICE ASSEMBLY TYPE II. Service assembly Type II as detailed on the PLANS shall be for those instances where no service assembly exists.

The CONTRACTOR shall furnish and install the components, fittings, etc. for the size and type of service assembly set up as detailed on the PLANS.

The Scope of Work for "Service Assembly Type II" shall include all the necessary labor, materials and equipment, field taps, tapping tees, saddlers, curb stops, curb stop boxes, or other incidental devices required to connect the service line to the distribution main; and to connect the service assembly set-up to the service line. All service line required to complete the installation shall be paid for separately.

- (C) GAS METERS. Where required, new gas meters shall be furnished and installed in accordance with these SPECIFICATIONS. New gas meters shall be measured by the type and number furnished and installed. The meters shall be installed with the Service Assemblies which shall be paid separately.

- 3.1.18 HOT TAP CONNECTIONS OF MAINS. All gas main hot tap connections shall be for those instances where said gas mains to be tapped and/or connected are active and under existing gas system pressure. The CONTRACATOR shall furnish the labor, materials (Such as all P.E. and steel fittings, transition fittings,

weld caps, stopple fittings, three way tees, etc.) and equipment required for each hot tap connection.

- 3.1.19 INSTALLING PIPE-DIRECTIONAL BORE METHOD. At least 7 days prior to mobilizing equipment the CONTRACTOR shall submit his detailed installation plan and profile of the bores and be plotted at a scale no smaller than 1" = 20' horizontal and vertical. The plan shall also include a list of major equipment and supervisory personnel and a description of the methods to be used.

Directional drilling and pipe installation shall be done only by and experienced contractor specializing in directional drilling and whose key personnel have at least five (5) years experience in this work.

Joining shall be performed by thermal butt-fusion in accordance with the manufactures recommendations.

All polyethylene pipe shall be cut, fabricated and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe.

Pipe shall be joined to one another by means of thermal butt-fusion. Polyethylene Pipe lengths to be joined by thermal butt-fusion shall be of the same type, grade and class of polyethylene compound and supplied from the same raw material supplier.

The CONTRACTOR shall install the pipelines by means of horizontal directional drilling. The CONTRACTOR shall assemble, support and protect the pipeline prior to installation in the directional drill tunnel. Horizontal directional drilling shall consist of drilling a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directional drilled installation will be determined by the CONTRACTOR, subject to the requirements of these SPECIFICATIONS.

Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the CONTRACTOR. The maximum allowable pull exerted on the HDPE pipelines shall be measured continuously and limited to the maximum allowed b the pipe manufacture so that the pipe or joints are not over stressed. A swivel shall be used to connect the pipeline to the drill pipe to prevent torsional stresses from occurring in the pipe. The lead end of the pipe shall be closed during the pullback operation.

During the drilling, reaming or pullback operations, the CONTRACTOR shall make adequate provisions to handle the drilling fluids or cuttings at the entry and exits pits. The drilling fluids and cuttings shall be removed from the site and disposed of legally. After completion of the directional drilling work, the entry and exit pits shall be restored to original condition.

After the pipe is in place, cleaning pigs shall be used to remove residual water and debris. After the cleaning operation, the CONTRACTOR shall provide and run a sizing piig to check for anomalies in the form of buckles, dents, excessive out-of-round, and any other deformations. The sizing pig run shall be considered acceptable if the test results indicate that there are no sharp anomalies greater than 2 percent of the nominal pipe diameter or excessive out-of-round greater than 5 percent of the nominal pipe diameter.

- 3.1.20 INSTALLING PIPE-BORING AND JACKING METHOD. When shown on the Plans, lines installed under this contract which require crossing under public highways, paved roads, streets, or driveways shall be installed by the jacking and boring method. The installation of utility pipe and the boring and jacking method shall be in accordance with A.R.E.A. Specifications, pages 1-4-18 thru 1-4-24.

The excavation of all approach pits and trenches within the right-of-way of the highway or railroad shall be of sufficient length from the street or railroad tracks to permit traffic to pass without interference. All backfill on the approach pits and trenches within the right-of-way shall be tamped in layers a maximum of six (6) inches thick for the entire length and depth of the trench or pit.

The backfill, in non-traffic areas, shall be compacted to 90% of maximum density obtained at optimum moisture as determined by AASHTO T180-57, Method A. Mechanical tampers may be used after a cover of six (6) inches has been obtained over the top of the barrel of the pipe.

The boring operation shall be accomplished using a commercial type boring rig and the hole made by the installation shall be of the same diameter (within two (2) inches) as the largest outside joint diameter of the pipe installed.

In the event sub-surface operations result in injury or damage to the pavement, repairs to this pavement shall be made by the CONTRACTOR, at no additional cost to the Owner. In the event paving cracks on either side of the pipeline, or is otherwise disturbed or broken due to the CONTRACTOR'S operations, he shall repair or replace same at his own expense without further compensation.

- 3.1.21 INSTALLING CASING PIPE. When shown on the PLANS, the CONTRACTOR shall furnish and install all utility mains perpendicular to and under railroad tracks and roadways in a casing pipe. This casing shall be complete with end seals, vent pipe, and other specials required to install the main in the casing. All installations shall be in accordance with these SPECIFICATIONS and the requirements of the railroad or roadway, as applicable.

Unless otherwise specified the casing pipe shall be installed by the boring and jacking method in conformance with Paragraph 3.1.20 of these SPECIFICATIONS.

3.1.22 FIELD CLEANING, TESTING AND PURGING. The field cleaning, testing and purging operations shall be applied to the whole or individual valved- off sections of the high pressure distribution mains (feeder mains), distribution mains and service lines either before or after the trench is backfilled, as directed by the ENGINEER.

The CONTRACTOR shall furnish the equipment, gauges, meter, gas and other material, tools, labor and other necessary assistance for conducting the field cleaning, testing and purging operations.

The ENGINEER shall be notified at least 48 hours in advance of the field cleaning, testing and purging operations. The cleaning, testing and purging of all lines shall conform to the requirements of USAS B31.8, except as modified below:

(A) CLEANING. Prior to conducting the pressure tests, all gas mains, service assemblies, fittings and/or service lines to be connected thereto shall be blown clear by the use of compressed air and this cleaning operation shall continue until these lines and/or fittings are cleared to the satisfaction of the ENGINEER.

At no time will compressed air be used without a dehumidifier. The lines shall then be pigged with approved foam pigs to demonstrate unrestricted clearance of all 2" size and larger mains.

(B) TESTING. All gas mains, services and service assemblies shall be tested as follows:

- (1) Distribution System Mains and Service Lines:
  - (a) Gas mains larger than 1" IPS Diameter – 100 psi for 24 hours with no pressure loss.
  - (b) Piping from the gas main including the service line to the valve on the upstream side of the service assembly, 100 psi for 24 hours with no pressure loss.
- (2) Any leak developing during any test shall be repaired, the lines and/or fittings made tight and the test repeated until successful.
- (3) All tests on the gas mains larger than 1" IPS diameter and the service line from the gas main to the valve on the upstream side of the service assembly shall be recorded by a pressure recorder with 10

inch dial and 24 hour charts which will clearly indicate a differential on one (1) pound.

- (C) PURGING. Prior to delivery of natural gas to the system, all gas mains, service lines, service assemblies and/or the associated fittings shall be purged with natural gas. This is to be performed through the use of the Owner's Gas paid for by the CONTRACTOR in a manner of procedure as approved by the City of Alexandria Gas Department and the ENGINEER.

At no time shall any valve in the system be subjected to gas pressure on one side and air pressure on the other. Blind flanges shall be used to prevent this condition from occurring.

When gas is delivered to the system, all fittings shall be checked for tightness with a soap-water solution. No gas leaks will be allowed.

Results of the tightness tests shall be recorded and a copy given to the ENGINEER.

Should the amount of leakage exceed that specified, the CONTRACTOR shall, at his expense, locate and repair the defective joints until the leakage is within the specified limits.

The cost for field cleaning, testing and purging shall be included in the unit price bid per foot of pipe.

- 3.1.23 WITNESSING OF TESTS. The cost of witnessing a test by the ENGINEER shall be borne by the Owner one time. The cost of witnessing re-tests of sections which fail the initial test will be deducted from CONTRACTOR payments for compensation of the ENGINEER.

- 3.1.24 GAS SERVICE INTERRUPTIONS. WORK shall be performed such that gas service will not be interrupted, if possible, throughout this contract. Whenever it becomes necessary to "Kill" a section of line, the CONTRACTOR shall cooperate fully with the City of Alexandria Gas Department Personnel.

The CONTRACTOR shall be responsible for checking each house, store, building, etc. in advance to insure that its owner or occupant is or will be available during anticipated gas service interruptions.

Prior to refitting and/or relocating the existing service assembly and connecting the service lines to said service assembly and the customer's piping, the CONTRACTOR shall turn off all pilot lights served by said service assembly.

After the customer's piping has been reconnected, the CONTRACTOR is responsible for determining that it is safe to turn on the gas, and re-lighting all pilot lights served by said service assembly.

The CONTRACTOR shall be responsible for coordinating his work with the City of Alexandria Gas Department personnel. Under no circumstances will the CONTRACTOR turn on the gas to a customer's piping until the CONTRACTOR has determined that it is safe to do so and without the full knowledge of the City of Alexandria Gas Department personnel. The CONTRACTOR shall align his WORK schedule to accommodate the City of Alexandria Gas Department.

3.1.25 GAS SYSTEM SWITCHOVER. CONTRACTOR shall schedule his work such that the switchover from the existing system to the new system shall be at minimum inconvenience to the Owner and its customers.

At no time will a new gas main be connected to existing customer until it has been tested and accepted by the Owner and the ENGINEER. Should the CONTRACTOR elect to connect customers to portions of the new system prior to completion of entire system, such connections shall not relieve him of the responsibility of completing his contract as required by the PLANS and SPECIFICATIONS. Portions so connected or turned over to the Owner will not relieve the CONTRACTOR of his responsibilities under the contract until the entire project is completed, tested and accepted.

3.1.26 PURGING, FLOODING AND ABANDONMENT OF EXISTING GAS LINES.

Where noted on the Plans, existing gas lines are to be abandoned. At that time when all services have been transferred to the new main and all interconnections have been completed, the existing main to be abandoned shall be disconnected from the main feed point and gas purged from the line by flooding and filling with water. When all flooding is complete, the line shall be tightly capped.

This work to be completed at "No Direct Pay."

3.1.27 "RED DIRT" BACKFILL. Where shown on the PLANS, the CONTRACTOR shall furnish and install "Red Dirt" backfill material. "Red Dirt" material shall conform to Section 330-02 "Embankment" of these SPECIFICATIONS. The degree of compaction shall be as specified in paragraph 3.1.28.

3.1.28 SPECIAL FOUNDATION (TYPE 2 STANDARD PIPE FOUNDATION). Where shown on the PLANS, all pipe shall be supported by a special foundation and bedding detailed as "Type 2" on the PLANS. The special foundation and bedding shall be 4" of washed gravel installed under the pipe.

The gravel shall be clean, free from clay, sticks, or other deleterious substances, meeting the following gradation:

Sieve	Percent Passing by Weight
3/4"	100
5/8"	95-100
No. 4	0-7

### 3.1.29 TRENCH BACKFILL AND COMPACTION.

- (A) Outside Street Surfaces and Shoulders. The backfill in the trench above the pipe shall be placed in layers and compacted to prevent settlement of the trench. Prior to the final acceptance of the pipeline, the trench shall be level with the surrounding natural ground.
- (B) Inside Street Surfaces, Other Paved Areas and Street Shoulders. The backfill in the trench above the pipe zone and bedding shall be placed in lifts not to exceed six inch compacted layers and compacted to 95% of standard density when measured by AASHTO T99.

The trench shall be compacted for a depth of 2'-0" above the top of the pipe using hand tamps or hand mechanical tamps before the use of a wheel type device or a hydro-hammer is used for compaction purposes.

### 3.1.30 REPLACING STREET SURFACE AND SIDEWALKS. In all paved or unimproved streets, the surface of the trenches shall be finished without any needless delay and in the best workmanlike manner with the same kind of roadway or sidewalk improvement that was removed in excavating the trench.

Should the CONTRACTOR fail or refuse to repair any such damage, the Owner may after twenty-four (24) hours written notice, employ such personnel and furnish such materials as may be necessary and do the WORK, deducting the actual cost thereof from any amounts due or to become due to the CONTRACTOR.

The CONTRACTOR shall be obligated to maintain and keep in good condition any replacement of base, street surfacing or sidewalks from the time of installation until final acceptance of the WORK.

The replacement of all street surfaces shall be in accordance with the Details shown on the PLANS.

### 3.1.31 CLEANING UP, REMOVING SURPLUS EARTH, ETC. As soon as the backfilling of any excavation is completed, the CONTRACTOR must at once begin the removal of all surplus dirt. Except dirt that is necessary to correct settlement of the initial backfilling operations.

He shall remove all pipe and other material placed or left on the street or right of way by him except material needed for the replacement of the paving. The street shall be opened and made passable for traffic. Following the above WORK, the repairing and complete restoration of the street surfaces, bridges, crossings and all places affected by the WORK shall be done as promptly as possible.

Any surplus earth which may be left on the street or right of way after the excavations have been completely refilled shall be regarded as the property of the CONTRACTOR and must be removed as soon as possible at his own expense except that in un-graded streets, it shall be optional with the ENGINEER whether surplus material shall be removed or deposited on the surface and graded for the convenience of traffic.

#### **4.1 MEASUREMENT.**

- 4.1.1 **GENERAL.** Except the minor modifications, the following SPECIFICATIONS are as developed by the Specifications Committee of the American Public Works Association, Louisiana Chapter and the Associated General Contractors, Louisiana Highway and Heavy Construction Branch.
- 4.1.2 **GAS PIPE.** Gas pipe will be paid for by the lineal foot according to size and type. Gas pipe will be measured by the lineal foot of pipe placed, tested, and accepted without deductions for the space occupied by valves, fittings or between either, and stub end of line being measured.
- 4.1.3 **STEEL PIPE FITTINGS.** Steel pipe fitting will be paid for by each listed in the bid form. Fittings other than steel will not be paid for separately, but will be included in the unit price bid per lineal foot of pipe, unless a specific bid price is requested on the Proposal Form. Steel fittings will be measured per each installed, tested, and accepted. No measurement will be made for welding.
- 4.1.4 **VALVES AND VALVE BOXES.** Valves and valve boxes will be paid for as a unit for valves with valve boxes together. Valves with valve boxes together, as a unit, will be measured by an actual count of each size, installed, tested, and accepted. The unit bid shall include any necessary joint adapters for connecting valves into the system, including the concrete pad around the valve box top.
- 4.1.5 **GAS SERVICE ASSEMBLIES.** Gas service assemblies will be paid for per each, according to size and type. Connectors and couplings shall be included in the unit price bid per foot of pipe. Gas service pipe will be measured by the linear foot according to size and type. This length of measurement shall be actual centerline length of pipe installed and accepted.
- 4.1.6 **GAS SERVICE PIPE.** Gas service pipe will be paid for, when specified, by the linear foot according to size and type. Connectors and couplings shall be

included in the unit price bid per foot of pipe. Gas service pipe will be measured by the linear foot according to size and type. This length of measurement shall be actual centerline length of pipe installed and accepted.

- 4.1.7 CASING PIPE – JACKING AND BORING METHOD. According to the SPECIFICATIONS and as indicated on the PLANS, the CONTRACTOR shall install pipe casings by jacking and boring to receive the gas carrier line. The CONTRACTOR will be paid on the basis of the unit price for furnishing and installing the casing.

Casing pipe, installed and accepted, will be measured by the linear foot. The quantity obtained will be the centerline length of the casing installed and accepted.

- 4.1.8 CASING PIPE – LAID IN OPEN CUT. According to SPECIFICATIONS and as indicated on the PLANS, the CONTRACTOR will install pipe casings, laid in open cut, to receive the gas line. The CONTRACTOR will be paid on the basis of the unit price for furnishing and installing the gas pipe in addition to the unit price under this item for furnishing and installing the casing. Casing pipe installed and accepted, will be measured by the linear foot. The quantity obtained will be the centerline length of the casing installed and accepted.

- 4.1.9 INSTALLING PIPE – JACKING AND BORING METHOD. Installing pipe – jacking and boring method – will be paid for by the linear foot according to the size of pipe to be bored. The CONTRACTOR will be paid on the basis of the unit price for furnishing and installing the gas pipe in addition to the unit price under this item for installing pipe by the jacking and boring method.

Pipe installed by the jacking and boring method will be measured by the linear foot. The quantity obtained will be the centerline length of pipe so installed and accepted.

- 4.1.10 SPECIAL PIPE FOUNDATIONS. Special pipe foundations will be paid for by the cubic yard installed in accordance with the section shown on the PLANS.

Special backfill material, placed and accepted, will be measured by the cubic yard in approved vehicles at the point of delivery as installed on the project.

No measurement for payment shall be made for additional material necessary to correct unauthorized over-width or over-depth excavation.

- 4.1.11 “RED DIRT” BACKFILL MATERIAL. “Red Dirt” backfill material shall be measured by the cubic yard (vehicular measurement) as specified in Section 330 “Embankment” of these SPECIFICATIONS.

No measurement for payment shall be made for additional material necessary to correct unauthorized over-width or over-depth excavation.

- 4.1.12 NATIVE BACKFILL MATERIAL. The use of excavated native material for backfilling gas lines will not be measured for payment, but shall be included in the unit price of other items.
- 4.1.13 SHEETING AND BRACING LEFT IN PLACE. No separate payment will be made for sheeting and bracing left in place.
- 4.1.14 REMOVAL AND REPLACEMENT OF HIGHWAY, STREET, DRIVEWAY, AND SIDEWALK PAVEMENT AND CURBS. When no bore is shown on the PLANS, the CONTRACTOR shall install pipe under improved surfaces by the open trench method. Concrete street pavement shall be removed joint to joint. Asphalt and brick streets pavement shall be broken back by the open trench method. Sidewalks and driveways will be broken back to the nearest joint or to a neat saw-cut straight edge. Removal of existing pavement, curbs and sidewalks shall be paid as specified in Section 320 of these SPECIFICATIONS.

Measurement for Replacement shall be in accordance with the specific bid item pertaining to the type of surfacing replaced. The various bid items are listed in the Master Bid Item (Roadway) Section and the Section of these Standards Specifications associated with the Items.

Removal and replacement of surfacing of gravel or limestone streets and driveways cut by trenches for installation of pipe will be measured by the cubic yard of gravel or limestone placed, bladed and accepted. Gravel or limestone will be placed only at the direction of the ENGINEER, and actual invoice records on quantities of material placed will be used for measurement.

- 4.1.15 CONCRETE SURFACES TO BE SAWED. Where called for on the PLANS or where designated by the ENGINEER, existing concrete or paved surfaces shall be neatly saw cut in a straight line to allow for creation of a neat repair patch. Saw cutting of existing pavement may be used wherever WORK is performed on sections of pavement that does not necessitate full removal of an entire concrete panel and at all asphaltic concrete street excavations. Concrete surfaces to be sawed will be paid for by the lineal foot. Concrete surfaces (streets, driveways, sidewalks, etc.) to be sawed will be measured by the actual linear foot sawed. (Note: When sawing both sides of a trench, both sides will be measured.) When a separate bid item for Saw Cut Asphalt pavement is in the Bid Documents, this quantity will be measured by the foot separately. The measurement shall be in accordance with Section 320 of these SPECIFICATIONS.
- 4.1.16 CLEARING AND GRUBBING. No separate payment will be made for clearing and grubbing work.

- 4.1.17 REMOVAL AND REPLACEMENT OF CULVERT PIPES. No separate payment for removal and replacement of culvert pipes disturbed by gas line excavations will be paid.
- 4.1.18 HOT TAP CONNECTIONS OF MAINS. All gas main hot tap connections will be measured by the actual count of each connection according to size, installed and accepted. The price shall be for a complete hot tap connection as specified.
- 4.1.19 SPECIAL LUMP SUM – METER/REGULATOR STATION, REGULATOR STATION OR REGULATOR STATION SCADA AND TELEMETRY REMOTE SYSTEM. The meter/regulator station, regulator station or regulator station SCADA and telemetry remote system for which a separate lump sum price is requested will be paid for per each. The price shall be for a complete installation as specified and detailed on the PLANS. All special lump sum meter/regulator stations, regulator stations, or regulator station SCADA and telemetry remote systems will be measured per each, installed, tested and accepted.
- 4.1.20 SPECIAL LUMP SUM – RAILROAD CROSSINGS, ROADWAY CROSSINGS, CANAL CROSSINGS AND LEVEE CROSSINGS, ETC. Crossings for which separate lump sum prices are requested will be paid for per each. The price shall be for a complete installation of the gas main portion as specified and detailed on the PLANS. The lump sum crossings will be measured by an actual count of each crossing installed and accepted.
- 4.1.21 SPECIAL LUMP SUM – GAS SEPARATOR WITH CONCRETE VAULT. Gas separator with concrete vault for which separate lump sum prices are requested will be paid for per each. The price shall be for a complete installation as specified and detailed on the PLANS. All special lump sum gas separators with concrete vaults will be measured by the actual count of each separator with vault installed and accepted.

## 5.1 PAYMENT.

- 5.1.1 GENERAL. Except for minor modifications, the following SPECIFICATIONS are as developed by the Specifications Committee of the American Public Works Association; Louisiana Chapter and the Associated General Contractors, Louisiana Highway and Heavy Construction Branch. Periodic estimates on all gas piping and appurtenances shall be paid at 75% of the contract unit price until tested.
- 5.1.2 GAS PIPE. Gas pipe, placed and accepted, will be paid for at the contract unit price per linear foot for gas pipe of the various sizes, types and classifications, which price and payment shall constitute full compensation for furnishing, hauling, installing complete, testing the pipe; for excavation, preparation of bed and backfilling, compaction and removing surplus earth; removing and replacing culvert pipe; transitional fittings; and for the furnishing of all equipment, tools,

labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Gas Pipe shall be as follows:

1210-01-(size)	PE Gas Main (size)	LF
1210-02-(size)	Steel Gas Main (size)	LF

- 5.1.3 STEEL PIPE FITTINGS. Steel pipe fittings, placed and accepted, measured as provided above, will be paid for at the contract unit price per each for steel pipe fittings, which price and payment shall constitute full compensation for furnishing, hauling, installing complete, testing; for excavation, preparation of bed and backfilling; concrete thrust blocks or anchors; and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Steel Pipe Fittings shall be as follows:

1210-03-(size)-(size)	Steel Gas Main 90 Deg. Bends (size)	EACH
1210-04-(size)-(size)	Steel Gas Tees (size to size)	EACH

- 5.1.4 VALVES AND VALVE BOXES. The number of valves or valves with valve boxes together, as a unit, installed and accepted, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling, installing complete and testing; for excavation and backfilling; and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Valves and Boxes shall be as follows:

1210-05-(size)	Steel Gas Valves (size)	EACH
1210-06-(size)	PE Gas Valves (size)	EACH

- 5.1.5 GAS SERVICE ASSEMBLIES. Gas service assemblies, in place and accepted, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling, and installing all material complete; for all excavation and backfilling; for all equipment, tools, taps, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Gas Service Assemblies shall be as follow:

1210-07-01-(size)	Gas Service Assemblies (Type 1)(size)	EACH
1210-07-02-(size)	Gas Service Assemblies (Type 2)(size)	EACH

- 5.1.6 GAS SERVICE METERS. Gas Service Meters, installed and accepted, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling, installing complete, including furnishing connectors, couplings, and testing in accordance with the PLANS AND SPECIFICATIONS.

Payment for Gas Service Meters shall be as follows:

1210-08-01	Gas Service Meters (275)	EACH
1210-08-02	Gas Service Meters (415)	EACH
1210-08-03	Gas Service Meters (750)	EACH
1210-08-04	Gas Service Meters (1600)	EACH
1210-08-05	Gas Service Meters (Capacity)	EACH

- 5.1.7 GAS SERVICE PIPE. Service pipe, placed and accepted, will be paid for at the contract unit price per linear foot, which price and payment shall constitute full compensation for furnishing, hauling, installing complete, including furnishing connectors, and couplings, testing the pipe; and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Gas Service Pipe shall be as follows:

1210-09-(size)	PE 3408 Gas Service Pipe (size)	LF
1210-10-(size)	Steel Gas Service Pipe (size)	LF

- 5.1.7 CASING PIPE – JACKING AND BORING METHOD. The actual total linear feet of casing, installed and accepted, will be paid for at the contract unit prices for casing pipe of various diameters, which price and payment shall constitute full compensation for furnishing, hauling and installing complete, for all excavation, boring, tunneling, jacking, and backfilling; and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Casing Pipe – Jacking and Boring Method shall be made as follows:

1210-11-(size)	Casing Pipe by Jack and Bore (size)	LF
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- 5.1.8 CASING PIPE – LAID IN OPEN CUT. The actual total linear feet of casing, installed and accepted, will be paid for at the contract unit price for casing pipe of various diameters, which price and payment shall constitute full compensation for furnishing, hauling and installing complete; for all excavation and backfilling; and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Casing Pipe – Laid in Open Cut shall be made as follows:

1210-12-(size)	Casing Pipe by Open Cut (size)	LF
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- 5.1.9 INSTALLING PIPE – DIRECTIONAL BORING METHOD. The cost of installing by the jacking and boring method will be paid for at the contract unit price for installing pipe of various diameters, which price and payment shall constitute full compensation installing complete, for all excavation, boring, jacking, and backfilling and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Installing Pipe – Directional Boring Method shall be made as follows:

1210-13-(size)	Directional Bore PE 3408 Gas Pipe (size)	LF
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- 5.1.10 SPECIAL PIPE FOUNDATIONS. Special pipe foundations, in place and accepted, will be paid for at the contract unit price per cubic yard (vehicular measurement) of gravel foundation and bedding, which price and payment shall constitute full compensation for furnishing, hauling, and installing all gravel, and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Special Pipe Foundations shall be paid as follows:

1210-14-01	Special Pipe Foundations	CY
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- 5.1.11 ”RED DIRT” BACKFILL. “RED DIRT” Backfill material, in place and accepted, will be paid for at the contract unit price per cubic yard (vehicular measurement in accordance with Section 320 “Embankment” of these SPECIFICATIONS.

Payment for “Red Dirt” Backfill shall be made as follows:

320-02	Embankment “Red Dirt”	CY
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- 5.1.12 SHEETING AND BRACING LEFT IN PLACE. No separate payment will be made for sheeting and bracing left in place.

- 5.1.12 REMOVAL AND REPLACEMENT OF HIGHWAY, STREET, DRIVEWAY, AND SIDEWALK PAVEMENT AND CURBS. Replacement of highway, street, driveway and sidewalk pavement in place and accepted will be paid for at the contract unit price per square yard for the various types of improved surfaces as shown in other sections of these SPECIFICATIONS. Replacement of surfacing of gravel or shell roads in place, bladed and accepted will be paid for at the contract unit price per cubic yard of gravel or limestone. Replacement of concrete curbs, in place and accepted, will be paid for at the contract unit price per linear

foot as shown in other sections of these SPECIFICATIONS. These prices and payment shall constitute full compensation for furnishing, hauling and installing all materials; for excavation and backfill compaction; sub-grade preparation; finishing and curing; and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Example:

910-06 Portland Cement Concrete Pavement (6" Thick) SY

Payment for Removal shall be made as per Section 320 of these SPECIFICATIONS.

Example:

320-01 Removal of Structures and Obstructions LS

5.1.14 CONCRETE SURFACES TO BE SAWED. Concrete surfaces (streets, driveways, sidewalks, etc.) sawed, approved and accepted, will be paid for at the contract unit price per linear foot for this item, which price and payment shall constitute full compensation for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Saw Cutting Concrete Surfacing shall be made as follows:

320-02 Saw Cutting Concrete Pavement LF

5.1.15 CLEARING AND GRUBBING. No separate payment will be made for clearing and grubbing.

5.1.16 REMOVAL AND REPLACEMENT OF CULVERT PIPES. Cost for the removal and replacement of culvert pipe will be included in the price bid for pipe. No additional payment will be made for new pipe necessary to replace culvert pipe broken or damaged while being removed and replaced unless authorized in writing by the ENGINEER.

5.1.17 HOT TAP CONNECTIONS OF MAINS. Hot tap connection of new mains to existing mains in place and accepted, will be paid for at the contract unit price per each according to size which price and payment shall constitute full compensation for locating the existing mains.

Preparation of bedding and backfilling, furnishing, hauling, and installing all material, including stopple fittings and three way tees, for removing and abandoning existing facilities, and for furnishing all equipment, tools, taps, labor

and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS.

Payment for Hot Tap Connections shall be made as follows:

1210-15-(size)-(size) Hot Tap (size) Gas Pipe to (size) Gas Pipe EACH

5.1.21 ITEMS TO BE FURNISHED TO OWNER. Items to be furnished to the OWNER shall be paid for at the lump sum contract price. The CONTRACTOR shall furnish a receipt signed by an authorized representative of the OWNER as evidence of delivery in good condition. The contract price and payment shall constitute full compensation for furnish, hauling, installing all material, and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS.

Payment for Items furnished by owner shall be made as follows:

1210-19-01 Items Furnished by Owner and Installed by Contractor LS

**SECTION 1220 WATER DISTRIBUTION MAINS AND APPURTENANCES**

- |          |   |      |  |
|----------|---|------|--|
| 1.1      | Description   | 3.3  | Inspection of Pipe before Installation               |
| 1.2      | Product Deliver, Storage and Handling                         | 3.4  | Installation of Water Pipe and Fittings              |
| 1.3      | Applicable Publications                                       | 3.5  | Pipe Laying  |
| 1.4      | Submittals  | 3.6  | Depth of Cover                                       |
|          |   | 3.7  | Installation of Polyethylene Wrap                    |
|          |   | 3.8  | Installation of #10 Gauge                            |
|          |   | 3.9  | Installation of Underground                          |
| <b>2</b> | <b>Products</b>   | 3.10 | Tapping Lines  |
| 2.1      | Water Pipe and Fittings                                       | 3.11 | Cutting and Capping Lines                            |
| 2.2      | Polyethylene Wraps  | 3.12 | Installation of Fire Hydrant                         |
| 2.3      | #10 Gauge Copper Stranded Wire                                | 3.13 | Remove and Salvage Existing                          |
| 2.4      | Wire Splice Kits  | 3.14 | Installation of Concrete Thrust                      |
| 2.5      | Valve and Valve Boxes (Underground)                           | 3.15 | Connection to Existing Line                          |
| 2.6      | Tapping Sleeves and Valves Assembly<br>And Valve Boxes        | 3.16 | Field Hydrostatic and Leakage                        |
| 2.7      | Service Assembly  | 3.17 | Installing Pipe-Boring and Jacking<br>Method         |
| 2.8      | Fire Hydrant Assembly   | 3.18 | Installing Casing Pipe                               |
| 2.9      | Compression Couplings   | 3.19 | Field Cleaning, Testing and Purging                  |
| 2.10     | Caps and Plugs  | 3.20 | Set-Up for Disinfecting of Water                     |
| 2.11     | Fill Material   | 3.21 | Disinfection of Water Mains by City of<br>Alexandria |
| 2.12     | Concrete for Valve Box Pads                                   | 3.22 | Disinfection of Fittings and Pipe at<br>Relocations  |
| 2.13     | Joint Restraints for PVC Pipe                                 | 3.23 | Cleaning Up, Removing Surplus<br>Earth, etc.         |
| 2.14     | Transitions for Small Diameter<br>Polyethylene Water Pipe     | 3.24 | Installation of P.E. Pipe by Directional<br>Bore     |
| 2.15     | Transitions for 6" to 12" Diameter<br>Polyethylene Water Pipe |      |  |
| <b>3</b> | <b>Execution</b>  |      |  |
| 3.1      | General   |      |  |
| 3.2      | Pipe Bedding Conditions                                       |      |  |

**4.1 Measurement****5.1 Payment**

**1.1 DESCRIPTION.** This section covers the installation of water main connections and related water works and piping as indicated on the PLANS and specified herein.

**1.2 PRODUCT DELIVERY, STORAGE AND HANDLING.**

1.2.1 Inspection of Material at Delivery Point.

- (A) When delivered to the site, and prior to unloading, the CONTRACTOR shall inspect all pipe, valves, valve boxes, and accessories for loss, damage or lack of specified identification and markings.

- (B) Any defective or improper material shall be immediately marked and shall not be unloaded. Defective or improper material shall not be considered for payment as material stored on or at the site.

1.2.2 Handling. In shipping, storing and installing pipe, valves and accessories shall be kept in a sound, undamaged condition. They shall, at all time, be handled with care and shall not be dropped, dumped or bumped against any other object. Any material(s) damaged shall be so marked and immediately removed from the jobsite.

1.2.3 Storing.

- (A) Pipe shall be stored off the ground on skids or pallets. Pipe shall be stacked with spigot ends projecting from the stack in opposite directions for alternate rows.

- (B) Valves, valve boxes, couplings, fittings, etc. shall be kept clean and dry.

1.2.4 Defective Materials. All materials found at any time during the progress of the work to have cracks, flaws, or other defects will be rejected and so marked and the CONTRACTOR shall promptly remove such defective material from the work site.

**1.3 APPLICABLE PUBLICATIONS.** The publications listed below form a part of this specification to the extent referenced. The publications may be referred to in the text by basic designation only.

1.3.1 American Water Works Association.

C104	Cement-Mortar lining for ductile-iron and gray-iron pipe and fittings for water.
C105	Polyethylene encasement for gray and ductile cast iron piping for water and other liquids.
C110	Gray-Iron and ductile fittings, 3" through 48" for water and other liquids.
C111	Rubber-Gasket joints for ductile-iron and gray-iron pressure pipe and fittings.
C150	Thickness design of ductile iron pipe.
C151	Ductile-iron Pipe, Centrifugally Cast in metal molds or Sand-lined molds, for water or other liquids.

- C153 Ductile-Iron Compact Fittings, 3" through 12" (75MM through 300 MM) for water and other liquids.
- C500 Gate valves, 3" through 48", NPS, for water and sewerage systems.
- C509 Resilient Seated Gate Valves, 2" through 12", for water and sewerage systems.
- C550 Protective interior coatings for valves and hydrants.
- C600 Installation of gray and ductile cast iron water mains and appurtenances.
- C605 Installation of Polyvinyl Chloride (PVC) pressure pipe and fittings for water.
- C900 Polyvinyl Chloride (PVC) pressure pipe, 4" through 12", for water.
- C901 Polyethylene (PE) pressure pipe and tubing, ¾" through 3", for water.
- C905 Polyvinyl Chloride (PVC) water transmission pipe, nominal diameter 14" through 36".
- C906 Polyethylene (PE) pressure pipe and fittings 4" through 36", for water distribution.

### 1.3.2 American Society for Testing and Materials.

- F714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
- D1784 Rigid Polyvinyl Chloride (PVC) compounds and chlorinated Polyvinyl Chloride (PVC) compounds.
- D2241 Polyvinyl Chloride (PVC) plastic pipe (SDR-PR).
- D2737 Specifications for Polyethylene (PE) plastic tubing.
- D3139 Joints for plastic pressure pipes using flexible elastomeric seals.
- D3350 Standard specifications for Polyethylene (PE) plastic pipe and fittings material.

### 1.4 **SUBMITTALS.** The CONTRACTOR shall provide submittals for any and all

variances or substitutions. Samples and product data and literature shall be submitted as required by this Section.

- 1.5 QUALITY ASSURANCE.** All pipe, valves, fittings and accessories shall be furnished by manufacturers who are fully experienced, reputable, and qualified in the manufacture of the material to be furnished.

**2 PRODUCTS.**

**2.1 WATER PIPE AND FITTINGS.**

**2.1.1 Plastic Water Pipe and Fittings (Push-On Joints).**

- (A) Plastic Water Pipe (Push-On Joints). Plastic water pipe shall be polyvinyl chloride (PVC) conforming to ASTM D1784 and ASTM D2241, latest revisions, with integral bell push-on gasket joint conforming to ASTM D3139. The requirements for the specific type of plastic pipe to be used shall be as given below unless otherwise noted on the PLANS.

12" PVC - (AWWA C-900) DR 18 Class 150

10" PVC - (AWWA C-900) DR 18 Class 150

8" PVC - (AWWA C-900) DR 18 Class 150

6" PVC - (AWWA C-900) DR 18 Class 150

4" PVC - (AWWA C-900) DR 18 Class 150

The pipe shall have an integral bell, rubber gasket joint and shall be capable of direct tapping. The PVC pipe shall be approved by the National Sanitation Foundation (NSF) for potable water pipe and the NSF stamp shall be inclusive on the pipe furnished along with the normal size O.D., pressure class, dimensional ratio, and the manufacturer's name or trademark which may be Certain Teed Corporation, J.M. Corporation, North American, or approved equal.

- (B) Fittings for PVC Pipe. Fittings that are 3" in diameter or larger may be either mechanical joint regular body or short body (S.S.B.) fittings, unless otherwise shown on the PLANS. All fittings shall be made of ductile cast iron with pressure rating of 350 PSI, cement lined and asphalt coated. All fittings shall also meet or exceed ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 specifications and shall be manufactured by Tyler Pipe or Union Foundry or approved domestic equal. Fittings 2" and smaller, unless otherwise shown on the Drawing, shall be PVC (Schedule 40) gasketed fittings manufactured by the Harrington Corporation of Lynchburg, Virginia or approved equal. Ductile cast iron fittings shall be wrapped with an 8-mil thickness black polyethylene wrap.

**2.1.2 Polyethylene Plastic Pipe (PE) and Fittings.** Polyethylene Plastic Pipe

classification 3408 shall be manufactured to AWWA C901, AWWA C906, ASTM F714, and NSF standards as applicable. Fittings for PE pipe shall be polyethylene, butt-fusion type manufactured by the same manufacturer as the pipe and of the same material specification. Transition fittings for connection to Ductile Iron fittings shall be ductile iron pipe size adapter kit acceptable to the pipe manufacturer and approved by the ENGINEER. Polyethylene Plastic Pipe used for water systems shall be permanently marked with the identifying **color blue or with blue stripes**.

- (A) 3/4", 1", 1-1/2" Polyethylene Plastic Pipe (PE). shall be PE 3408, (CTS), SDR 9 conforming to ASTM D2737 and approved by the National Sanitation Foundation for potable water use and meet AWWA C901 specifications. The PE tubing shall be rated for use with water at 73.4° F at a maximum working pressure of 200 psi. The PE water service tubing shall be Driscopipe 5100 - Ultra Line manufactured by Phillips Driscopipe, Inc., or "Plexco Bluestripe" as manufactured by Chevron Chemical Company or approved equal.
- (B) 2" thru 3" Polyethylene Plastic Pipe (PE). shall be PE 3408, (IPS), SDR 11 conforming to ASTM D2737 and approved by the National Sanitation Foundation for potable water use and meet AWWA C901 specifications.
- (C) 4" thru 36" Polyethylene Plastic Pipe (PE). shall be PE 3408, (DPS), SDR 11 conforming to ASTM D3350 and approved by the National Sanitation Foundation for potable water use and meet AWWA C906 specifications.

### 2.1.3 Ductile Iron Pipe and Fittings.

- (A) Pipe. Sizes 4" through 24" – Ductile iron pipe shall comply with AWWA C151 (ANSI A21.51), Thickness Class 51 unless otherwise specified. Provide pipe interior with a cement mortar lining conforming to AWWA C104 (ANSI A21.4), and exterior of pipe with the manufacturer's standard bituminous coating applied by the airless spray method.
- (B) Fittings. Ductile iron fittings shall have a minimum pressure rating of 150 psi and comply with AWWA C110 or AWWA C153 (ANSI Standard A21.10) cement lined and outside coated as specified above for ductile iron pipe. Use fittings with mechanical joints, or manufacturers restrained joints for underground use as indicated, and flanged joints for above ground use.
- (C) Joints.
  - (1) Mechanical Joints. Joints shall comply with AWWA C111 (ANSI A21.11), with bolts and nuts machined true and nuts trapped at right angles to a smooth bearing surface. Use bolts of high

strength, annealed cast iron or high strength low alloy steel, T-head type having hexagonal nuts.

Bolts and nuts for mechanical joints shall be Cor-Ten T Bolts as manufactured by NSS Industries of Plymouth, Michigan (1-800-221-5125) or an approved equal.

- (2) Push on Joints. Joints with single seal gasket shall comply with AWWA C111 (ANSI A21.11) and equal to Tyton, Fastite, Super Bell Tite, Altite or an approved equal.
- (3) Restrained Joints. The CONTRACTOR shall submit a detail, to the Owner's Representative, of the type of restrained joints used on a project if other than that specified on the PLANS. Restrained joints shall be provided for all water pipe at changes in direction of eleven and one-quarter degrees ( $11\text{-}\frac{1}{4}^{\circ}$ ) or greater.
- (4) Gaskets. Vulcanized crude rubber or polyvinyl chloride plastisol with plain tips unless otherwise specified.

**2.2 POLYETHYLENE WRAP.** All ductile iron water pipe, valves and fittings shall be installed with 8 mil thick black polyethylene sheeting wrap in accordance with AWWA C105, secured to the pipe by methods approved by the ENGINEER. Film shall be Class "C" -Black, with a minimum nominal thickness of .008 (8 mils). Tape for securing the film shall be thermoplastic material with a pressure sensitive adhesive face capable of bonding to metal, bituminous coating and polyethylene. Tape shall have a minimum thickness of 8 mils, and a minimum width of (1") one inch. The polyethylene film envelope shall be free as is commercially possible of gels, streaks, pinholes, particles of foreign matter, and undispersed raw materials. There shall be no other visible defect such as holes, tears, blisters, or thinning out at folds. Manufacturers shall furnish a certification of conformance of the material to the requirement of AWWA C105 or ANSI A21.5. The polywrap shall be as manufactured by Dupont or approved equal. The tape shall be Scotch Wrap No. 50 or approved equal.

**2.3 #10 GAUGE COPPER STRANDED WIRE.** #10 gauge stranded copper wire installed over polyethylene and PVC pipe for detection purposes shall be copper wire, Type TW, A.W.G. #10 gauge stranded.

**2.4 WIRE SPLICE KITS.** Wire splices shall be Direct Bury Splice Kit, ID # 08-6105-9435-2, Part No. 500-54007-496965 as manufactured by 3M Electrical Products Division of Austin, Texas 78769-2963 or an approved equal.

**2.5 VALVE AND VALVE BOXES (UNDERGROUND).**

2.5.1 Line valves 3" or larger shall be resilient seated wedge type, iron body, bronze

mounted (IBBM), non-rising stem with "O" ring stem seals, open left with 2" square operating nut and with mechanical joint ends unless otherwise noted in the DRAWINGS. All gate valves shall comply with the latest revision of the AWWA Gate Valve Standard C-509 for double disc bronze mounted gate valves or with the latest revision of the AWWA C-550. Gate valves shall be rated as follows:

Diameter	Working Pressure	Hydrostatic Test Pressure
3" – 12"	200 PSI	400 PSI
14" – 42"	150 PSI	300 PSI

Testing shall conform to AWWA C-500. Resilient seated gate valves 3" through 12" shall be rated for zero leakage at the rated working pressure. Testing shall conform to AWWA C-509. Gate valves shall be as manufactured by Mueller, M & H or approved equal.

The 2" valves shall be Model A-2360-2 manufactured by Mueller Company or Style 4067-07 manufactured by M & H Valve Company or approved equal.

Line valves smaller than 2" shall be Model B103 manufactured by Stocham Company or approved equal.

- 2.5.2 Valve boxes shall be three (3) piece adjustable, five and one-quarter inch (5-1/4") shaft diameter, high grade screw-tube cast iron valve boxes as manufactured by the Mueller, Model H-1301-1 or Tyler Series 6850 or approved equal. The cast iron base shall be large enough to fit completely over the valve bonnet and the valve box cover shall have the word "Water" embossed on the topside of its cover.
- 2.5.3 Iron bodied gate valves shall be wrapped with an 8 mil thickness black polyethylene wrap.

## **2.6 TAPPING SLEEVES AND VALVES AND VALVE BOXES.**

- 2.6.1 Tapping sleeves for 12" and smaller water mains shall be of steel with epoxy coating and stainless steel bolts, style FTS, as manufactured by Ford or an approved equal, mechanical joint end connections, 200 psi maximum working pressure, designed to meet or exceed AWWA Standards. Sleeve section shall be sized for the pipe on which it is to be mounted as verified by the CONTRACTOR. The outlet or branch shall be flanged for acceptance of the companion-tapping valve. Gaskets shall be plain ends for use on cast iron or PVC mains.

- 2.6.2 Tapping sleeves for 14" and larger water mains shall be as listed above or may be constructed of Grade 18-8 Type 304 Stainless Steel and be of the split sleeve design style FTSS, as manufactured by Ford or an approved equal. Sleeves shall be provided with a gridded gasket, which totally surrounds the pipe to be tapped. The gasket shall be composed of virgin GPR conforming to ASTM D2000-80M 4AA607. The sleeves shall be manufactured to withstand a maximum working pressure of 150 psi. The outlet or branch shall be constructed of stainless steel and be flanged in accordance with AWWA 207 Class D, ANSI 150 psi drilling.
- 2.6.3 Tapping valves shall conform to the manufacturer requirements above and shall have ANSI 150 psi flange or inlet and mechanical joint at outlet.
- 2.6.4 Valve boxes for tapping valves shall be equal to valve boxes described in paragraph 2.5.

## **2.7 SERVICE ASSEMBLY.**

Pay Item for Service Assembly, unless otherwise shown on the DRAWINGS, shall include the main line field tap (direct tap or tapping saddle) with corporation stop on the newly installed and accepted water line, new meter box, and associated yoke bar, meter inlet valve, fittings and connection of the new assembly to the customer's existing service line.

### **2.7.1 Corporation Stop.**

- (A)  $\frac{3}{4}$ ", Catalog No. F1000-3, as manufactured by Ford Meter Box Company, Inc., with pack joint and with insert stiffener for PE or an approved equal.
- (B) 1", Catalog No. F1000-4, as manufactured by Ford Meter Box Company, Inc., with pack joint and with insert stiffener for PE or an approved equal.

2.7.2 **Tapping Saddle.** For AWWA C-900 mains (4" to 12") direct tap is acceptable or; use Catalog No. Hinged S90 manufactured by Ford Meter Box Company, Inc. or an approved equal. Direct tapping of the new main is required for pipe over 12".

### **2.7.3 Meter Inlet Valve.**

- (A) On short side services, use Catalog No. AV94-323W or AV94-324W, as manufactured by Ford Meter Box Company, Inc. or an approved equal.
- (B) On long side services, use Catalog No. B94-323W or B94-324W, as manufactured by Ford Meter Box Company, Inc. or an approved equal.

2.7.4 **Expansion Connection.** Catalog No. EC-23 as manufactured by Ford Meter Box Company, Inc. or an approved equal.

- 2.7.5 Yoke. Catalog No. Y202 as manufactured by Ford Meter Box Company, Inc. or an approved equal.
- 2.7.6 Water Meter. New water meter(s) will be provided by the City of Alexandria Water Department. CONTRACTOR shall install water meter(s) at no additional charge. Compensation for the installation of the service assembly shall include installing City furnished water meter(s).

For each water meter installation, the CONTRACTOR shall provide a document indicating the following information:

- 1) Serial # of the existing meter being replaced;
- 2) Numerical reading of the meter being replaced;
- 3) Street address of the affected relocation;
- 4) Serial # of the new meter being installed;
- 5) Numerical reading of the meter being installed; and,
- 6) Date of installation.

All existing water meters and boxes removed shall be delivered to the City of Alexandria Water Department, located at the City Consolidated Compound on Industrial Park Road.

- 2.7.7 Connection to Customer's Existing Service Line. Connection fitting(s) required to connect meter yoke to existing service line shall be a Ford C87-33 Pack joint coupling or an approved equal.
- 2.7.8 Meter Box. Meter boxes shall be a #15-P Plastic Meter Box with a cast iron lid as manufactured by East Jordan Iron Works, Inc., or an approved equal.
- 2.7.9 Gravel. Gravel installed under the meter shall be washed road gravel meeting the requirements of Section 1003.08(e)(1) of the Louisiana Standard Specifications for Roads and Bridges, latest Edition. The thickness of the bedding material shall be no less than six inches (6") thick by the width and length of the meter box.

## **2.8 FIRE HYDRANT ASSEMBLY.**

- 2.8.1 Fire hydrants shall be Model T-129 manufactured by M & H, or approved equal and conform to AWWA Standard C-502 and be equipped with two (2) nozzles, and one (1) pumper nozzle. The two (2) – 2 ½" hose connection nozzles shall be 3 5/64" O.D. with eight (8) threads per inch. The one (1) – 4 ½" pumper nozzle shall be 5 31/64" O.D. with four (4) threads per inch. The fire hydrant shall be 5 1/4" main valve opening with 6" mechanical joint inlet, and shall have ductile iron upper and lower barrels and elbows. Hydrants shall be factory painted. CONTRACTOR shall verify and be responsible for matching the hose connections and pumper nozzle threads to the thread standard used by the City

of Alexandria Fire Department. All components, barrel, valve stem, etc., shall be designed to “break away” at a point above ground level in the event of traffic contact. **CONTRACTOR SHALL INSTALL FIRE HYDRANT SO THAT THE BURY LINE ON THE FIRE HYDRANT IS AT THE FINISHED GROUND ELEVATION.**

- 2.8.2 Fire Hydrant Assembly - Type I (parallel mount) shall include the main line mechanical joint tee, swivel by swivel 90° elbow, mechanical joint gate valve, cast iron valve box with concrete pad, swivel by solid adapter fire hydrant lead, and mechanical joint hydrant.
- 2.8.3 Fire Hydrant Assembly - Type II (perpendicular mount) shall include the main line swivel tee, mechanical joint gate valve, cast iron valve box with concrete pad, swivel by solid adapter fire hydrant lead, and mechanical joint hydrant. The swivel by solid adapter fire hydrant leads shall be of the lengths required to suit field conditions.
- 2.8.4 Fire Hydrant Assembly - Type III (tap on existing line) shall include steel with epoxy coating and stainless steel bolts manufactured by Ford tapping sleeve, mechanical joint tapping valve, cast iron valve box with concrete pad swivel by solid adapter fire hydrant lead, and mechanical joint hydrant.
- 2.8.5 Swivel tees, swivel by solid adapter fire hydrant leads, and swivel by swivel 90° elbow shall be as manufactured by Tyler Pipe or approved equal.
- 2.8.6 Gravel installed around the fire hydrant weep holes shall be washed road gravel meeting the requirements of Section 1003.08(e)(1) of the Louisiana Standard Specifications for Roads and Bridges, latest Edition.
- 2.9 **COMPRESSION COUPLINGS.** Compression couplings for four inch (4") size pipe and up shall be ductile iron mechanical joint sleeves manufactured in accordance with ANSI/AWWA C110/A21.10 and ANSI/AWWA. Compression couplings for two inch (2") and smaller pipe shall be steel compression couplings manufactured by Rockwell or approved equal.
- 2.10 **CAPS AND PLUGS.**
- 2.10.1 Where existing lines are to be abandoned, the ends shall be cut and fitted with an appropriately sized cap or plug. The cap or plug shall be cast iron mechanical joint fitting. The capped end shall be back-filled with compacted native material in such a manner as to ensure the integrity of the cap.
- 2.10.2 Where lines are to remain in service, the ends shall be cut and fitted with a ductile iron mechanical joint plug or cap with retainer glands. This assembly shall be blocked with concrete thrust blocking.

- 2.11 FILL MATERIAL. Material for backfill of valves and valve boxes shall be Class A-2-4 material with a minimum PI of three (3), this material is commonly known as "Red Dirt".
- 2.12 CONCRETE FOR VALVE BOX PADS. Concrete required for the valve box pads shall be a five and one-half (5-1/2) cement sack mix with a twenty eight (28) day compressive strength of three thousand pounds per square inch (3,000-psi) and conform with Section 620, "Concrete".
- 2.13 JOINT RESTRAINTS FOR PVC PIPE. Restraint devices to be installed on PVC C900 pipe for all mechanical joint ductile iron fittings and valves shall be Ford Uni-Flanged Series 1300-C or approved equal. Restraint devices to be installed on PVC C900 pipe bells shall be Ford Uni-Flanged Series 1390-C or approved equal.
- 2.14 TRANSITIONS FOR SMALL DIAMETER POLYETHYLENE WATER PIPE. Transitions for joining polyethylene (PE) water pipe to other types of pipe (3" and smaller) shall be made with a properly sized steel insert (Stiffener) inserted into the polyethylene pipe and using a compression coupling to connect the pipes together.
- 2.15 TRANSITIONS FOR 6" THRU 12" DIAMETER POLYETHYLENE WATER PIPE. Transitions for joining 6" thru 12" polyethylene (PE) water pipe to other types of pipes shall be made with a Ductile Iron Mechanical Joint Anchoring Kit as manufactured by Independent Pipe Products, or approved equal, to a mechanical joint fitting or valve.

### **3 EXECUTION.**

- 3.1 **GENERAL.** All pipe, valves, appurtenances and accessories shall be installed as indicated on the PLANS. Any deviations must be approved by the ENGINEER before installation.
- 3.2 **PIPE BEDDING CONDITIONS.** All pipes and other related items laid in open trench excavations shall be haunched and bedded and uniformly supported over their full length on beddings of the types specified, if any, as shown on the Drawings. Flat-bottomed trenches shall be excavated and dewatered prior to preparing the specified foundations. All WORK shall be performed in a dry trench. Where pipe bedding conditions of a higher type than those shown on the Drawings or than those called for in the SPECIFICATIONS are ordered, as a result of the CONTRACTOR'S method of operation, the CONTRACTOR shall be due no additional compensation. Where special bedding is directed by the ENGINEER as a result of unsuitable soil conditions, the CONTRACTOR shall be paid for special bedding under appropriate bid items, or if not included as a bid item, then as negotiated.

**3.3 INSPECTION OF PIPE BEFORE INSTALLATION.** All pipe, fittings and related items shall be carefully inspected in the field before lowering in the trench. Cracked, broken, warped, out of round or otherwise defective pipe, fittings, or other related items, as determined by the CONTRACTOR or the ENGINEER, shall be pulled and not installed. Such rejected pipe shall be clearly tagged in such manner as not to deface or damage it, and the pipe shall then be removed from the job site by the CONTRACTOR at his expense.

**3.4 INSTALLATION OF WATER PIPE AND FITTINGS.**

3.4.1 All pipe and fittings shall be installed in strict accordance with the manufacturer's recommendations with excavation and backfill in accordance with Section 330.

3.4.2 Water main installation shall conform to ANSI/AWWA C600 pipe specifications and use a Type 1 bedding as detailed in the Standard Details for Water Line Installation, unless otherwise directed by the ENGINEER.

3.4.3 Trench widths should provide a minimum space of four inches (4") on each side of the pipe to avoid excess earth loads on pipe and to allow proper compacting of backfill to provide sidewall support. Where excavation is in soil of a select material type, normal trench depth will be used.

3.4.4 INSTALLING P.E. PIPE. All P.E. water mains shall be installed in strict accordance with the manufacturer's recommendation.

The manufacturer of the type of pipe furnished shall furnish a qualified factor representative for a minimum of three full working days to train, observe and qualify the CONTRACTOR'S personnel on the proper method of joining and installing every size of pipe and the associated fittings to be used on the job in accordance with applicable Department of Transportation (DOT) regulations.

The CONTRACTOR and the factory representative shall coordinate these days in order to assure that the representative is on the job at the start of the laying of each different size pipe by the CONTRACTOR.

On P.E. service lines and mains, each valve will be supported by a 80-pound bag of "Sackrete" concrete mix.

Heat fused P.E. pipe shall not be snaked in the trench. Backfill shall not be placed on any plastic pipe while it is in a heated condition. Cooling of the pipe by an approved method will be required by the ENGINEER, if necessary.

Set time for newly assembled heat fused joints shall be as follows:

- 10 Minutes minimum @ 60°F to 90°F
- 11 Minutes minimum @ 40°F to 60°F

12 Minutes minimum @ 25°F to 40°F

- 3.4.5 **FIELD CUTTING OF PIPE.** Field cutting of all pipes shall be accomplished by a method approved by the ENGINEER. Any section of pipe, which is damaged during the cutting cooperation, will be rejected.
- 3.4.6 **SETTING OF VALVES AND FITTINGS.** Settings of valves and fittings shall be in accordance with USAS B31.8, except as modified for P.E. pipe in Paragraph 3.4.4 of these SPECIFICATIONS.
- 3.4.7 **INSTALLING SERVICE ASSEMBLIES.** All essential details of construction of the service assemblies to be installed are indicated on the PLANS. These DRAWINGS shall be followed carefully. The labor, materials and equipment required to be furnished by the CONTRACTOR for each service assembly shall depend on the installation size, type and meter setting.

The CONTRACTOR shall set each service assembly where shown on the PLANS or as directed by the ENGINEER. The PLANS will indicate whether the existing meters in the proposed service assembly are to be refitted and used at the relocation point.

Existing meters and regulators, not to be refitted, used again or relocated, shall be delivered to the City of Alexandria Water Department, accompanied by a "Water Service Ticket", furnished by the CONTRACTOR, detailing the location from which it was removed, old meter number, new meter number, etc. All existing water service lines, which are not to be re-used, shall be cut and capped below natural ground surface.

The CONTRACTOR shall not set the service assemblies until all the mains have been cleaned, tested, purged and approved by the ENGINEER.

- 3.5 **PIPE LAYING.** Every precaution shall be taken to prevent foreign material from entering water pipe while it is being placed in the trench. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a water tight plug or other means approved by the ENGINEER. If water is in the trench, the seal shall remain in place until the trench is pumped enough to resume laying operations. No pipe shall be laid in water or when, in the opinion of the ENGINEER, trench conditions are unsuitable.

### 3.6 **DEPTH OF COVER.**

- 3.6.1 The water mains shall be laid so as to have a minimum of thirty inches (30") of earth cover. If the carrier pipe is in a casing, the minimum cover in the road shall be five feet (5') and at the street ditch shall be a minimum of three feet (3'). Where required by site conditions or LA DOTD or railway permits or noted on the PLANS, the CONTRACTOR shall provide for extra depth burial.

3.6.2 The CONTRACTOR shall install all water lines as to maintain a minimum horizontal distance of six feet (6') from all sewer lines and minimum vertical distance of eighteen inches (18") above all sewer lines unless otherwise instructed by the ENGINEER in writing. All distance shall be measured from the outside diameter of each pipe.

**3.7 INSTALLATION OF POLYETHYLENE WRAP.** All underground ductile iron pipe, fittings, valves and tapping sleeves and valves shall be encased with the specified eight (8) mil black polyethylene wrap. The wrap shall be installed in accordance with the manufacturer's recommendations and AWWA C-600. The wrap shall be secured to the pipe, fittings, etc. with polyethylene compatible adhesive tape. All rips, tears or other damage shall be repaired with the adhesive tape.

**3.8 INSTALLATION OF #10 GAUGE STRANDED COPPER WIRE.**

3.8.1 The CONTRACTOR shall install #10 gauge stranded copper tracer wire directly over and on the center of all PVC water mains and PE service lines. The wire shall be continuous on all mains and service lines and shall be connected to all fixtures and appurtenances.

3.8.2 Wire Splice Kits. Wire splices shall be Direct Bury Splice Kit, ID # 08-6105-9435-2, Part No. 500-54007-496965 as manufactured by 3M Electrical Products Division of Austin, Texas 78769-2963 or an approved equal.

3.8.3 The #10 gauge stranded copper tracer wire shall be attached to C.I. valve box, seven inches (7") below top of valve box, with a Thomas & Betts Type H Split Bolt Connector or an approved equal. CONTRACTOR shall drill hole in valve box to accommodate split bolt connector.

**3.9 INSTALLATION OF UNDERGROUND VALVES AND VALVE BOXES.**

3.9.1 All valves and valve boxes shall be backfilled with one-half (1/2) cubic yard of Class A-2-4 material with a minimum PI of three (3), this material is commonly known as "Red Dirt".

3.9.2 The valve boxes shall have a concrete pad poured at the top of the box as shown on the Standard Details for Water Line Installation and painted with one coat of silicone alkyd paint "Medium Blue".

**3.10 TAPPING LINES.**

3.10.1 Tapping city water lines 12" and smaller shall be performed by the City of Alexandria Water Department. The City of Alexandria Water Department, (318) 441-6214, shall be notified 48 hours in advance of any water line tap. The cost

for performing a tap shall be \$300 per tap to be paid by the CONTRACTOR to the City of Alexandria Water Department.

- 3.10.2 The CONTRACTOR shall verify the outer dimension and type of existing lines, which are to be tapped for connecting the new line to the existing lines prior to ordering connection equipment and fittings. The CONTRACTOR'S attention is directed to the fact that cast iron lines to be tapped are old and the outside diameters may be to a different standard than current standards. Any deviation from the data shown on the Drawings shall be brought to the attention of the ENGINEER for resolution. The CONTRACTOR shall set up the tapping sleeve and valve for inspection by the City of Alexandria Water Department Personnel, prior to the City performing the tapping operation. Any adjustments or modification to tapping sleeve and/or valve shall be made by the CONTRACTOR under the direction of the City of Alexandria Water Department Personnel.

### **3.11 CUTTING AND CAPPING LINES.**

- 3.11.1 Existing water lines shall be cut, capped and blocked where designated on the PLANS. Existing water pipe is to be cut in a straight and true face after arranging with the City of Alexandria Water Department Personnel on a time and sequence of valving-off the section of water mains to remain in service. As part of the operation, the CONTRACTOR shall physically remove a minimum five foot (5') length of pipe. The cut ends shall be cleaned for attachment of appropriate fittings. Unless otherwise specified, fittings shall include a ductile iron mechanical joint plug or cap with retainer glands as required. Concrete blocking shall be installed as shown on the Standard Details for Water Line Installation.
- 3.11.2 The sequence of water cut-off operations will determine the type of capping and blocking to be required for the end of pipe to be eventually abandoned. The existing line to be abandoned must have the ends sealed.

### **3.12 INSTALLATION OF FIRE HYDRANT ASSEMBLY.**

- 3.12.1 All fire hydrants will be installed at the location specified on the PLANS unless otherwise directed by the ENGINEER. The fire hydrant shall be installed with the pumper nozzle facing the street and in a manner that allows a minimum of eighteen inches (18") from the face of the pumper nozzle to the back of the curb. If field condition does not allow the above requirement or the fire hydrant location creates obstruction as to maintain the above requirement, the ENGINEER shall be notified and a suitable resolution shall be directed by the ENGINEER. Installation shall be as shown on the Drawings.
- 3.12.2 The hydrant shall be installed so that the pumper nozzle faces the principle street. The fire hydrant lead piping shall have a minimum of thirty inches (30") of cover. CONTRACTOR SHALL INSTALL FIRE HYDRANT SO THAT THE BURY LINE ON THE FIRE HYDRANT IS AT THE FINISHED GROUND ELEVATION.

3.12.3 The fire hydrant together with ductile iron piping, fittings, valves, etc. shall be wrapped with the specified eight (8) mil black polyethylene wrap. Special care shall be taken so that the fire hydrant drain hole is not blocked.

3.12.4 A 16" x 8" x 4" thick pre-cast concrete pad shall be installed to support the fire hydrant as shown on the Standard Details.

3.12.5 Four (4) cubic feet of washed gravel shall be installed around the fire hydrant as shown on the Standard Details.

3.12.6 All fire hydrants shall be installed with a factory applied paint.

**3.13 REMOVE AND SALVAGE EXISTING FIRE HYDRANTS.** Existing fire hydrants shall be removed as designated on the Drawings or where directed by the ENGINEER. Existing fire hydrants shall be removed by cutting the fire hydrant lead with a straight true cut. The cut end shall be capped with the appropriate ductile iron mechanical joint cap with retainer gland. The removed fire hydrant shall be delivered to the City of Alexandria's Water Department.

**3.14 INSTALLATION OF CONCRETE THRUST BLOCKING.** Concrete thrust blocking on water mains 14" or larger shall be provided at all tees, bends, dead ends and other such appurtenances as indicated on the Standard Details for Water Line Installation. Concrete shall conform to Section 620, Concrete, and shall be a 5½ cement sack mix with a 28-day compressive strength of 3,000 psi.

**3.15 CONNECTION TO EXISTING LINE.**

3.15.1 Connection to existing lines shall be performed under the direction of the City of Alexandria Water Department. The City of Alexandria Water Department (318) 441-6214, shall be notified, forty eight (48) hours in advance of any water line tap.

3.15.2 The CONTRACTOR shall verify the out dimensions and type of existing lines, which are to be connect for tying the new lines to the existing lines prior to ordering connection equipment and fittings. Any deviation from the data shown on the Drawings shall be brought to the attention of the ENGINEER for resolution.

3.15.3 Connection of new pipe or main to existing pipe or main shall be accomplished by using appropriately sized nipples and couplings or sleeves, specifically designed for the connection work as specified. A search for existing locator wire shall be made. New wire, installed with the new pipe work, shall be attached around the sleeve or coupling and then connected to the existing locator wire as specified elsewhere herein with splice kits.

**3.16 FIELD HYDROSTATIC AND LEAKAGE TESTS.** The hydrostatic testing of all lines shall conform to the requirements of AWWA C600, Section 13, except as modified below.

- (A) The test pressure shall be 150 psi and shall be maintained for a minimum of four (4) hours with no leakage.
- (B) The test shall be applied to the whole individual valved-off sections of the mains either before or after the trench is backfilled, as directed by the ENGINEER.
- (C) At the CONTRACTOR'S option, services may or may not be included in the hydrostatic and leakage test. If the CONTRACTOR elects not to test the services, then all services will have a visual inspection after installation with full line pressure and the CONTRACTOR shall satisfy himself that there are no leaks. All services shall be flushed for a full 15 minutes.

The ENGINEER may require that he be present at any or all of these tests.

- (D) The CONTRACTOR shall furnish gauges, meters, water, tools, labor, equipment, and all other materials necessary to conduct the tests. The ENGINEER will be notified at least 48 hours in advance of the hydrostatic test.
- (E) The test pressure will be based upon the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge. Gauges shall have an operating range of twice the testing pressure and be severe service liquid dampened, and liquid lubricated type. Unless otherwise specified, gauges shall be Catalog No. 625 by John C. Ernst Co. or approved equal.

Should leakage be encountered, the CONTRACTOR shall, at his expense, locate and repair the defective joint(s) or fitting(s), until there is no leakage within the specified test area.

- (F) Results of the field hydrostatic test shall be submitted to the City of Alexandria Water Department for approval prior to acceptance of water improvements by the City of Alexandria.

**3.17 INSTALLING PIPE-BORING AND JACKING METHOD.** When shown on the PLANS, lines installed under this contract which require crossing under public highways, paved roads, streets, or driveways shall be installed by the jacking and boring method. The installation of utility pipe and the boring and jacking method shall be in accordance with A.R.E.A. Specifications, pages 1-4-18 thru 1-4-24.

The excavation of all approach pits and trenches within the right-of-way of the highway or railroad shall be of sufficient length from the street or railroad tracks to permit traffic to pass without interference. All backfill on the approach pits and trenches within the right-of way shall be tamped in layers a maximum of six (6) inches thick for the entire length and depth of the trench or pit.

The backfill shall be compacted to 90% of maximum density obtained at optimum moisture as determined by AASHTO T 180-57, Method A. Mechanical tampers may be used after a cover of six inches (6") has been obtained over the top of the barrel of the pipe.

The boring operation shall be accomplished using a commercial type boring rig and the hole made by the installation shall be of the same diameter (within two (2) inches) as the largest outside joint diameter of the pipe installed.

In the event sub-surface operations result in injury or damage to the pavement, repairs to this pavement shall be made by the CONTRACTOR, at no additional cost to the City of Alexandria. In the event paving cracks or either side of the pipeline, or is otherwise disturbed or broken due to the CONTRACTOR'S operations, he shall repair or replace same at his own expense without further compensation.

- 3.18 INSTALLING CASING PIPE.** When shown on the PLANS, the CONTRACTOR shall furnish and install all utility mains perpendicular to and under railroad tracks and roadways in a casing pipe. This casing shall be completed and with end seals, vent pipe, an other specials required to install the main in the casing. All installations shall be in accordance with these SPECIFICATIONS and the requirements of the railroad or roadway, as applicable.

Unless otherwise specified the casing pipe shall be installed by the boring and jacking method in conformance with Paragraph 3.17 of these SPECIFICATIONS.

- 3.19 FIELD CLEANING, TESTING AND PURGING.** The field cleaning, testing and purging operations shall be applied to the whole or individual valved-off sections of the high pressure distribution mains (feeder mains), distribution mains and service lines either before or after the trench is backfilled, as directed by the ENGINEER.

The CONTRACTOR shall be obligated to maintain and keep in good condition any replacement of base, street surfacing or sidewalks from the time of installation until final acceptance of the WORK.

The replacement of all street surfaces shall be in accordance with the Details shown on the PLANS.

**3.20 SET-UP FOR DISINFECTING OF WATER MAINS BY CITY OF ALEXANDRIA.**

- 3.20.1 The CONTRACTOR shall assist the City of Alexandria Water Department in the collection of samples required for State Department of Health and Hospitals approval of the completed system by providing acceptable injection taps, sampling taps, temporary blow-off and line flushing as required, and suitable for satisfactory disinfection of the new lines.
- 3.20.2 The CONTRACTOR shall install a ¾" brass corporation stop at each point of injection of chlorine solution and a ¾" corporation stop in the existing main for chlorination water supply. All corporation stops shall be left in the main after completion of chlorination. A temporary blow-off(s) shall be installed as shown on the Drawings, the minimal size of the blow-off(s) shall be no less than ½ the diameter of the line being tested.
- 3.20.3 The CONTRACTOR shall make the excavation for each corporation stop and have same open and pumped free of water, earth, and debris for use by the City of Alexandria Water Department. CONTRACTOR shall notify the City of Alexandria Water Department, 48 hours prior to the work of each chlorination operation as scheduled by the CONTRACTOR, and shall have men and equipment attending the needs of the City for any excavation, shoring, bailing, pumping, flushing, valve operation or other incidental assistance required for the City to have adequate help in access to the work, and in the injection, blow-off, location and operation of valves, hydrants, and in general to assist the City to do its WORK.
- 3.20.4 The CONTRACTOR shall flush the lines to be chlorinated prior to calling on the City for chlorination.
- 3.20.5 The CONTRACTOR shall be responsible for scheduling the chlorination and testing to demonstrate that the lines in each section tested are free of contamination. After a section is disinfected and reported clear of contamination, the CONTRACTOR shall conduct his operations so that no further contamination of that section is caused by his operations.
- 3.20.6 The scheduling may be done in any reasonable sectioning or phasing, and the approval of both the City and the ENGINEER will be obtained for each proposed section to be disinfected to make sure the operation is practical.
- 3.20.7 The CONTRACTOR shall ensure that the water in the new line cannot be used by consumers until water samples collected and analyzed by the City of Alexandria Laboratory show the water to be free of coliform bacterial.

**3.21 DISINFECTION OF WATER MAINS BY CITY OF ALEXANDRIA.**

3.21.1 The City of Alexandria Water Department will perform all actual injection, sampling, testing, and reporting.

3.21.2 The City's disinfection procedure is to inject gaseous chlorine solution into the new lines immediately adjacent to the valve separating the new line from the existing system and to continue to inject sufficient chlorine solution until a 50 ppm reading is attained at all extremities and within all reaches of the new piping. Reversed flow is to be prevented. Solution shall remain in the new lines for at least twenty-four (24) hours and a sample is checked to ascertain a 5 ppm chlorine residual. All valves, hydrants, taps and other appurtenances are to be operated while the lines are filled with the highly concentrated chlorine solution. If the residual has fallen below 5 ppm, the lines are re-chlorinated. If the residual is more than 5 ppm, the lines are flushed with potable water and a sample taken for bacteriological testing by the City of Alexandria's Laboratory.

The new lines shall not be placed into service until the sample is proved to be coliform free.

3.21.3 In the event the chlorine residual, after 24 hours, is below 5 ppm or if the sample fails, the flushing, chlorination and purging procedure is repeated until the new lines are proved sterile. The cost for additional injection, sampling, testing, and reporting shall be paid for by the CONTRACTOR to the City of Alexandria Water Department. The fee shall be as set forth in the schedule below:

\$100.00 for each set up  
\$ 50.00 for each blow-off

PLUS

CHLORINATION	CHLORINE
2" to 10" .10 per ft. 1 <sup>st</sup> 1000' .05 per ft. all over 1000'	\$50.00 1 <sup>st</sup> 1000' \$25.00 each additional 1000'
12" .12 per ft. 1 <sup>st</sup> 1000' .06 per ft. all over 1000'	\$55.00 1 <sup>st</sup> 1000' \$30.00 each additional 1000'
14" .14 per ft. 1 <sup>st</sup> 1000' .07 per ft. all over 1000'	\$60.00 1 <sup>st</sup> 1000' \$35.00 each additional 1000'
16" .16 per ft. 1 <sup>st</sup> 1000' .08 per ft. all over 1000'	\$65.00 1 <sup>st</sup> 1000' \$40.00 each additional 1000'
18" .19 per ft. 1 <sup>st</sup> 1000' .09 per ft. all over 1000'	\$70.00 1 <sup>st</sup> 1000' \$45.00 each additional 1000'
20" .20 per ft. 1 <sup>st</sup> 1000' .10 per ft. all over 1000'	\$75.00 1 <sup>st</sup> 1000' \$50.00 each additional 1000'
24" 0.24 per ft. 1 <sup>st</sup> 1000' .12 per ft. all over 1000'	\$80.00 1 <sup>st</sup> 1000' \$55.00 each additional 1000'

**3.22 DISINFECTION OF FITTINGS AND PIPE AT RELOCATIONS.** At all tie-ins, short relocations or other points where disinfection by chlorination is not possible, pipe, fittings, valves and other items shall be thoroughly cleaned and disinfected by mopping with a 50 ppm chlorine solution.

**3.23 CLEANING UP, REMOVING SURPLUS EARTH, ETC.** As soon as the backfilling of any excavation is completed, the CONTRACTOR must at once begin the removal of all surplus dirt. Except dirt that is necessary to correct settlement of the initial backfilling operations.

He shall remove all pipe and other material placed or left on the street or right of way by him except material needed for the replacement of the paving. The street shall be opened and made passable for traffic. Following the above WORK, the repairing and complete restoration of the street surfaces, bridges, crossings and all places affected by the WORK shall be done as promptly as possible.

Any surplus earth which may be left on the street or right of way after the excavations have been completely refilled shall be regarded as the property of the CONTRACTOR and must be removed as soon as possible at his own expense except that in un-graded streets, it shall be optional with the ENGINEER whether surplus material shall be removed or deposited on the surface and graded for the convenience of traffic.

**3.24 INSTALLATION OF PE PIPE BY DIRECTIONAL BORE.**

3.24.1 At least 7 days prior to mobilizing equipment the CONTRACTOR shall submit his detailed installation plan to the ENGINEER. The plan shall include a detailed plan and profile of the bores and be plotted at a scale no smaller than 1" = 20' horizontal and vertical. The plan shall also include a list of major equipment and supervisory personnel and a description of the methods to be used.

3.24.2 Directional drilling and pipe installation shall be done only by an experienced contractor specializing in directional drilling and whose key personnel have at least five (5) years experience in this work.

3.24.3 Joining shall be performed by thermal butt-fusion in accordance with the manufactures recommendations.

3.24.4 All polyethylene pipe shall be cut, fabricated and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying and pulling of polyethylene pipe shall be accomplished by personnel experienced in working polyethylene pipe.

3.24.5 Pipe shall be joined to one another by means of thermal but fusion. Polyethylene Pipe lengths to be joined by thermal butt-fusion shall be of the same type, grade and class of polyethylene compound and supplied from the same raw material supplier.

- 3.24.6 The CONTRACTOR shall install the pipelines by means of horizontal directional drilling. The CONTRACTOR shall assemble, support and protect the pipeline prior to installation in the directional drill tunnel. Horizontal directional drilling shall consist of drilling a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directional drilled installation will be determined by the CONTRACTOR, subject to the requirements of these SPECIFICATIONS.
- 3.24.7 Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the CONTRACTOR. The maximum allowable pull exerted on the HDPE pipelines shall be measured continuously and limited to the maximum allowed by the pipe manufacture so that the pipe or joints are not overstressed. A swivel shall be used to connect the pipeline to the drill pipe to prevent torsional stresses from occurring in the pipe. The lead end of the pipe shall be closed during the pullback operation.
- 3.24.8 During the drilling, reaming or pullback operations, the CONTRACTOR shall make adequate provisions for handling the drilling fluids or cuttings at the entry and exit pits. The drilling fluids and cuttings shall be removed from the site and disposed of legally. After completion of the directional drilling work, the entry and exit pits shall be restored to original conditions.
- 3.24.9 After the pipe is in place, cleaning pigs shall be used to remove residual water and debris. After the cleaning operation, the CONTRACTOR shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-round, and any other deformations. The sizing pig run shall be considered acceptable if the test results indicate that there are no sharp anomalies greater than 2 percent of the nominal pipe diameter or excessive out-of-round greater than 5 percent of the nominal pipe diameter.

#### **4.1 MEASUREMENT.**

- 4.1.1 GENERAL. Except for minor modifications, the following SPECIFICATIONS are developed by the Specifications Committee of the American Public Works Association, Louisiana Chapter and the Associated General Contractors, Louisiana Highway and Heavy Construction Branch.
- 4.1.2 WATER MAIN. Water Main will be measured by the linear foot according to size and type. Water pipe will be measured by the linear foot of pipe placed, tested, and accepted in accordance with these SPECIFICATIONS or as directed by the ENGINEER. No deductions for the space occupied by valves or fittings. No separate measurement will be made for water pipe fittings except for Ductile Iron fittings.

- 4.1.3 INSTALLATION BY JACK AND BORE. Installing pipe by jacking and boring will be measured by the linear foot according to the size of pipe to be bored. Installation by Jack and Bore shall include labor, equipment, excavation, backfilling, bedding, testing and all incidentals to perform the work in accordance with these SPECIFICATIONS or as directed by the ENGINEER. This item is for installing pipe by Jack and Bore. The pipe will be measured in accordance with Subsection 4.1.2 of these SPECIFICATIONS.
- 4.1.4 INSTALLATION BY DIRECTIONAL BORE. Installation by Directional Bore will be measured by the linear foot according to the size of the pipe to be installed. Installation by Directional Bore shall include all necessary labor, material, equipment, excavation, bedding, backfill, testing and all incidentals necessary to install the pipe by Directional Bore in accordance with these SPECIFICATIONS or as directed by the ENGINEER. This item is for Installation by Directional Bore. The pipe will be measured in accordance with Subsection 4.1.2 of these SPECIFICATIONS.
- 4.1.5 PIPE FITTINGS. Fittings other than Cast Iron (C.I.) or Ductile Iron (D.I.) will not be measured for payment. Pipe fittings shall be considered incidental to other items.
- 4.1.6 DUCTILE IRON FITTINGS: Ductile Iron fittings shall be measured by the Pound of fittings furnished and installed and accepted. The weight shall be the published Standards of the AWWA for the type of fitting supplied. No measurement will be made for flanges, nuts, bolts and miscellaneous materials needed for the installation of the fitting. Ductile Iron Fittings shall include all necessary labor, material, excavation, backfill, bedding, blocking, testing and incidentals for the installation of the fitting in accordance with these SPECIFICATIONS or as directed by the ENGINEER.
- 4.1.7 VALVES AND VALVE BOXES. Valves and valve boxes shall be measured by Each installed as a unit for valves with valve boxes together. Valves with valve boxes together, as a unit, will be measured by an actual count of each size, installed, tested, and accepted. Valves and Valve Boxes shall include any necessary labor, material, excavation, bedding, backfill, testing as well as joint adapters for connecting valves into the system, including the concrete pad around the valve box top, installed in accordance with these SPECIFICATIONS or as directed by the ENGINEER.
- 4.1.8 WATER SERVICE ASSEMBLIES. Water Service Assemblies shall be measured per each, according to size of the main to which the Service Assembly is being installed. Water Service Assemblies shall include all necessary labor, material, equipment, excavation, bedding, backfill, testing as well as any connectors and couplings installed in accordance with these SPECIFICATIONS or as directed by the ENGINEER.

- 4.1.9 WATER SERVICE PIPE. Water Service Pipe shall be measured by the linear foot according to size and type. Water Service Pipe shall include all necessary labor, material, equipment, excavation, bedding, backfill, testing as well as all connectors and couplings installed and accepted in accordance with these SPECIFICATIONS or as directed by the ENGINEER. This length of measurement shall be actual centerline length of pipe installed and accepted.
- 4.1.10 CASING PIPE – JACKING AND BORING METHOD. Casing Pipe – Jack and Boring Method shall be measured by the Linear Foot according to size. Casing Pipe – Jack and Bore Method shall include all necessary labor, material, equipment, excavation, bedding, backfill, testing and all incidentals to install the casing pipe by Jack and Bore. The carrier pipe will be measured in accordance with Subsection 4.1.2 of these SPECIFICATIONS. The quantity obtained will be the centerline length of the casing installed and accepted.
- 4.1.11 CASING PIPE – LAID IN OPEN CUT. Casing Pipe - Laid in Open Cut shall be measured by the Linear Foot according to size. The quantity obtained will be the centerline length of the casing installed and accepted. Casing Pipe – Laid in Open Trench shall include all necessary labor, material, equipment, excavation, bedding, backfill, testing and all incidentals to install the casing pipe in open trench. The carrier pipe will be measured in accordance with Subsection 4.1.2 of these SPECIFICATIONS.
- 4.4.12 BEDDING MATERIAL. Bedding Material shall be measured by the Linear Foot according to the Type shown on City of Alexandria Standard Plan WT-03. Type 1 bedding will not be measured for payment. Type 1 bedding will be considered incidental to the pipe. No measurement shall be made for additional material necessary to correct unauthorized over-width or over-depth excavation. Bedding Material shall include all necessary labor, material, equipment, testing and incidentals necessary to install the bedding in accordance with these SPECIFICATIONS and City of Alexandria Standard Plan WT-03.
- 4.1.13 ADDITIONAL BEDDING MATERIAL (AS DIRECTED). Additional Bedding Material (As Directed) shall be paid by the Cubic Yard according to Type shown on City of Alexandria Standard Plan WT-03. This material shall be used only as directed by the ENGINEER when native material is not suitable for bedding or foundation. Additional Bedding Material (As Directed) shall include material, labor, equipment, and all incidentals required to install the additional bedding material in accordance with these SPECIFICATIONS or as directed by the ENGINEER. It shall also include excavation and removal of unsuitable native material.
- 4.1.14 “RED DIRT” BACKFILL MATERIAL. “Red Dirt” backfill material shall be measured by the cubic yard (vehicular measurement) as specified in Section 330 “Excavation and Embankment” of these SPECIFICATIONS.

No measurement for payment shall be made for additional material necessary to correct unauthorized over-width or over-depth excavation.

4.1.15 SHEETING AND BRACING LEFT IN PLACE. No separate payment will be made for sheeting and bracing left in place.

4.1.16 REMOVAL AND REPLACEMENT OF IMPROVED SURFACING. When no bore is shown on the Plans, the CONTRACTOR shall install pipe under improved surfacing by the open cut method. Removal of the improved surfacing shall be measured in accordance with Section 320, "Removal of Structures and Obstructions" of these SPECIFICATIONS. Replacement of the improved surfacing shall be measured in accordance with the pertinent section of these SPECIFICATIONS.

Removal and Replacement of Improved Surfacing will be measured by the square yard, and the area for measurement shall be as shown on the PLANS or specified in these SPECIFICATIONS.

Removal and replacement of concrete curbs will be measured by the linear foot, and the length of measurement shall be as indicated on the PLANS or in these SPECIFICATIONS.

4.1.17 CLEARING AND GRUBBING. Clearing and Grubbing shall be measured in accordance with Section 310 "Clearing and Grubbing". If no Item for Clearing and Grubbing is included in the contract documents, Clearing and Grubbing will not be measured for payment, but shall be included in the price bid on other items.

4.1.18 REMOVAL AND REPLACEMENT OF CULVERT PIPES. Removal of Culvert Pipe will be measured in accordance with Section 320, "Removal of Structures and Obstructions", of these SPECIFICATIONS. Replacement of Culvert Pipe shall be measured in accordance with Section 710, "Culvert Pipe". Should no items for Removal and Replacement of culvert pipes be included in the contract documents, it shall not be measured and shall be included in other items.

4.1.19 #10 GAUGE COPPER STRANDED WIRE AND WIRE SLICE KITS. Installation of # 10 gauge copper stranded wire and wire slice kits over the top and the centerline of P.E. waterline, PVC waterline, and within valve boxes will not be measured for payment, but shall be included in the bid price on other items.

4.1.20 TAPPING SLEEVE AND VALVE. Hot Tap Connections of Mains will be measured by the actual count of each Tapping Sleeve and Valve according to the size installed and accepted. Hot Tap Connections of Mains shall include all necessary labor, materials, equipment, bedding, backfill, testing and incidentals to make the Hot Tap Connections in accordance with these SPECIFICATIONS or as directed by the ENGINEER.

- 4.1.21 **FIRE HYDRANTS:** Fire Hydrants shall be paid by the actual count of each Fire Hydrant, regardless of depth of bury, installed and accepted. Fire Hydrants shall consist of all necessary labor, material, equipment, bedding, backfill, blocking, drainage gravel, backfill, testing and incidentals to install the Fire Hydrant in accordance with these SPECIFICATIONS or as directed by the ENGINEER.
- 4.1.22 **REMOVE AND RELOCATE FIRE HYDRANTS:** Remove and Relocate Fire Hydrants shall be paid by the actual count of each Fire Hydrant removed and relocated. Remove and Relocate Fire Hydrants shall consist of all necessary labor, material, equipment, bedding, backfill, blocking, drainage gravel, testing and incidentals to remove and install the existing Fire Hydrant and Valve in accordance with the DRAWINGS and these SPECIFICATIONS or as directed by the ENGINEER. Fire Hydrant leads shall be measured as per Section 1220, 4.1.2, Water Pipe, of these SPECIFICATIONS. Valves shall be measured as per Section 1220, 4.1.4, Water Valves, of these SPECIFICATIONS. Tees and Anchor Tees shall be measured as per Section 1220, 4.1.3 of these SPECIFICATIONS.
- 4.1.23 **SPECIAL CROSSINGS (PER PLAN)** Special Crossings (Per Plan) shall be measured by the Lump Sum for each crossing installed and accepted in accordance with the details shown on the DRAWINGS. The lump sum crossings will be measured by an actual count of each crossing installed and accepted. Special Crossing (Per Plan) shall include all necessary labor, material, equipment and all incidentals to install the Crossing within the limits shown on the DRAWINGS and in accordance with these SPECIFICATIONS or as directed by the ENGINEER.
- 4.1.24 **REMOVAL OF EXISTING PIPE, FITTINGS, VALVES FIRE HYDRANTS, ETC.** Removal of Existing Pipe, Fittings, Valves, Fire Hydrants, etc. shall be measured in accordance with Section 320, Removal of Structure and Obstructions, of these SPECIFICATIONS. Should no Item be included for Removal of Structures and Obstructions, removal of existing pipe, fittings, valves, fire hydrants, etc. shall be included in other items.

## **5.1 PAYMENT.**

- 5.1.1 **GENERAL.** Except for minor modifications, the following SPECIFICATIONS are as developed by the Specifications Committee of the American Public Works Association, Louisiana Chapter and the Associated General Contractors, Louisiana Highway and Heavy Construction Branch. Periodic estimates on all water piping and appurtenances shall be paid at 75% of the contract unit price until tested.
- 5.1.2 **WATER PIPE.** Water Pipe shall be paid for at the contract unit price per linear foot for water pipe of the various sizes and types. The unit bid price shall include all necessary labor, material equipment, Type 1 bedding, native soil backfill and compaction, removal of excess material, site dressing, testing, and all incidentals

to install the water pipe in accordance with these SPECIFICATIONS. Should no Items be included for Removal and Replacing Culvert Pipe, Removal and Replacing Culvert Pipe shall be included in the unit price per Linear Foot of the Water Pipe. Should no Items be included for Clearing and Grubbing, Clearing and Grubbing shall be included in the unit price per Linear Foot of Water Pipe. The pay items for Water Pipe shall be as follows:

1220-01-(Size)	PVC Water Pipe (Size)	Linear Feet
1220-02-(Size)	C-900 Water Pipe (Size)	Linear Feet
1220-03-(Size)	Ductile Iron Water Pipe (Size)	Linear Feet
1220-04-(Size)	Polyethylene Water Pipe (Size)	Linear Feet

Example: 1220-01-08 C-900 Water Pipe (8") Linear Feet

- 5.1.3 DUCTILE IRON FITTINGS. Ductile Iron (D.I.) shall be paid at the Contract Unit Piece per Pound. Payment for Ductile Iron Fittings shall constitute full compensation for furnishing, hauling, installing complete, testing, excavation, preparation of bed and backfilling, concrete thrust blocks or anchors and for the furnish of all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS. The Pay Item for Ductile Iron Fittings shall be as follows:

1220-05	Ductile Iron Fittings	Pound
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- 5.1.4 GATE VALVES. Gate Valves shall be paid for at the contract unit price per each. The Unit Price for Gate Valves shall constitute full compensation for furnishing, hauling, installing, testing, excavation and backfilling; and for the furnishing of equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. Gate Valve shall also include the Boxes. The Pay Items for Gate Valves shall be as follows:

1220-06-(Size)	Gate Valves (Size)	Each
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Example: 1220-05-08 Gate Valves (8") Each

- 5.1.5 WATER SERVICE ASSEMBLIES. Water service assemblies, in place and accepted, will be paid for at the contract unit price per each for the size of the main to which the service assembly is being attached, which price and payment shall constitute full compensation for furnishing, hauling, and installing all material complete; for all excavation and backfilling; for all equipment, tools, taps, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS. The Pay Item for Water Service Assemblies shall be as follows:

1220-07-(Size Main)	Water Service Assemblies (Size Main)	Each
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Example: 1220-07-08 Water Service Assemblies (8" Main) Each

- 5.1.6 WATER SERVICE PIPE. Service pipe, placed and accepted, will be paid for at the contract unit price per linear foot, which price and payment shall constitute full compensation for furnishing, hauling, installing complete, including furnishing connectors, and couplings, testing the pipe; and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance PLANS and SPECIFICATIONS. The Pay Item for Water Service Pipe shall be as follows:

1220-08-(Size) Water Service Pipe (Size)                      Linear Feet

Example: 1220-08-01 Water Service Pipe (1")                      Linear Feet

- 5.1.7 CASING PIPE – JACKING AND BORING METHOD. The actual total linear feet of casing, installed and accepted, will be paid for at the contract unit prices per linear feet for casing pipe of various diameters, which price and payment shall constitute full compensation for furnishing, hauling and installing complete, for all excavation, boring, tunneling, jacking, and backfilling; and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The Pay Item for Casing Pipe – Jacking and Boring shall be as follows:

1220-09-(Size) Casing Pipe – Jacking and Boring (Size)                      Linear Feet

Example: 1220-09-12 Casing Pipe – Jacking and Boring (12") Linear Feet

- 5.1.8 CASING PIPE – OPEN CUT. The actual total linear feet of casing, installed and accepted, will be paid for at the contract unit price per linear feet for casing pipe of various diameters, which price and payment shall constitute full compensation for furnishing, hauling and installing complete; for all excavation and backfilling; and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with PLANS and SPECIFICATIONS. The Pay Item for Casing Pipe – Open Cut shall be as follows:

1220-10-(Size) Casing Pipe – Open Cut (Size)                      Linear Feet

Example: 1220-10-12 Casing Pipe – Open Cut (12") Linear Feet

- 5.1.9 INSTALLING PIPE – JACKING AND BORING. The cost of installing by the jacking and boring method will be paid for at the contract unit price per linear feet for installing pipe of various diameters, which price and payment shall constitute full compensation for installing complete, for all excavation, boring, jacking, and backfilling and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with

PLANS and SPECIFICATIONS. The Pay Item for Installing Pipe – Jacking and Boring shall be as follows:

1220-11-(Size) Installing Pipe – Jacking and Boring (Size) Linear Feet

Example: 1220-11-08 Installing Pipe – Jacking and Boring (8”) Linear Feet

- 5.1.10 INSTALLING PIPE – DIRECTIONAL BORE. Installing Pipe – Directional Bore shall be paid for at the contract unit price per linear foot for installing pipe of various diameters, which price and payment shall constitute full compensation for installing complete, for all excavation, boring, backfilling, bedding and for furnishing all equipment, tools, labor and incidentals and the performance of all WORK necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The Pay Item for Installing Pipe – Directional Bore shall be as follows:

1220-12-(Size) Installing Pipe – Directional Bore (Size) Linear Feet

- 5.1.11 SPECIAL PIPE BEDDING Special Pipe Bedding shall be paid at the contract unit price per linear foot as shown on City of Alexandria Standard Detail WT-02 for the various types and pipe sizes. The unit price shall constitute full compensation for furnishing all material, hauling, excavation, installation of all material and furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The Pay Item for Special Pipe Bedding shall be as follows:

1220-13-(Size) Special Pipe Bedding (Type 2)(Size) Linear Feet

1220-14-(Size) Special Pipe Bedding (Type 3)(Size) Linear Feet

1220-15-(Size) Special Pipe Bedding (Type 4)(Size) Linear Feet

1220-16-(Size) Special Pipe Bedding (Type 5)(Size) Linear Feet

1220-17-(Size) Special Pipe Bedding (Type 6)(Size) Linear Feet

Example: 1220-14-08 Special Pipe Bedding (Type 3)(8”) Linear Feet

- 5.1.12 ADDITIONAL BEDDING MATERIAL (AS DIRECTED) Additional Bedding Material (As Directed), in place and accepted, will be paid for at the contract unit price per cubic yard (vehicular measurement) of bedding material, which price and payment shall constitute full compensation for furnishing, hauling, and installing all bedding, and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The unit price shall also include removal of unsatisfactory native material. The pay item for Additional Bedding Material (As Directed) shall be as follows:

1220-18 Additional Bedding Material (As Directed) Cubic Yard

- 5.1.13 TAPPING SLEEVE AND VALVE Tapping sleeve and valve on existing mains in place and accepted, will be paid for at the contract unit price per each according to size which price and payment shall constitute full compensation for locating the existing mains.

Preparation of bedding and backfilling, furnishing, hauling, and installing all material, including stopple fittings and three way tees, for removing and abandoning existing facilities, and for furnishing all equipment, tools, taps or tapping fees, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The pay item for Tapping Sleeve and Valve shall be as follows:

1220-19-(Size) 6 x (Size) Tapping Sleeve and Valve Each  
 1220-20-(Size) 8 x (Size) Tapping Sleeve and Valve Each  
 1220-21-(Size) 10 x (Size) Tapping Sleeve and Valve Each  
 1220-22-(Size) 12 x (Size) Tapping Sleeve and Valve Each

Example: 1220-22-08 10 x 8 Tapping Sleeve and Valve Each

- 5.1.14 SPECIAL CROSSING (PER PLAN DETAIL) Special lump sum crossings in place and accepted will be paid for at the contract lump sum price which price and payment shall constitute full compensation for furnishing, hauling, and installing all material, and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with PLANS and SPECIFICATIONS. The limits of this pay item will be shown on the detail. The pay item for Special Crossing (Per Plan Detail) shall be as follows:

1220-23 Special Crossing (Per Plan Detail) Lump Sum

- 5.1.15 OWNER FURNISHED MATERIAL: Items to be furnished to the OWNER shall be paid for at the lump sum contract price. The CONTRACTOR shall furnish a receipt signed by an authorized representative of the OWNER as evidence of delivery in good condition. The contract price and payment shall constitute full compensation for furnishing, hauling, installing all material, and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the PLANS and SPECIFICATIONS. The pay item for Owner Furnished Material shall be as follows:

1220-24 Owner Furnished Material Lump Sum

- 5.1.16 FIRE HYDRANTS: Fire Hydrants shall be paid for by the contract unit price per Each installed and accepted. The unit price shall constitute full compensation for all labor, material, equipment, bedding, backfill, blocking, drainage material, testing and all incidentals necessary to complete the item in accordance with these SPECIFICATIONS. The pay item for Fire Hydrants shall be as follows:

1220-25 Fire Hydrants Each

5.1.17 REMOVE AND RELOCATE FIRE HYDRANTS. Remove and Relocate Fire Hydrants shall be paid for by the contract unit price per Each removed, installed and accepted. The unit price shall constitute full compensation for all necessary labor, material, equipment, bedding, backfill, blocking, drainage material, testing and all incidentals necessary to complete the item in accordance with these SPECIFICATIONS. The pay item for Remove and Relocate Fire Hydrants shall be as follows:

1220-26	Remove and Relocate Fire Hydrants	Each
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**SECTION 1230 SANITARY SEWER AND RELATED APPURTENANCES**

- |  |   |
|--|---|
| 1.1 Description                            | 1.12 Obstruction of Street and Premises                 |
| 1.2 Louisiana One Call                     | 1.13 Conflict with Surface Obstructions                 |
| 1.3 Quality Assurance                      | 1.14 Conflict with Subsurface Obstructions              |
| 1.4 Product Delivery, Storage and Handling | 1.15 Replacing Street Surfacing Driveways and Sidewalks |
| 1.5 Materials                              | 1.16 Cleanup  |
| 1.6 Force Mains                            | 1.17 Testing  |
| 1.7 Manholes                               | 2.1 Measurement   |
| 1.8 Manhole Cover and Frames               | 3.1 Payment   |
| 1.9 Excavation                             |   |
| 1.10 Pipe Bedding                          |   |
| 1.11 Construction Methods                  |   |

**1.1 DESCRIPTION.** The CONTRACTOR shall furnish all labor, materials, tools, and equipment, and perform all operations necessary for sanitary sewers and appurtenances as indicated on the PLANS and SPECIFICATIONS.

**1.2 LOUISIANA ONE CALL.** R.S. 1749.13 requires excavators and demolishers are to notify a Regional Notification Center of their excavation activity. Telephonic notice must be given to the Notification Center at least 48 hours, but no more than 120 hours, in advance, excluding weekends and holidays. The owner/operator of an underground facility must mark the location or provide information to enable an excavator or demolisher using reasonable means to determine the location of the underground facility. Contact **Louisiana One Call** (1-800-272-3020) prior to digging. Locate existing underground utilities by careful probing and hand excavation. Where utilities are to remain in place, protect them from damage during construction operations.

Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the ENGINEER immediately for directions prior to proceeding. All uncharted or incorrectly charted piping or other utilities that are encountered, by the CONTRACTOR, shall be denoted on the Record DRAWINGS with the type and location of the piping or utilities found. In the event that the CONTRACTOR damages uncharted or incorrectly charted piping or other utility, the CONTRACTOR shall contact the affected piping or utility company for repairs.

**1.3 QUALITY ASSURANCE.**

1.3.1 Pipes shall be laid true to the lines and grades shown on the PLANS or as directed by the ENGINEER. The grade shown on the PLANS is the invert grade

to which the WORK shall conform. WORK rejected shall be corrected by the CONTRACTOR at his own expense in a manner acceptable to the ENGINEER.

1.3.2 The CONTRACTOR shall demonstrate his proposed methods of maintaining the grade and alignment of pipe during construction with the ENGINEER before the start of construction.

1.3.3 The CONTRACTOR shall furnish all labor, material and tools to establish and maintain all lines and grades. The ENGINEER shall approve such tools and materials as are required for the WORK and furnished by the CONTRACTOR. Benchmarks and reference points as required for control of the WORK shall be the responsibility of the ENGINEER. Transferring line and grade from these references shall be the responsibility of the CONTRACTOR.

1.3.4 Source Quality Control.

Submittals.

- (A) CONTRACTOR shall submit a listing of suppliers to all manufactured products to be used for sewer appurtenances. These shall include but are not limited to, suppliers of pipe, fittings, manholes, frames, covers, and sewer brick. Inferior performance on prior projects of a similar nature shall be grounds for rejecting a supplier's product.
- (B) CONTRACTOR shall submit for approval shop drawings and technical data on manholes, frames, covers, pipe and fittings prior to ordering and receiving these materials.
- (C) Certificates of compliance with specified standards and tests will be required from the manufacturers, through the CONTRACTOR to the ENGINEER.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING.**

1.4.1 Inspection of material at Delivery Point.

- (A) When delivered to the site, and prior to unloading, the CONTRACTOR shall inspect all pipe, fittings, manholes, frames, covers, and accessories for loss, damage or lack of specified identifications and markings.
- (B) Any defective or improper material shall be immediately marked and shall not be unloaded.

1.4.2 Handling.

- (A) In shipping, storing and installing pipe, fittings, manholes and accessories shall be kept in a sound, undamaged condition. They shall, at all times, be handled with care and shall not be dropped, dumped or bumped against any other object. Any material(s) damaged shall be marked and immediately removed from the job site.
- (B) All precast manhole sections shall be lifted and moved by use of suitable lifting slings, plugs and holes so as not to damage the manhole lip or edges.

#### 1.4.3 Storing.

- (A) Pipe shall be stored off the ground on sticking or pallets. Pipe shall be stacked with spigot ends projecting from the stack in opposite directions for alternate rows.
- (B) Sewer brick shall be kept clean and dry.
- (C) Manhole joints shall be kept protected from damage and shall be kept clean and free of mud, dirt, concrete or other materials that would affect the making of a watertight seal.

#### 1.4.4 Defective Materials.

- (A) All materials found at any time during the progress of the work to have cracks, flaws or other defects shall be rejected and marked and the CONTRACTOR shall promptly remove such defective materials from the WORK site.
- (B) All damage to precast sections that is not cause for rejection shall be repaired. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of a non-shrink grout. Sufficient time shall be allowed for curing before precast sections are installed.

### 1.5 **MATERIALS.** PIPE AND FITTINGS.

GENERAL NOTE. Where it is necessary to join pipes of different types, the CONTRACTOR shall furnish and install the necessary adapters as mentioned in this section and payment for adapter shall be included in the cost of the pipe on which the adapter is placed.

#### 1.5.1 Gravity Sewer Mains and Fittings.

- (A) PVC. PVC sewer pipe shall comply with ASTM D3034 "Standard Specifications for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and

Fittings" or UNI-BELL UNI-B-4. The pipe shall be of Type PSM Poly Vinyl Chloride with a standard dimension ration (SDR) of 26. Pipe and fitting shall have an integral bell with elastomeric seal joints. The joints shall comply with ASTM D3212 or UNI BELL UNI-B-1 "Standard SPECIFICATIONS for Joints for Drain and Sewer Plastic Pipes using Flexible Elastomer Elastomeric Seals (Gaskets) for Joining Plastic Pipe". Joint lubricants shall be as recommended by the pipe manufacturers. PVC sewer pipe shall be installed in accordance with ASTM D2321 using a Class 2 bedding. Except as may be modified above, bedding conditions shall conform to ASTM D2321.

- (B) Truss. ABS or PVC truss sewer pipe shall comply with ASTM D2680 "Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and PolyVinyl Chloride) (PVC) Composite Sewer Piping". Jointing shall be factory attached, Type SC, Solvent-cemented. Primer and cement shall be as recommended by the manufacturer. Fitting for ABS or PVC truss sewer pipe shall comply ASTM D2751 "Standard Specifications for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and fittings". ABS sewer pipe shall be installed in accordance with D2321 using a Class 2 bedding except as detailed in the DRAWINGS. Except as modified above, laying conditions shall conform to ASTM D2690, Appendix XI with reference to ASTM D2321.
- (C) Ductile Iron. Ductile cast iron (D.I.) pipe shall comply with American National Standards Institute (ANSI) A212.50 (AWWA C150) specifications and have push-on joints. If not designated as such on the DRAWINGS, pipe shall be push-on joint. All mechanical joint pipe shall be specifically designated on DRAWINGS. Pipe shall be manufactured in accordance with ANSI/AWWA-C151/A21.51 and ANSI/AWWA - C111/A21.11 SPECIFICATIONS.

Pipe shall be as specified below:

Size	W.T.	Class	Related Working Pressure (PSI)
8"	0.27	50	350
10"	0.32	51	350
12"	0.34	51	350
14"	0.39	52	350
16"	0.43	53	350
18"	0.47	54	350
20"	0.51	55	350

Pipe shall be cement lined and seal coated inside and outside in accordance with ANSI A21-4 (AWWA C104, latest revision). D.I. pipe

shall be laid within a polyethylene tube (polytube) made of 8-mil virgin polyethylene and as produced from Dupont Alathon resin, U.S.I. Petrothene resins, or approved equal.

- (D) Manufacturers of sewer pipe shall have an established track record for pipe production under the same corporate name for a period of at least five (5) years.

#### 1.5.2 Gravity Sewer Service Lines and Fittings.

- (A) PVC. PVC sewer service pipe shall comply with ASTM D3034 "Standard Specifications for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings". The pipe shall be Type PSM Polyvinyl Chloride with a standard dimension ration (SDR) of 26. Pipe and fitting shall have an integral bell with elastomeric seal joints. The joints shall comply with ASTM D3212 "Standard Specifications for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomer Seals". Gaskets shall comply with ASTM F477 "Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe". Joint lubricants shall be as recommended by the pipe manufacturers. PVC service pipe shall be installed in accordance with ASTM D2321 using a Class 1 bedding as detailed on the PLANS.
- (B) ABS. ABS solid wall sewer service pipe shall comply with ASTM D2751, "Standard Specifications for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings". The pipe shall be ABS plastic with a standard dimension ration (SDR) of 26. ABS solid wall sewer service pipe will be installed in accordance with ASTM D2321 using a Class 2 bedding as detailed on the PLANS.
- (C) Ductile Iron. Ductile cast iron (D.I.) pipe for sewer services will comply with American National Standards Institute (ANSI) A212.50 (AWWA C150) specifications and have push-on joints. If not designated as such on the DRAWINGS, pipe shall be push-on joint. All mechanical joint pipe will be specifically designated on the DRAWINGS. Pipe shall be manufactured in accordance with ANSI/AWWA-C151/A21.51 and ANSI/AWWA-C111/A21.11 SPECIFICATIONS. Pipe shall be as specified below:

Size	W.T.	Class	Related Working Pressure (PSI)
4"	0.26	51	350
6"	0.28	50	350

Pipe shall be cement lined and seal coated inside and outside in accordance with ANSI A21.4 (AWWA C104, latest revision). D.I. pipe shall be laid within a polyethylene tube (Polytube) made of 8 mil virgin polyethylene and as produced from Dupont Althon resin, U.S.I. Petrothene resins, or approved equal.

#### 1.5.3 Gravity Sewer Fittings.

- (A) Fittings for PVC or truss pipe must be manufactured by the same company that manufactured the pipe to which it is to be attached.
- (B) Cast Iron Soil Pipe Fittings and Pipe used in cleanout assemblies shall conform to ASTM A74.
- (C) Adapter couplings to connect Cast Iron Soil Pipe and Ductile Pipe to PVC or ABS/PVC truss pipe shall be Fernco Flexible Couplings, or approved equal.

#### 1.5.4 Gravity Sewer Fittings. PVC, Truss and Cast Iron Soil Pipe.

- (A) Fittings for PVC or truss pipe shall be manufactured by the same company that manufactured the pipe to which it is to be attached.
- (B) Cast Iron Soil Pipe Fittings and Pipe used in cleanout assemblies shall conform to ASTM A74.
- (C) Adapter couplings to connect Cast Iron Soil Pipe and Ductile Pipe to PVC or ABS/PVC truss pipe shall be Fernco Flexible Couplings, or approved equal.

### 1.6 **FORCE MAINS.**

- (A) Ductile Cast Iron (D.I.) - Ductile Cast Iron (D.I.) pipe shall be designed in accordance with ANSI A212.50 (AWWA C150) specifications and be push-on joints unless otherwise noted on the construction PLANS or Bid Proposal Form. The pipe shall be manufactured in accordance with ANSI/AWWA-C151/A21.51 and ANSI/AWWA -C111/A21.11 SPECIFICATIONS. Mill certificates shall be furnished upon request of the ENGINEERS. Pipe shall be as specified below:

Size	W.T.	Class	Related Working Pressure (PSI)
4"	0.26	51	350
6"	0.28	50	350
8"	0.27	50	350
10"	0.32	51	350
12"	0.34	51	350
14"	0.39	52	350
16"	0.43	53	350
18"	0.47	54	350
20"	0.51	55	350

The pipe shall be cement lined and seal coated inside and outside in accordance with ANSI A21.4 (AWWA C104, latest revision). Ductile iron pipe shall be laid within a polyethylene tube (Polytube) made of 8 mil virgin polyethylene and as produced from Dupont Alathon resin, U.S. I. Petrothene resins, or approved equal.

- (B) Polyvinyl Chloride Pipe (PVC). Polyvinyl Chloride Pipe (PVC) used for sewer force mains shall conform in all respects to commercial standard CS 256, ASTM D2241, and shall bear the seal of approval of the National Sanitation Foundation.

All polyvinyl chloride pipes shall be furnished in the standard Class 200, SDR- 21 in the sizes shown on the DRAWINGS. All pipe shall have the manufacturer's trade name, the initials P.V.C., the pressure rating and the N.S.F. seal of approval conspicuously marked on each length of pipe.

- (C) High Density Polyethylene (HDPE). High Density Polyethylene (HDPE) used for sewer force mains shall conform to ASTM D3350 with cell classification of 345464C/E and shall be listed with the Plastic Pipe Institute's (PPI) TR4. It shall be formulated with carbon clack and/or ultraviolet stabilizer for protection against UV rays. High Density Polyethylene (HDPE) sizes ½" to 3" shall conform to ASTM D3035 and AWWA C901. It shall have a minimum DR of 9. High Density Polyethylene (HDPE) sizes 4" and larger shall conform to ASTM F714 and AWWA C906. It shall have a minimum DR of 9.

All High Density Polyethylene (HDPE) pipe shall be marked with nominal size and OD base, material code, dimension ratio, pressure class, AWWA C906 or C901, whichever is applicable, and ASTM 714 or ASTM D3035, whichever is applicable.

- (D) Force Main Fittings. Fittings shall be ductile cast iron short body (SSB), with retainer glands in accordance with ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A21.11, and AWWA C104 Standards. Fittings shall have a pressure rating of 350 psi and cement lined. Ductile cast iron fittings shall be wrapped with 8 mil thickness polytube (polyethylene tube) covered under Paragraph 1.5.1 (C) "Ductile Iron" of this section. Cement lining shall be the same as specified from D.I. pipe. Bolts and nuts for fittings shall be Cor-Ten T Bolts as manufactured by NSS Industries of Plymouth, Michigan (1-800-221-5126).

Fittings for High Density Polyethylene (HDPE) shall meet all the requirements for the size pipe listed in Subsection 1.6 (C) above. All special fitting and adaptors shall be included in the price of the pipe.

- (E) Steel Casing Pipe. Steel casing pipe shall be manufactured from steel conforming to ASTM Grade 2 as amended to date, with a minimum yield strength of 35000 psi before forming. The pipe may be straight seam or spiral welded. A protective coat will not be required. Spacer for installation of the carrier pipe shall be installed by the CONTRACTOR.

The diameter and wall thickness of the steel piping shall be as listed in the following table.

<b>Carrier Pipe Size (Inches)</b>	<b>Casing Size (Inches)</b>	<b>Casing Thickness (Inches)</b>
4	8	0.250
6	10	0.250
8	16	0.281
12	20	0.344
24	36	0.532
30	42	0.625

The Thicknesses of casing shown above are minimum thicknesses. Actual thicknesses shall be determined by the casing installer based on an evaluation of the required jacking forces. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the City of Alexandria.

Casing spacers shall be flanged, bolt on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09 inch thick, also having a hardness of 85-90 durometers. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float in the casing. Casing spacers shall be Cascade Waterworks Manufacturing Company or Advanced Products and Systems, Inc., or approved equal.

## 1.7 MANHOLES.

- 1.7.1 Precast Concrete Manholes. Precast reinforced concrete manholes sections shall be manufactured in accordance with ASTM C478 to the dimensions required by the contract DRAWINGS.

Joints for precast sections shall be primed on the sealing faces with a product recommended by the manufacturer of the gasket. Primer shall be applied in accordance with the manufacturer recommendations prior to delivery of the manhole section to the job site. Joints shall be sealed with a flexible gasket material conforming to AASHTO M198, Type B.

The interior of all manhole sections including base sections, risers, cones, grade rings, tops, etc. shall be coated with an epoxy coal tar paint system. The coverage shall exclude approximately three inches (3") each way from the joint of each section in order for the joints to be field grouted on the exterior and interior.

Top or rim elevation adjustments of plus or minus ( $\pm$ ) two feet (2') shall be made in the field with no increase or decrease in the contract unit price.

The epoxy coal tar paint system shall consist of a single coat system with a total dry film thickness of 6 to 8 mils. The epoxy coal tar paint shall be Tneme-Tar system 46-413 as manufactured by Tneme Company, Inc., Catalyzed Epoxy Coal Tar System 40-AX-7, as manufactured by BLP Mobile Paint Company, or approved equal.

- 1.7.2 Concrete. Concrete used in the construction of this item shall comply with Section 910 "Portland Cement Concrete Pavement and Section 620 "Concrete" of these SPECIFICATIONS.
- 1.7.3 Mortar. All mortar for this item shall be composed of one (1) part cement and two (2) parts of sand by volume. The cement and sand shall be thoroughly mixed and sufficient water added to produce a consistency of stiff paste.
- 1.7.4 Reinforcing Steel. Reinforcing steel shall consist of deformed bars and shall comply with Section 620 "Reinforcing Steel" of these SPECIFICATIONS.
- 1.7.5 Bricks. Brick shall conform to the requirements of the Specifications for Sewer Brick (made from clay or shale), ASTM C32. Unless otherwise specified on the PLANS or in the SPECIAL PROVISIONS, brick shall be Grade MA.
- 1.7.6 Gray Iron Castings. Gray iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting their strength and value for the service intended. The castings shall be boldly filleted at angles and the arrises shall be sharp and perfect.

- 1.7.7 General Construction Methods. Where concrete is specified, the structure shall be constructed with concrete placed in accordance with Section 910 "Portland Cement Concrete Pavement and Section 620 "Concrete" of these SPECIFICATIONS. Reinforcing steel where required shall be placed in accordance with the PLANS and securely fastened with wire so as not to be displaced during the placing of concrete.

Where brick is specified, the structure shall be constructed of brick laid in courses in full and closed joints of mortar. Adjoining courses shall break joints one-half (1/2) brick as nearly as practicable. The courses shall be level in all places except where otherwise necessary. At least one (1) course in every seven (7) shall be composed of headers. All brick shall be thoroughly wetted immediately before being laid. Broken or chipped bricks will not be allowed in the face of the structure. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable to finish out a course. All joints shall be completely filled with mortar and shall be finished properly as the WORK progresses.

Inlet and outlet pipes shall be of the same size and kind and meet the same requirements as the pipe with which they are to connect. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections and the structure shall be so constructed around them as to prevent leakage along their outer surface.

Any accumulation of silt, debris or foreign matter of any kind shall be removed from the inside of the structures before final acceptance. After inspection of the completed structures by the ENGINEER, and when directed, the excavated areas that are not occupied by the completed structures shall be refilled to the required elevation with suitable material which shall be placed in layers not more than twelve inches (12") in depth when in a loose condition and each layer thoroughly compacted by mechanical tapping. If the backfill material is too dry to compact to the satisfaction of the ENGINEER, it shall be wetted with water as directed.

## 1.8 MANHOLE COVERS AND FRAMES.

Castings. All castings for manhole covers and frames and other purposes shall be close grained, tough, gray iron free from cracks, holes, swells and cold spots. The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal. All manhole castings shall be made accurately to the pattern and to the dimensions specified with carefully machined bearing surfaces.

Allowances shall be made in the patterns so that specified thickness shall not be reduced. All lids that "rock" and do not lie solid after construction is finished shall be rejected and shall be replaced by adequate lids. No plugging, burning-in or

filing will be allowed. Covers shall fit the frames in any position. All castings shall be carefully coated, both inside and out, with coal tar pitch varnish. The varnish shall be made from a good quality of coal tar, with sufficient oil added to make a smooth coating, tough and tenacious when cold and not brittle nor with any tendency to scale off.

The total weight of each manhole cover and frame shall not be less than three hundred and ten pounds (310 lbs.). The opening inside diameter shall be twenty-two inches (22") and the minimum total height shall be seven and seven-eighths inches (4-7/8") and similar to or equal to EJIW V-1105 or EJIW 2480-1.

Weight and dimensional tolerances shall not exceed those permitted by ASTM Standards. Castings shall be Class 30 conforming to the ASTM A48 "Standard Specification for Gray Iron Castings".

The cover shall have the word "Sewer" in two inch (2") or larger letters cast into the top surface.

## **1.9 EXCAVATION.**

- 1.9.1 General Excavation. The CONTRACTOR shall perform all excavation and trenching of all substances encountered to the depth shown on the PLANS. Excavated materials not required for fill or backfill shall be removed from the site by the CONTRACTOR.

Quantities and different classes of excavation shall be determined by cross-sectioning. Borings and subsurface information shown is for the general information for the bidder and is not guaranteed.

Excavation shall not be continued below the required level shown on the PLANS. Any excavation below required level shall be backfilled at the CONTRACTOR'S expense with native material or "Red Dirt" and thoroughly compacted in accordance with Section 330 "Embankment" of these SPECIFICATIONS.

Unstable soil shall be removed and replaced with gravel crushed stone, or crushed slag, which shall be thoroughly tamped. The ENGINEER will determine the required depth of removal of unstable soil.

- 1.9.2 Trench Excavation. Trenching shall be excavated to conform with the following:

Trench width shall be a minimum of twenty four inches (24") with a minimum of four inches (4") on each side of the bell. Trenches shall have vertical sides extending twelve inches (12") above the top of the bell.

Gravity sewers and force mains shall have a minimum cover of thirty inches (30") unless additional protection is provided as indicated.

Depth of cover shall be measured from the top of the bell or flange, not from the top of the barrel of the pipe.

- 1.9.3 Shoring and Bracing. The CONTRACTOR is responsible for all shoring and bracing and shall comply with all Federal, STATE, and local safety regulations.

Shoring, sheeting and bracing is the full responsibility of the CONTRACTOR. The OWNER and the ENGINEER shall not be held in anyway liable for any damages resulting from the failure of the walls of any trench or excavation.

Where removal of sheeting or bracing is likely to cause damage to pavement or property, the ENGINEER may order such sheeting and bracing left in place. Neither the giving of such orders by the ENGINEER nor his failure or refusal to issue such orders shall not in anyway relieve the CONTRACTOR of responsibility for damages to pipe, pavement or buildings.

Where pipe, conduit or other structures come within the limits of the trench, such pipe or structure shall be supported in a manner that will prevent any damage to them.

Where ground conditions are such that timber sheeting should be left in place or that special cradles should be constructed to ensure proper alignment of the sewer pipe, the CONTRACTOR will be given notice by the ENGINEER to that effect. Sheeting to be left in place shall be driven to a point two feet (2') below the pipe invert and cut off, after initial backfill, to a point no less than two feet (2') above the top of the pipe.

Only sheeting or timber left in place as directed by the ENGINEER shall constitute a pay item and only if included in the Schedule of Bid Items.

The cost of all shoring and bracing not required to be left in place shall be included in the price bid for pipe of each size and depth, and the CONTRACTOR shall receive no additional compensation.

- 1.9.4 Backfilling. Backfilling shall be accomplished by the following methods:

- (A) Trenches. Backfill material shall be placed and compacted evenly and carefully around and over pipes.

Backfilling operations shall be completed immediately after the pipe has been placed in the trench. Upon completion of each day's operations, not more than fifty feet (50') of open trench shall be left uncovered.

- (B) Trench Under Roads, Streets, and Driveway Crossings. After pipe is properly bedded, backfill with Class A-2-4 soil commonly known as "Red

Dirt” and compact to 95% Standard Proctor Density to top of trench by mechanical or hand tamping in 6" compacted layers. “Red Dirt” backfill material shall be considered incidental to the cost of other items.

- (C) **Manholes and Other Structures.** All forms, trash and debris shall be removed and cleared away. Should the Manhole or other Structure be under Roads, Streets, Driveways or other improved surfaces, backfill shall be as described in Subsection 1.9.4 (B). In unimproved areas, backfill may be select on site material. In unimproved areas, backfill material shall be placed symmetrically on all sides in 8 inch maximum layers. Each layer shall be moistened and compacted with mechanical or hand tampers to the satisfaction and approval of the ENGINEER.
- (D) Service Lines. The CONTRACTOR shall exercise extreme caution in laying service lines over lawns, driveways and in easements across privately owned property. Trees, shrubs, flowers and other planting shall be protected and any damage to such property shall be repaired and transformed to the original condition immediately upon completing the service line installation.

**1.10 PIPE BEDDING.** Bedding for vitrified clay, cast iron soil, ductile iron and concrete pipe shall conform to Class 1, 2, 3, 4 or 5 as herein specified. Class 1 bedding shall be used except where other bedding is indicated. Bedding for PVC and truss pipe shall conform to Class 2 bedding, unless otherwise indicated on the PLANS.

Vitrified Clay, Cast Iron, Concrete and Asbestos Cement Pipe.

- (A) Class 1. The pipe shall be bedded in native material on an unshaped trench bottom.
- (B) Class 2. The pipe shall be bedded in crushed stone, rounded gravel which has 95% passing a three-quarter inch ( $\frac{3}{4}$ " ) sieve and five percent (5%) passing a No. 4 sieve, shells, or pea gravel. The bedding shall have a minimum thickness beneath the pipe of 4 inches (4") or one-eighth ( $\frac{1}{8}$ ) of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to one-half ( $\frac{1}{2}$ ) of the outside diameter of the pipe. Backfill between the bedding and a plane twelve inches (12") over the top of the pipe shall be finely divided earth free from debris and stones.
- (C) Class 3. The pipe shall be bedded in washed gravel bedding material placed on 2 - 2" x 10" mud sills running parallel with the trench with 2" x 12" solid creosoted planking attached to the top of the sills on the trench bottom. The bedding material shall have 95% passing a three-quarter inch ( $\frac{3}{4}$ " ) sieve and five percent (5%) passing a No. 4 sieve. The bedding shall have a minimum thickness beneath the pipe of four inches (4") or one-eighth ( $\frac{1}{8}$ )

of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to the horizontal centerline (springline). Backfill, meeting the above requirements, shall be placed from the horizontal centerline to a level twelve inches (12") above the top of the pipe.

- (D) Class 4. The pipe shall be bedded in a monolithic cradle of plain or reinforced concrete having a thickness under the barrel of at least four (4) inches or one quarter ( $\frac{1}{4}$ ) of the inside diameter of the pipe, whichever is greater, and extending up the sides to a height of at least one quarter ( $\frac{1}{4}$ ) of the pipe's outside diameter. The concrete cradle shall have a width at least equal to the outside diameter of the pipe plus eight inches (8") or one and one quarter ( $1\frac{1}{4}$ ) of the outside diameter of the pipe, whichever is greater. Backfill shall be carefully placed above the cradle and extending twelve inches (12") above the top of the pipe.
- (E) Class 5. The pipe shall be bedded in washed gravel bedding material. The bedding material shall have 95% passing a three-quarter inch ( $\frac{3}{4}$ ") sieve and five percent (5%) passing a No. 4 sieve. The bedding shall have a minimum thickness beneath the pipe of twelve (12") and shall extend up the sides of the pipe to the top of the pipe. The bedding material shall be completely wrapped in filter cloth.
- (F) Undercut Bedding. Undercut Bedding shall be used as directed by the ENGINEER to replace unsuitable native material below the required bedding for the pipe or widths greater than that shown on the standard detail. The bedding material shall be the same as specified in Subsection 1.10 (B) above.

## **1.11 CONSTRUCTION METHODS.**

- 1.11.1 Laying Schedule of Pipe Systems. The approximate location of existing sewers, manholes and other utilities are shown on the PLANS. The CONTRACTOR shall be responsible for verifying these locations in the field.

The final location of all tie-ins, service connections and other fittings shall be determined in the field by the ENGINEER.

- 1.11.2 Cutting into and Connecting to Existing Sewers and Manholes. In order to complete the WORK, it may become necessary to cut into and/or connect to existing sewers and manholes. Since such lines are presently in use, the CONTRACTOR shall not be permitted to interrupt the flow at his discretion. The CONTRACTOR shall arrange with the City of Alexandria Waste Water Department and the ENGINEER for a mutually acceptable time when service can be temporarily disconnected. If necessary, the ENGINEER may require the CONTRACTOR to maintain pumps or provide some other means of bypassing flow.

1.11.3 Field Cutting of Pipe. Field cutting of all pipe shall be accomplished in a manner recommended by the manufacturer. Any section of pipe, which is damaged during the cutting operation (including cement mortar lining), will be replaced by the CONTRACTOR at no additional cost to the OWNER.

1.11.4 Thrust Blocks and Anchoring Devices for Force Mains. Concrete thrust blocks shall be provided on sewer force mains at locations shown in the DRAWINGS. The concrete shall be Class B, 2000 psi compressive strength at 28 days, unless otherwise specified in the SPECIAL PROVISIONS. The size of the thrust blocks shall be in accordance with the STANDARD Detail WT-01 "Thrust Blocking Details". The sizes listed in these tables are based on an undisturbed soil bearing pressure of two thousand pounds per square foot (2000 lbs./ft.<sup>2</sup>).

When indicated on the PLANS or directed by the ENGINEER, the CONTRACTOR shall install special tie-rods or other anchoring devices in lieu of installing concrete thrust blocks. When installing a tie-rod assembly, the CONTRACTOR shall use the appropriate bends or other fittings with lugs, socket clamps, tie-rods and rod couplings, as recommended by the manufacturer for the type and size of pipe used.

Special pipe joints, such as a locked-type mechanical joint, may be used, but in all cases where special thrust devices are utilized, only standard items recommended by the pipe manufacturer will be accepted.

The CONTRACTOR shall also provide and remove any temporary thrust blocks needed to complete the testing of the system.

The cost of permanent and temporary thrust blocks shall be included in the unit bid price for sewer pipe.

1.11.5 Tracers for non-metallic Force Mains. Force mains constructed from non-metallic pipe shall be covered with backfill in accordance with these SPECIFICATIONS to twelve inches (12") above the top of the pipe. A metallic detection tape shall then be laid in the trench parallel to and directly above the pipe. The trench shall then be backfilled in accordance with these SPECIFICATIONS to the level of the undisturbed surface.

1.11.6 Installation of Piping for Gravity Main.

- (A) Pipe shall be so laid in the trench that after the sewer pipe installation is completed, the pipe invert shall conform accurately to the grades and alignments shown on the DRAWINGS.
- (B) Eighteen inches of vertical clearance is required between all sewer and waterlines. This is measured from the outside of each pipe.

- (C) Minimum slope on four inch (4") sewer services shall be two percent (2%). Slopes of less than two percent (2%) shall be allowed only if permitted in writing by the ENGINEER. Minimum slope on six inch (6") sewer services shall be three quarters percent (0.75%).

Pipe shall be laid with bell of pipe always placed upstream of pipe laying.

(D) Installation of Piping for Force Mains.

- (1) The minimum vertical distance from the ground surface to the pipe invert shall be three and one-half feet (3-½'), unless otherwise shown on the PLANS.
- (2) Pipe shall be laid with bell of pipe always placed toward direction of lift station and end of pipe towards outfall of main.

(E) Installation of Steel Casing Pipe by Jack and Bore.

- (1) Installation of steel pipe casing shall be by the dry bore method at locations shown on the DRAWINGS. Should the Steel Casing Pipe be installed under LaDOTD roadways or Railroads, the installation shall be in accordance with their respective regulations.
- (2) Boring pits shall be solid sheeted, braced and shored as necessary to provide safe operations. The CONTRACTOR shall take all precautions and comply with all requirements as may be necessary to protect private and public property.
- (3) The CONTRACTOR shall set the boring rig so that after the casing is complete and the sewer pipe is installed, the invert of the pipe shall conform to grade and alignment as shown on the DRAWINGS. As the casing is installed, the CONTRACTOR shall check the horizontal and vertical alignment frequently.
- (4) Boring and Jacking of the casing pipe shall be accomplished by the dry auger boring method without jetting, sluicing or wet boring. The hole shall be bored and cased through the soil by a cutting head on a continuous auger mounted inside the casing pipe. The boring of the hole and installation of the casing pipe shall be simultaneous. Lengths of the casing pipe shall be fully welded to the preceding section in accordance with AWS recommended procedures.
- (5) The bored installations shall have a bored hole diameter essentially the same as the outside diameter of the casing pipe to be installed.

- (6) Lengths of casing pipe shall be as long as practical for site conditions. Joints between sections shall be completely welded in accordance with AWS recommended procedures. Prior to welding joints, the CONTRACTOR shall ensure that both ends of the casing sections being welded are square.
  - (7) Once the jacking procedure has begun, it should be continued without stopping until completed.
- (F) Installation of High Density Polyethylene Pipe by Directional Bore.
- (1) At least 7 days prior to mobilizing equipment the CONTRACTOR shall submit his detailed installation plan to the ENGINEER. The plan shall include a detailed plan and profile of the bores and be plotted at a scale no smaller than 1" = 20' horizontal and vertical. The plan shall also include a list of major equipment and supervisory personnel and a description of the methods to be used.
  - (2) Directional drilling and pipe installation shall be done only by an experienced contractor specializing in directional drilling and whose key personnel have at least five (5) years experience in this work.
  - (3) Joining shall be performed by thermal butt-fusion in accordance with the manufactures recommendations.
  - (4) All polyethylene pipe shall be cut, fabricated, and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe.
  - (5) Pipe shall be joined to one another by means of thermal butt-fusion. Polyethylene pipe lengths to be joined by thermal butt-fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier.
  - (6) The CONTRACTOR shall install the pipelines by means of horizontal directional drilling. The CONTRACTOR shall assemble support, and protect the pipeline prior to installation in the directional drill tunnel. Horizontal directional drilling shall consist of drilling a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directional drilled installation will be determined by the CONTRACTOR, subject to the requirements of these SPECIFICATIONS.

- (7) Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the CONTRACTOR. The maximum allowable pull exerted on the HDPE pipelines shall be measured continuously and limited to the maximum allowed by the pipe manufacturer so that the pipe or joints are not over stressed. A swivel shall be used to connect the pipeline to the drill pipe to prevent torsional stresses from occurring in the pipe. The lead end of the pipe shall be closed during the pullback operation.
- (8) During the drilling, reaming, or pullback operations, the CONTRACTOR shall make adequate provisions for handling the drilling fluids or cuttings at the entry and exit pits. The drilling fluids and cuttings shall be removed from the site and disposed of legally. After completion of the directional drilling work, entry and exit pit shall be restored to original conditions.
- (9) After the pipe is in place, cleaning pigs shall be used to remove residual water and debris. After the cleaning operation, the CONTRACTOR shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-round, and any other deformations. The sizing pig run shall be considered acceptable if the test results indicate that there are no sharp anomalies greater than 2 percent of the nominal pipe diameter, or excessive out-of-round greater than 5 percent of the nominal pipe diameter.

1.11.7 GRAVITY SEWER MAIN POINT REPAIR. Gravity sewer main point shall be single source point repairs and main line point repairs, as authorized by the ENGINEER, and includes all excavation, bedding and backfill necessary to locate, evaluate and repair or replace defective areas of the sewer line, as well as all acceptance testing required by the ENGINEER.

- (A) Point Repair Location: The location of the Point Repair shall be determined by the Engineer and or his representative based on previously performed television inspection. The CONTRACTOR shall verify the location of proposed excavation with the ENGINEER.
- (B) Excavation, Backfill and Compaction: Installation and compaction of trench bedding and placement and compaction of backfill shall be in accordance with the provisions above for Gravity Sewers. Related work shall include, but not be limited to, dewatering trench as necessary to provide a safe and suitable working condition, and sheeting, shoring or bracing trench as deemed necessary to protect adjacent property and/or utilities, to prevent slides, cave-ins, settlement or movement of banks and

to maintain excavation clear of obstructions which would hinder or delay progress of work.

- (C) Materials: The type of pipe used to make the repair shall be equal to or better than the pipe being repaired. The material used to make the repair must be approved by the ENGINEER before the repair is made. Bedding Material shall be Class 2 as per Section 1230, 1.10(B). Backfill shall be in accordance with Section 1230, 1.9.4.
- (D) Surface Removal and Replacement: When the repairs are to be made on sewers lying under paved surfaces, those surfaces shall be removed and replaced to the limits shown of the Drawings or described in the other section of these Specifications. If no Pay Item is included, this work shall be considered incidental to the price of the Point Repair.
- (E) Single Source Point Repairs: Those repairs located on 6" diameter or larger gravity mains, which require excavation from the surface to accurately locate sources of infiltration and inflow and to eliminate them by making the necessary repairs. This work requires sealing and closing and opening in the pipe or fittings which shall remain in place. These repairs are accomplished with wrap-around repair sleeves or couplings or the removal and replacement of a section of pipe less than three (3) feet in length.
- (F) Main Line Point Repairs: Those repairs located on 6" diameter or larger gravity mains, which require excavation from the surface to accurately locate sources of infiltration and inflow and to eliminate them by making the necessary repairs. This work requires removal and replacement of a section of pipe greater than three (3) feet in length but less than fourteen (14) feet, which is the nominal length of one new joint of PVC ASTM D 3034 pipe.
- (G) Extension to Main Line Point Repairs: Should the Main Line Point repair extend beyond the fourteen (14) feet, an extension to the repair may be directed by the ENGINEER. These extension will be made in minimum sections of four (4) feet.

**1.12 OBSTRUCTION OF STREETS AND PREMISES.** All excavated material shall be placed so as to cause minimum interference with public travel. At street crossings and other points, as necessary, trenches shall be bridged in a manner that will allow continued public travel. The closure of both sides of a roadway to vehicular traffic will not be permitted except by special permission for a specified period. Care shall be taken to give free access at all times to fire hydrants, water valves, fire alarm boxes and Police Department and Fire Department driveways.

- 1.13 CONFLICT WITH SURFACE OBSTRUCTIONS.** All shade trees, shrubbery, utility poles, or other surface obstructions within the right-of-way provided shall be protected. Any buildings or structures that may be endangered during the WORK shall be shored up and otherwise protected. Any properties disturbed or damaged by the CONTRACTOR shall be restored to their original condition. No additional compensation will be made for this correction work.
- 1.14 CONFLICT WITH SUBSURFACE OBSTRUCTIONS.** The CONTRACTOR shall exercise care to prevent damage to any gas, water, telephone, cable, electric, sewer, drain, or service line, or other underground structure. All damage caused by the construction and due to the CONTRACTOR'S failure to contact OWNER of the utility or structure shall be immediately repaired at the expense of the CONTRACTOR. Should the CONTRACTOR fail to correct such damages or injury, the OWNER may have the repairs made and deduct the cost thereof from any amounts due or to become due to the CONTRACTOR.
- 1.15 MAINTENANCE OF TRENCHES.** The CONTRACTOR shall maintain all backfilled trenches and other areas disturbed by construction of the PROJECT until completion and acceptance of the PROJECT. Following the Notification of Acceptance by the OWNER, the CONTRACTOR shall maintain the surface of the trench excavation for a period of ninety (90) days thereafter. All sidewalks, curbs, gutters, driveways, shrubbery, fences, sod, or other property paved or replaced shall be guaranteed by the CONTRACTOR for a period of one year after said Notification of Acceptance and repaired if necessary.
- 1.16 REPLACING STREET SURFACING, DRIVEWAYS AND SIDEWALKS.** On all paved or unimproved streets, driveways and sidewalks, the surface of the trenches shall be restored, without delay, to the original condition. The finished surfaces shall conform to the undisturbed portion of the roadway or sidewalks, and shall in every respect, be equal in quality, materials and workmanship to the original. If no Pay Item is included in the Bid Documents for Removal or Replacement of paved or unimproved streets, driveways, curbs and sidewalks, the cost of these items shall be considered incidental to other items.

The CONTRACTOR shall maintain any replacement of base, street surfacing, or sidewalks and driveways from the time of installation until final acceptance of the WORK by the OWNER. This work shall be at no additional cost to the City of Alexandria.

- 1.17 Clearing and Grubbing and Removal of Structures and Obstructions.** The CONTRACTOR shall Clear and Grub the areas necessary to install work in accordance with Section 310 of the City of Alexandria Standard Specifications. If no Pay Item for Clearing and Grubbing is included in the Bid Documents, this work shall be considered incidental to other Items.

**1.18 Removal of Structures and Obstructions.** The CONTRACTOR shall remove all structures and obstructions necessary to install the work in accordance with Section 320 of the City of Alexandria Standard Specifications. If no Pay Item for Removal of Structures and Obstructions are included in the Bid Documents, this work shall be considered incidental to other Items.

**1.19 CLEANUP.** Upon backfilling of any excavation, the CONTRACTOR shall immediately begin the removal of all surplus dirt except the amount that is actually necessary to compensate for settlement of the fill. He shall remove all pipe and other excess material placed or left by him on the street or right-of-way except material needed for the replacement of the paving. The street shall be opened and made passable for traffic following the above WORK.

On ungraded streets, any surplus dirt may be deposited on the surface and graded for the convenience of traffic, if approved by the ENGINEER.

Final acceptance will not be made until the CONTRACTOR has removed all refuse or surplus material left by him and restored the PROJECT area in all respects to a condition equal to its original condition.

**1.20 TESTING.**

**1.20.1 Field Leakage Tests for Gravity Mains.** At no point in the new portion of the gravity sewer collection system shall the leakage of ground water into the system exceed an infiltration or exfiltration rate of two hundred (200) gallons/inch/mile/day for heads of up to fifteen feet (15'), as determined by one of the test methods of Paragraph 1.20.2 or 1.20.3 of this section.

**1.20.2 Field Hydrostatic and Leakage Tests for Force Mains.** The hydro-static testing of all lines shall conform to the requirements of AWWA C600, Section 13, except as modified below.

- (A) The test shall be applied to the whole individual valved-off sections of the mains.
- (B) Maximum allowable leakage shall not exceed ten (10) gallons per inch of pipe diameter per mile of pipe per twenty four (24) hours.
- (C) The CONTRACTOR shall furnish gauges, meters, water and any other material, tools, labor, equipment and other necessary assistance for conducting the tests. The ENGINEER will be notified at least twenty four (24) hours in advance of the hydrostatic test.
- (D) The test pressure shall be 100 psi and shall be maintained for a minimum of four (4) hours. The test pressure will be based on the elevation of the

lowest point of the line or section under test and corrected to the elevation of the test gauge.

- (E) Test Method. The completed sewerage system will be tested by one or more of the following methods at the discretion of the ENGINEER.
- (1) Air Test Technique. This test is a measurement of air pressure drop plotted against time and pipe diameters. The pipe section to be tested shall be securely plugged at each opening. Pipe walls shall be in a wet condition to minimize loss of air due to permeability in the dry condition. An air compressor shall fill the pipe line until a constant pressure of four (4.0) psig is maintained. The air compressor shall be fitted with a blow-off valve set to operate at (five) 5.0 psig to prevent dangerously high air pressure. After a constant pressure of four (4.0) psig is achieved, a two (2) minute stabilization period shall be allowed so that entering air can equalize with the temperature of the pipe wall. After the two-minute stabilization period, the air supply shall be disconnected. The time required for the pressure to drop from 3.5 to 2.5 psig shall be determined. The loss of air is acceptable and the line is considered to be free from defects if the time, in seconds, for the pressure to drop from 3.5 to 3.5 psig is not less than the amount shown in the following table for the respective pipe diameter.

Pipe Diameter	Time (minutes:seconds)
8"	3:57
10"	4:43
12"	5:40
14"	6:36
16"	7:33
18"	8:30
20"	9:26
24"	11:20
30"	14:10
36"	17:00

If the air pressure drops in less than the time shown in the above table, the test shall be considered a failure and the CONTRACTOR shall locate and repair defective joints and perform the test again at his expense.

- (2) Infiltration Test. This test shall only be used when the ground water table completely surrounds the section of pipe to be tested.

Sections of the pipe between adjacent manholes are tested by plugging all outlets at the upstream manhole, except that which is to be tested. All house laterals or other entrances to the sewer shall be capped or plugged. At the downstream manhole, a V-notch weir is inserted into the pipe and used to determine the flow. Other flow plans of such device shall be submitted to the ENGINEER for his prior review and concurrence.

- (3) Ex-filtration Test. This test shall be used when the ground water level is below the invert of the sewer pipe. In this test, the downstream manhole of the section to be tested shall be filled with a plug to which a water connection can be made for filling the pipe. All laterals and any tributary lines not included in the test shall be plugged. Water shall be introduced into the line at the downstream manhole until the upstream manhole terminus of the line under test has been completely filled. The line shall then be allowed to stand for two hours to allow water absorption depth of the line shall then be applied for two hours. The leakage during the two-hour period shall be determined by measuring the amount of water in gallons that must be added to bring the water level back to its original position.
- (4) Materials and Equipment for Testing. In all of the above testing procedures, the CONTRACTOR shall be responsible for providing the labor, equipment and other materials required to complete the tests in the specified manner.

**2.1 MEASUREMENT.** This section presents the methodology that shall be used to pay for all items shown on the Bid Form. Payment includes, but is not limited to, all labor, materials and incidentals necessary to complete the item in full accordance with the PLANS and SPECIFICATIONS, and to provide the OWNER with a totally and completely functional PROJECT. Any item required for construction of this PROJECT that is not shown on the Bid Form is considered incidental and it shall be included in the unit price bid for the item to which it most closely pertains. Unbalanced bids may be cause for rejection of any bid. The deductive items shown in the Bid Form are not to be totaled in with the total bid. They are for the purpose of setting unit prices for contingency items only.

**2.1.1 Sewer Manholes.** Sewer Manholes including frame and cover, etc. placed, tested and accepted shall be measured per each. The Standard Depth of the Sewer Manhole is a maximum of four feet. The depth of the Sewer manhole above four feet shall be measured as extra depth.

The basis for determining depth shall be the difference between the invert out of the manhole and the elevation of the center of the upper surface of the manhole top.

2.1.2 Gravity Sewer Pipe. Gravity sewer pipe shall be measured by the linear foot from center of manhole to center of manhole with no deduction in footage for distance across wyes. The depth of the Gravity sewer shall not be measured. Should the Gravity Sewer depth be different from that shown on the Drawings, any additional work required shall be paid as Extra Work as shown in the General Provisions.

The use of Class 3, 4 or 5 bedding shall be paid for under a separate item. Use of Class 1 or 2 bedding as required by these specifications shall be included in cost of gravity sewer pipe.

2.1.3 Force Main Sewer Pipe. Force Main sewer pipe shall be measured by the Linear Foot of Force Main of the Size and Type shown on the PLANS and in these SPECIFICATIONS. PVC fittings required shall not be measured and shall be considered incidental to the Pipe. High Density Polyethylene fittings and adaptors shall not be measured and shall be considered incidental to the pipe. Ductile Iron fittings shall be measured separately.

2.1.4 Ductile Iron Fittings. Ductile Iron Fittings shall be measured by the Pound. The weight of the fittings shall be as shown in published standards for short body fittings. Truss block, bolts, nuts, washers, rings, flange packs, and other miscellaneous material to complete the installation of the fitting shall not be measured and shall be considered incidental to the Ductile Iron Fitting.

2.1.5 Steel Casing Pipe. Steel Casing Pipe shall be measured by the Linear Foot installed by Open Cut or Jack and Bore as shown on the PLANS. Excavation and backfill of pits shall not be measured and shall be considered incidental to the Steel Casing Pipe. Spacer, grout and miscellaneous materials required to install the carrier pipe shall not be measured and shall be included in the Steel Casing Pipe.

2.1.6 Bedding Material. Bedding material of the Class shown on the Plans or in the Specifications shall be measured by the Linear Foot for the various sizes of pipe. It shall include all incidentals required to install the material in accordance with these SPECIFICATIONS or as shown on the PLANS. Class 1 or Class 2 bedding shall not be measured and shall be considered incidental to pipe.

2.1.7 Sewer Service Pipe. Sewer service pipe installed and tested shall be measured by the linear foot. The type and size shall be shown of the PLANS and in the BID DOCUMENTS.

2.1.8 Sewer Force Main Pipe. Sewer force main pipe installed and tested shall be measured by the linear foot. The type and size shall be shown on the PLANS and in the BID DOCUMENTS.

2.1.9 Sewer Service Connections. Sewer service connections installed and tested shall be by the each. The sewer service connections shall include all materials to

install the connection in accordance with the City of Alexandria Standard SS-04. It shall include all pipe, wye's, 1/8 bends, caps, etc. to install the connection. The sewer service line shall be measured under other items.

2.1.10 Cleanout Assemblies. Cleanout assemblies will be measured on a per each basis. Cleanout assemblies shall include:

- (A) Fernco Flexible Coupling or PVC sewer spigot by C.I. Hub with Jones Tite Seal Gasket, or approved equal;
- (B) Cast iron soil pipe wyes;
- (C) PVC plug;

Required length of cast iron soil pipe;

Bess and Hays Pattern #404;

18" x 18" x 4" concrete pad; and

All gaskets, lubricants and labor to complete installation.

2.1.11 Undercut Bedding. Undercut Bedding furnished and installed shall be measured by the C.Y. No measurement shall be made for excavation of unsuitable material which shall be included in the price for Undercut Bedding. Undercut Bedding shall be used only at the direction of the ENGINEER.

2.1.12 Single Source Point Repairs (0' to 6'): Single Source Point Repairs shall be measured by the actual number of repairs completed and accepted. Single Source Point Repairs will be classified by pipe size and shall be no deeper than six (6) feet. Single Source Point Repairs shall include all excavation, bedding, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.

2.1.13 Main Line Point Repairs (0' to 6'): Main Line Point Repairs will be measured by the actual number of repairs completed and accepted. Point repairs will be classified by pipe size and shall be no deeper than six (6) feet measured from of the flow line of the pipe to the existing surface. Main Line Point Repairs shall include excavation, bedding, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.

2.1.14 Extension to Main Line Point Repairs (0' to 6'): Extension to Main line Point Repairs shall be measured by the Linear Foot measured along the pipe in excess of fourteen (14) feet and shall be no deeper than six (6) feet measured from the flow line of the pipe to the existing surface. The pay length shall be a minimum

of four (4) feet. Extension to Main Line Point Repairs shall include all excavation, bedding, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.

- 2.1.15 Single Source Point Repair (Extra Depth): Single Source Point Repair (Extra Depth) shall be measured by the Vertical Foot in excess of six (6) feet measured from the flow line of the pipe to the existing surface. Single Source Point Repair (Extra Depth) shall include excavation, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.
- 2.1.16 Main Line Point Repair (Extra Depth): Main Line Point Repair (Extra Depth) shall be measured by the Vertical Foot in excess of six (6) feet measured from the flow line of the pipe to the existing surface. Main Line Point Repair (Extra Depth) shall include excavation, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.
- 2.1.17 Extension to Main Line Point Repairs (Extra Depth): Extension to Main Line Point Repairs (Extra Depth) shall be measured by the Vertical Foot in excess of six (6) feet measured from the flow line of the pipe to the existing surface. Extension to Main Line Point Repairs (Extra Depth) shall include excavation, backfill, testing and any incidentals required to complete the point repair in accordance with these Specifications or as directed by the ENGINEER.
- 2.1.18 Sewer Main Connection to Existing Manhole (Any Size): Sewer Main Connection to Existing Manholes shall be measured by the Each installed in accordance with these Specifications and accepted by the ENGINEER. The size of the main to be connected shall be shown on the plans. Sewer Main Connection to Existing Manhole (Any Size) shall include all excavation material, demolition, testing and incidentals required to complete the connection in accordance with these Specifications or as directed by the ENGINEER.
- 2.18.19 Sewer Main Connection to Existing Sewer Main (Any Size): Sewer Main Connection to Existing Sewer Main (Any Size) shall be measured by the Each installed in accordance with these Specifications and accepted by the ENGINEER. The size of the main to be connected shall be shown on the plans. Sewer Main Connection to Existing Sewer Main (Any Size) shall include all excavation, material, demolition, testing and incidentals required to complete the connection in accordance with these Specifications or as directed by the ENGINEER.
- 3.1 PAYMENT.** Payment for various items shall be made at the contract bid price for items installed and accepted, which price and payment shall constitute full compensation for excavation, installation, compacting backfill; and for furnishing

all materials, tools, equipment, labor and incidentals necessary to complete the WORK.

- 3.1.1 Gravity Sewer Pipe (PVC). Gravity Sewer Pipe (PVC) shall be paid for by the Linear Foot of PVC gravity sewer pipe installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, bedding as required by these SPECIFICATIONS, pipe material including fittings except for D.I. Fittings, haul off of excess material, backfill, and all incidentals necessary to complete this item in accordance with the SPECIFICATIONS and the DRAWINGS. The depth of the PVC gravity sewer pipe shall be as shown on the DRAWINGS. Where changes of more than two (2) feet in depth are directed by the ENGINEER, changes in the Linear Foot price will be made in accordance with the GENERAL PROVISIONS for extra work. The pay items for Gravity Sewer Pipe (PVC) will be as follows:

1230-01-(Diameter) Gravity Sewer Pipe (PVC) (Diameter) L.F.

Example: 1230-01-04 Gravity Sewer Pipe (PVC) (4" Diameter)

- 3.1.2 Gravity Sewer Pipe (ABS/PVC Truss). Gravity Sewer Pipe (ABS/PVC Truss) shall be paid for by the Linear Foot of ABS/PVC Truss gravity sewer pipe installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing bedding material, furnishing and installing pipe material including fittings, except for D.I. Fittings, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The depth of the ABS/PVC Truss gravity sewer pipe shall be as shown on the DRAWINGS. Where changes of more than two (2) feet in depth are directed by the ENGINEER, changes in the Linear Foot price will be made in accordance with the GENERAL PROVISIONS for extra work. The pay items for Gravity Sewer Pipe (ABS/PVC Truss) will be as follows:

1230-02-(Diameter) Gravity Sewer Pipe (ABS/PVC Truss) (Diameter) L.F.

Example: 1230-02-08 Gravity Sewer Pipe (ABS/PVC Truss) (8" Diameter)

- 3.1.3 Gravity Sewer Pipe (Ductile Iron). Gravity Sewer Pipe (Ductile Iron) shall be paid for by the Linear Foot of Ductile Iron gravity sewer pipe installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing bedding material, furnishing and installing pipe material including fittings except for D.I. Fittings, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The depth of the Ductile Iron gravity sewer pipe shall be as shown on the DRAWINGS. Where changes of more than two (2) feet in depth are directed by the ENGINEER, changes in the Linear Foot price will be made in accordance

with the GENERAL PROVISIONS for extra work. The pay items for Gravity Sewer Pipe (Ductile Iron) will as follows:

1230-03-(Diameter) Gravity Sewer Pipe (D.I.) (Diameter) L.F.

Example: 1230-03-04 Gravity Sewer Pipe (D.I.) (4" Diameter)

- 3.1.4 Force Main (PVC). Force Main (PVC) shall be paid for by the Linear Foot of Force Main (PVC) installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing bedding material, furnishing and installing fittings except for D.I. Fittings, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The depth of the Force Main (PVC) shall be as shown on the DRAWINGS. The pay items for Force Main (PVC) shall be as follows:

1230-04-(Diameter) Force Main (PVC) (Diameter) L.F.

Example: 1230-05-04 Force Main (PVC) (4" Diameter)

- 3.1.5 Force Main (Ductile Iron). Force Main (Ductile Iron) shall be paid for by the Linear Foot installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing pipe, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Force Main (Ductile Iron) shall be as follows:

1230-05-(Diameter) Force Main (D.I.) (Diameter) L.F.

Example: 1230-05-04 Force Main (D.I.) (4" Diameter)

- 3.1.6 Ductile Iron Fittings. Ductile Iron Fittings shall be paid for by the pound installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall include excavation, furnishing and installing Ductile Iron Fittings including nuts, bolts, flanges, etc., removal of excess material, truss block or restraints and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Ductile Iron Fittings shall be as follows:

1230-06 Ductile Iron Fittings LB

- 3.1.7 High Density Polyethylene (HDPE) (Directional Bore). High Density Polyethylene (HDPE) (Directional Bore) shall be made by the Linear Foot of pipe installed and

accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation and backfill of bore pits, furnishing and installing the pipe including necessary fittings and adaptors, removal of excess material including drilling fluids and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for High Density Polyethylene (HDPE) (Directional Bore) shall be as follows:

1230-07-(Diameter) HDPE Directional Bore (Diameter) L.F.

Example: 1230-07-04 HDPE Directional Bore (4" Diameter)

- 3.1.8 Steel Casing Pipe (Open Cut). Steel Casing Pipe (Open Cut) shall be made by the Linear Foot of Steel Casing Pipe installed by open cut in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing pipe, backfill and compaction, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Steel Casing Pipe shall be as follows:

1230-08-(Diameter) Steel Casing Pipe (Open Cut) (Diameter) L.F.

Example: 1230-08-06 Steel Casing Pipe (Open Cut) (6" Diameter)

- 3.1.9 Steel Casing Pipe (Jack and Bore). Steel Casing Pipe (Jack and Bore) shall be made by the Linear Foot of Steel Casing Pipe installed by Jack and Bore in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation and backfill of bore pits, sheeting and shoring, furnishing and installing pipe, removal of excess material and all other incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Steel Casing Pipe (Jack and Bore) shall be as follows:

1230-09-(Diameter) Steel Casing Pipe (Jack and Bore) (Diameter) L.F.

Example: 1230-09-06 Steel Casing Pipe (Jack and Bore) (6" Diameter)

- 3.1.10 Standard Depth Sanitary Manhole. Standard Depth Sanitary Manhole shall be paid for by each Standard Depth Sanitary Manhole installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation and backfill, furnishing and installing the Sanitary Manhole, boots, grout, invert, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Standard Depth Sanitary Manholes shall be as follows:

1230-10-(Diameter) Standard Depth Sanitary Manhole (Diameter) Each

Example: 1230-10-04 Standard Depth Sanitary Manhole (4' Diameter)

- 3.1.11 Extra Depth Sanitary Manhole. Extra Depth Sanitary Manhole will be paid for by the Vertical Foot installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation and backfill, furnishing and installing the Sanitary Manhole sections, boots, grout, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay items for Extra Depth Sanitary Manholes shall be as follows:

1230-11-(Diameter) Extra Depth Sanitary Manhole (Diameter) V.F.

Example: 1230-11-04 Extra Depth Sanitary Manhole (4' Diameter)

- 3.1.12 Service Assemblies (All Sizes). Service Assemblies shall be paid for by the Each service assembly installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation and backfill, furnishing and installing the pipe and fittings, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay item for Service Assemblies shall be as follows:

1230-12 Service Assemblies (All Sizes) Each

- 3.1.13 Bedding Material (Class 3). Bedding Material (Class 3) shall be paid by the Linear foot of Bedding Material (Class 3), installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS or as directed by the ENGINEER for the various sizes of pipe. The Unit Price shall be full compensation for excavation, furnishing and installing bedding materials shown on the plans for Class 3 Bedding, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATION and the DRAWINGS. This pay item shall be used for both Gravity Sewer and Force Mains. The pay items for Bedding Material (Class 3) shall be as follows:

1230-13-(Diameter) Bedding Material (Class 3) (Diameter) L.F.

Example: 1230-13-04 Bedding Material (Class 3) (4" Diameter)

- 3.1.14 Bedding Material (Class 4). Bedding Material (Class 4) shall be paid for by the Linear Foot installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS or as directed by the ENGINEER for the various sizes of pipe. The Unit Price shall be full compensation for excavation, furnishing and installing bedding materials shown on the plans for Class 4 Bedding, removal of

excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. This pay item shall be used for both Gravity Sewer and Force Mains. The pay items for Bedding Material (Class 4) shall be as follows:

1230-14-(Diameter) Bedding Material (Class 4) (Diameter) L.F.

Example: 1230-14-04 Bedding Material (Class 4) (4" Diameter)

- 3.1.15 Bedding Material (Class 5). Bedding Material (Class 5) shall be paid for by the Linear Foot installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS or as directed by the ENGINEER for the various sizes of pipe. The Unit Price shall be full compensation for excavation, furnishing and installing material as shown on the plans for Class 5 Bedding, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. This pay item shall be used for both Gravity Sewer and Force Mains. The pay items for Bedding Material (Class 5) shall be as follows:

1230-15-(Diameter) Bedding Material (Class 5) (Diameter) L.F.

1230-15-04 Bedding Material (Class 5) (4" Diameter)

- 3.1.16 Clean Out Assemblies (Type 1) (All Sizes). Clean Out Assemblies (All Sizes) shall be paid for by Each Clean Out Assembly installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing pipe and fittings as shown on the DRAWINGS for Type 1 Clean Out Assemblies, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay item for Clean Out Assemblies (All Sizes) shall be as follows:

1230-16 Clean Out Assemblies (Type 1) (All Sizes) Each

- 3.1.17 Clean Out Assemblies (Dead End) (All Sizes). Clean Out Assemblies (Dead End) (All Sizes) shall be paid for by Each Clean Out Assembly installed and accepted in accordance with these SPECIFICATIONS and the DRAWINGS. The Unit Price shall be full compensation for excavation, furnishing and installing pipe and fittings as shown on the DRAWINGS for Dead End Cleanout Assemblies, removal of excess material and all incidentals required to complete the installation in accordance with these SPECIFICATIONS and the DRAWINGS. The pay item for Clean Out Assemblies (Dead End) (All Sizes) shall be as follows:

1230-17 Clean Out Assemblies (Dead End) (All Sizes) Each

- 3.1.18 Undercut Bedding. Undercut bedding shall be paid for by the Cubic Yard of Bedding material installed and accepted in accordance with these Specifications and as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, furnishing bedding material, compaction and all incidentals necessary install the Bedding Material. No payment will be made for excavation and removal of unsuitable material and this shall be included in the unit price for Undercut Bedding. The pay item for Undercut Bedding shall be as follows:

1230-18 Undercut Bedding (As Required) C.Y.

- 3.1.19 Single Source Point Repair (0' to 6'): Single Source Point Repair (0' to 6') shall be paid by Each installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, furnish and placing bedding material, pipe and fittings, backfill, compaction, testing and all incidentals necessary to perform the Point Repair. The pay item for Single Source Point Repair (0' to 6') shall be as follows:

1230-19-(Diameter) Single Source Point Repair (0' to 6') Each

1230-19-06 Single Source Point Repair (0' to 6') (6" Diameter)

- 3.1.20 Main Line Point Repair (0' to 6'): Main Line Point Repair (0' to 6') shall be paid by the Each installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, furnish and placing bedding material, pipe and fittings, backfill, compaction, testing and all incidentals necessary to perform the Point Repair. The pay item for Main Line Point Repair (0' to 6') shall be as follows:

1230-20-(Diameter) Main Line Point Repair (0' to 6') Each

Example: 1230-20-06 Main Line Point Repair (0' to 6') (6" Diameter)

- 3.1.21 Extension to Main Line Point Repair (0' to 6'): Extension to Main Line Point Repair (0' to 6') shall be paid by the Linear Foot installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The minimum pay length shall be four (4) feet. The Unit Price shall be full compensation for excavation, haul off, furnishing and placing bedding material, pipe and fittings, backfill, compaction, testing and all incidentals necessary to perform the point repair. The pay item for Main Line Point Repair (0' to 6') shall be as follows:

1230-21-(Diameter) Extension to Main Line Point Repair (0' to 6') L.F.

Example: 1230-21-06 Extension to Main Line Point Repair (0' to 6') (6" Dia.)

- 3.1.22 Single Source Point Repair (Extra Depth): Single Source Point Repair (Extra Depth) shall be paid by the Vertical Foot installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, furnishing and placing bedding material, backfill, compaction, testing and all incidentals necessary to perform the point repair. The pay item for Single Source Point Repair (Extra Depth) shall be as follows:

1230-22-(Diameter) Single Source Point Repair (Extra Depth) Vertical Foot

Example: 1230-22-06 Single Source Point Repair (Extra Depth)(6" Diameter)

- 3.1.23 Main Line Point Repair (Extra Depth): Main Line Point Repair (Extra Depth) shall be paid by the Vertical Foot installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, furnishing and placing bedding material, backfill, compaction, testing and all incidentals necessary to perform the point repair. The pay item for Main Line Point Repair (Extra Depth) shall be as follows:

1230-23-(Diameter) Main Line Point Repair (Extra Depth) Vertical Foot

Example: 1230-23-06 Main Line Point Repair (Extra Depth) (6" Diameter)

- 3.1.24 Extension to Main Line Point Repair (Extra Depth): Extension to Main Line Point Repair (Extra Depth) shall be paid by the Vertical Foot installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, haul off, backfill material, compaction, testing and all incidentals necessary to perform the point repair. The pay item for Extension to Main Line Point Repair (Extra Depth) shall be as follows:

1230-24-(Dia.) Extension to Main Line Point Repair (Extra Depth) Vertical Foot

Example: 1230-24-06 Extension to Main Line Point Repair (Extra Depth) (6" Dia.)

- 3.1.25 Sewer Main Connection to Existing Manhole (Any Size): Sewer Main Connection to Existing Manhole (Any Size) shall be paid by the Each installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, demolition, materials, backfill, haul-off, compaction, testing and all incidentals necessary to make the connection. The pay item for Sewer Main Connection to Existing Manhole (Any Size) shall be as follows:

1230-25 Sewer Main Connection to Existing Manhole (Any Size) Each

3.1.26 Sewer Main Connection to Existing Main (Any Size): Sewer Main Connection to Existing Main (Any Size) shall be paid by the Each installed and accepted in accordance with these Specifications or as directed by the ENGINEER. The Unit Price shall be full compensation for excavation, demolition, materials, backfill, haul-off, compaction, testing and all incidentals necessary to make the connection. The pay item for Sewer Main Connection to Existing Main (Any Size) shall be as follows:

1230-26 Sewer Main Connection to Existing Main (Any Size) Each

**SECTION 1310 PLASTIC PAVEMENT MARKINGS**

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Material                          | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** The WORK consist of furnishing and placing reflective pavement markings of hot applied thermoplastic or preformed (cold or hot applied) plastic at the locations shown on the plans or as directed by the ENGINEER. The WORK shall be in compliance with the MUTCD, plan details and these specifications. Plastic pavement markings include stripes, gore markings, lines, legends and symbols.

**1.2 MATERIAL.** Thermoplastic marking material shall conform to the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 732.02.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.** Thermoplastic Pavement Markings shall be installed in accordance with the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 732.03.

**2.1 MEASUREMENT.** Plastic pavement marking shall be measured as follows;

(a) Plastic Pavement Striping: Plastic striping will be measured by the Linear Foot or Linear Mile as specified. The width of each type of plastic striping will be shown on the plans. An item will be established for each width shown and will be measured by the Linear Foot or Linear Mile as specified.

(b) Plastic Pavement Legends and Symbols: Plastic legends and symbols will be measured per each legend or symbol. Symbols shall include all letters, lines, bars or markings necessary to convey the message at each location.

(c) Removal of Existing Pavement Markings: Removal of existing pavement markings will not be measured. Removal of existing pavement markings shall be included in other items.

**3.1 PAYMENT.** Payment for Plastic pavement marking shall be made as follows:

(a) Plastic Pavement Striping: Plastic striping will be paid at the CONTRACT unit price per Linear Foot or Linear Mile at the width specified. The CONTRACT unit price shall be full compensation for Plastic Pavement Markings complete and accepted in accordance with these SPECIFICATIONS.

(b) Plastic Pavement Legends and Symbols: Plastic legends and symbols shall be paid at the CONTRACT unit price per each legend or symbol completed and accepted in accordance with these SPECIFICATIONS. Payment shall be full compensation for all letters, lines, bars or markings necessary to convey the message at each location.

(c) Removal of Existing Pavement Markings: Removal of existing pavement markings will not be paid but shall be included in the bid price of other items.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Units</b>
1310-01-(line width)	Plastic Pavement Marking (line width)	Linear Foot (Mile)
1310-02-(letter)	Plastic Pavement Symbol (description)	Each
Letter	Description	
A	Arrow	
B	Double Arrow	
C	Only	
D	RR Crossing	
E	School	
F	Other Symbol	

## SECTION 1320 PAINTED TRAFFIC MARKINGS

- |                                       |                 |
|---------------------------------------|-----------------|
| 1.1 Description                       | 2.1 Measurement |
| 1.2 Material                          | 3.1 Payment     |
| 1.3 General Construction Requirements |                 |

**1.1 DESCRIPTION.** The WORK shall consist of furnishing and applying reflective white or yellow paint for pavement markings in accordance with plan details, the MUTCD and these specifications.

**1.2 MATERIAL.** Traffic paint shall conform to the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 737.02.

**1.3 GENERAL CONSTRUCTION REQUIREMENTS.** Painted Traffic Markings shall be installed in accordance with the Louisiana Department of Transportation Standard Specifications, Latest Edition, Section 737.03 through Section 737.13.

**2.1 MEASUREMENT.** Painted Traffic Markings will be measured as follows:

(a) **Painted Traffic Striping:** Painted striping will be measured by the Linear Foot or Linear Mile as specified. The width of each type of plastic striping will be shown on the plans. An item will be established for each width shown and will be measured by the Linear Foot or Linear Mile as specified. No deduction will be made for gaps in broken-line striping; however, deduction will be made for the length of other omitted sections.

(b) **Painted Pavement Legends and Symbols:** Painted legends and symbols will be measured per each legend or symbol. Symbols shall include all letters, lines, bars or markings necessary to convey the message at each location.

(c) **Removal of Existing Pavement Markings.** Removal of existing pavement markings will not be measured. Removal of existing pavement markings shall be included in other items.

**3.1 PAYMENT.** Payment for Painted Traffic Markings shall be made as follows:

(a) **Painted Traffic Striping:** Painted striping will be paid at the CONTRACT unit price per Linear Foot or Linear Mile at the width specified. The CONTRACT unit price shall be full compensation for Painted Striping complete and accepted in accordance with these SPECIFICATIONS.

(b) **Painted Pavement Legends and Symbols:** Painted legends and symbols shall be paid at the CONTRACT unit price per each legend or symbol completed and accepted in accordance with these SPECIFICATIONS. Payment shall be full compensation for all letters, lines, bars or markings necessary to convey the message at each location.

(c) **Removal of Existing Pavement Markings:** Removal of existing pavement markings will not be paid but shall be included in the bid price of other items.

Payment will be made as follows:

<b>Item No.</b>	<b>Pay Item</b>	<b>Pay Unit</b>
1320-02-(line width)	Painted Pavement Marking (line width)	Linear Feet (Mile)
1320-02-(letter)	Painted Pavement Symbol (description)	Each

Letter	Description
A	Arrow
B	Double Arrow
C	Only
D	RR Crossing
E	School
F	Other Symbol Description

**CITY OF ALEXANDRIA, LOUISIANA  
STANDARD SPECIFICATIONS**

**MASTER PAY ITEM LIST**

Item No.	PAY ITEM	Unit	Item No.	PAY ITEM	Unit
<a href="#">210-01</a>	<a href="#">Construction Layout</a>	L.S.	<a href="#">710-03-18</a>	<a href="#">18" Equiv. RCP Arch</a>	L.F.
<a href="#">220-01</a>	<a href="#">Mobilization</a>	L.S.	<a href="#">710-03-24</a>	<a href="#">24" Equiv. RCP Arch</a>	L.F.
<a href="#">310-01</a>	<a href="#">Clearing and Grubbing</a>	L.S.	<a href="#">710-03-30</a>	<a href="#">30" Equiv. RCP Arch</a>	L.F.
<a href="#">320-01-A</a>	<a href="#">Removal of Concrete Pavement</a>	S.Y.	<a href="#">710-03-36</a>	<a href="#">36" Equiv. RCP Arch</a>	L.F.
<a href="#">320-01-B</a>	<a href="#">Removal of Curbs</a>	L.F.	<a href="#">710-03-42</a>	<a href="#">42" Equiv. RCP Arch</a>	L.F.
<a href="#">330-01</a>	<a href="#">General Excavation</a>	C.Y.	<a href="#">710-03-48</a>	<a href="#">48" Equiv. RCP Arch</a>	L.F.
<a href="#">330-02</a>	<a href="#">Embankment (Red Dirt)</a>	C.Y.	<a href="#">710-03-54</a>	<a href="#">54" Equiv. RCP Arch</a>	L.F.
<a href="#">330-03</a>	<a href="#">Top Soil</a>	C.Y.	<a href="#">710-03-60</a>	<a href="#">60" Equiv. RCP Arch</a>	L.F.
<a href="#">340-01</a>	<a href="#">Erosion Control &amp; SWPPP Plan</a>	L.S.	<a href="#">710-03-72</a>	<a href="#">72" Equiv. RCP Arch</a>	L.F.
<a href="#">410-01-06</a>	<a href="#">Crushed Limestone Base (6" Thick)</a>	S.Y.	<a href="#">710-04</a>	<a href="#">Pipe Collars (Per Plan)</a>	Each
<a href="#">410-01-08</a>	<a href="#">Crushed Limestone Base (8" Thick)</a>	S.Y.	<a href="#">710-05</a>	<a href="#">Cleaning Existing Pipe (Per Plan)</a>	L.F.
<a href="#">410-01-10</a>	<a href="#">Crushed Stone Limestone Base (10" Thick)</a>	S.Y.	<a href="#">720-01-02</a>	<a href="#">CB-2 Standard Installation</a>	Each
<a href="#">410-02</a>	<a href="#">Crushed Limestone for Traffic Control</a>	Ton	<a href="#">720-02-02</a>	<a href="#">CB-2 Conflict Installation</a>	Each
<a href="#">420-01</a>	<a href="#">Cement for Cement Stabilization</a>	Ton	<a href="#">720-01-12</a>	<a href="#">Single CB-12</a>	Each
<a href="#">420-02-06</a>	<a href="#">Processing Cement (6" Thick)</a>	S.Y.	<a href="#">720-02-12</a>	<a href="#">Double CB-12</a>	Each
<a href="#">420-02-08</a>	<a href="#">Processing Cement (8" Thick)</a>	S.Y.	<a href="#">720-01-13</a>	<a href="#">Single CB-13</a>	Each
<a href="#">420-02-10</a>	<a href="#">Processing Cement (10" Thick)</a>	S.Y.	<a href="#">720-02-13</a>	<a href="#">Double CB-13</a>	Each
<a href="#">430-01</a>	<a href="#">Lime for Lime Stabilization</a>	Ton	<a href="#">720-01-14</a>	<a href="#">Single CB-14</a>	Each
<a href="#">430-02-06</a>	<a href="#">Processing Lime (6" Thick)</a>	S.Y.	<a href="#">720-02-14</a>	<a href="#">Double CB-14</a>	Each
<a href="#">430-02-08</a>	<a href="#">Processing Lime (8" Thick)</a>	S.Y.	<a href="#">720-01-15</a>	<a href="#">Single CB-15</a>	Each
<a href="#">430-02-10</a>	<a href="#">Processing Lime (10" Thick)</a>	S.Y.	<a href="#">720-02-15</a>	<a href="#">Double CB-15</a>	Each
<a href="#">510-01</a>	<a href="#">Superpave Asphalt</a>	Ton	<a href="#">720-01-16</a>	<a href="#">Single CB-16</a>	Each
<a href="#">510-01-1.5</a>	<a href="#">Superpave Asphalt (1.5" Thick)</a>	S.Y.	<a href="#">720-02-16</a>	<a href="#">Double CB-16</a>	Each
<a href="#">510-01-02</a>	<a href="#">Superpave Asphalt (2" Thick)</a>	S.Y.	<a href="#">720-01-17</a>	<a href="#">CB-17P Catch Basin</a>	Each
<a href="#">510-01-2.5</a>	<a href="#">Superpave Asphalt (2.5" Thick)</a>	S.Y.	<a href="#">720-01-18</a>	<a href="#">CB-18 Catch Basin</a>	Each
<a href="#">510-01-03</a>	<a href="#">Superpave Asphalt (3" Thick)</a>	S.Y.	<a href="#">720-02-18</a>	<a href="#">CB-18P Catch Basin</a>	Each
<a href="#">520-01</a>	<a href="#">Pavement Patching</a>	S.Y.	<a href="#">720-01-21</a>	<a href="#">CB-21 Catch Basin (Non-Traffic Area)</a>	Each
<a href="#">530-01</a>	<a href="#">Cold Planning Asphalt Pavement (0"-4")</a>	S.Y.	<a href="#">720-02-21</a>	<a href="#">CB-21 Catch Basin (Traffic Area)</a>	Each
<a href="#">530-02</a>	<a href="#">Cold Planning Asphalt Pavement (&gt;4")</a>	S.Y.	<a href="#">730-01</a>	<a href="#">Adjust Manholes</a>	Each
<a href="#">540-01</a>	<a href="#">Aggregate Surface Course</a>	Ton	<a href="#">730-02</a>	<a href="#">Adjust Valve Boxes</a>	Each
<a href="#">610-01</a>	<a href="#">Bedding Material</a>	Ton	<a href="#">810-01</a>	<a href="#">Seeding</a>	Ac.
<a href="#">620-01</a>	<a href="#">Concrete for General Use</a>	C.Y.	<a href="#">820-01</a>	<a href="#">Hydro-Seeding</a>	Ac.
<a href="#">620-02</a>	<a href="#">Flowable Fill</a>	C.Y.	<a href="#">830-01</a>	<a href="#">Slab Sod</a>	S.Y.
<a href="#">640-01</a>	<a href="#">Riprap (Class)</a>	Ton	<a href="#">910-06</a>	<a href="#">Portland Cement Conc. Pvm't (6" Thick)</a>	S.Y.
<a href="#">710-01-08</a>	<a href="#">8" PVC Yard Drain (SDR 26)</a>	L.F.	<a href="#">910-08</a>	<a href="#">Portland Cement Conc. Pvm't (8" Thick)</a>	S.Y.
<a href="#">710-01-10</a>	<a href="#">10" PVC Yard Drain (SDR 26)</a>	L.F.	<a href="#">910-10</a>	<a href="#">Portland Cement Conc. Pvm't (10" Thick)</a>	S.Y.
<a href="#">710-01-12</a>	<a href="#">12" PVC Yard Drain (SDR 26)</a>	L.F.	<a href="#">910-12</a>	<a href="#">Portland Cement Conc. Pvm't (12" Thick)</a>	S.Y.
<a href="#">710-02-15</a>	<a href="#">15" RCP Culvert Pipe</a>	L.F.	<a href="#">920-01</a>	<a href="#">4" Barrier Type Curb</a>	L.F.
<a href="#">710-02-18</a>	<a href="#">18" RCP Culvert Pipe</a>	L.F.	<a href="#">920-02</a>	<a href="#">6" Barrier Type Curb</a>	L.F.
<a href="#">710-02-24</a>	<a href="#">24" RCP Culvert Pipe</a>	L.F.	<a href="#">920-03</a>	<a href="#">Mountable Type Curb</a>	L.F.
<a href="#">710-02-30</a>	<a href="#">30" RCP Culvert Pipe</a>	L.F.	<a href="#">920-04</a>	<a href="#">4" Monolithic Barrier Curb and Gutter</a>	L.F.
<a href="#">710-02-36</a>	<a href="#">36" RCP Culvert Pipe</a>	L.F.	<a href="#">920-05</a>	<a href="#">4" Barrier Type Curb and Gutter</a>	L.F.
<a href="#">710-02-42</a>	<a href="#">42" RCP Culvert Pipe</a>	L.F.	<a href="#">920-06</a>	<a href="#">6" Monolithic Barrier Curb and Gutter</a>	L.F.
<a href="#">710-02-48</a>	<a href="#">48" RCP Culvert Pipe</a>	L.F.	<a href="#">920-07</a>	<a href="#">6" Barrier Type Curb and Gutter</a>	L.F.
<a href="#">710-02-54</a>	<a href="#">54" RCP Culvert Pipe</a>	L.F.	<a href="#">920-08</a>	<a href="#">Monolithic Mountrable Type Curb and Gut.</a>	L.F.
<a href="#">710-02-60</a>	<a href="#">60" RCP Culvert Pipe</a>	L.F.	<a href="#">920-09</a>	<a href="#">Mountable Type Curb and Gutter</a>	L.F.
<a href="#">710-02-72</a>	<a href="#">72" RCP Culvert Pipe</a>	L.F.	<a href="#">930-01-04</a>	<a href="#">Concrete Sidewalks (4" Thick)</a>	S.Y.
<a href="#">710-03-15</a>	<a href="#">15" Equiv. RCP Arch</a>	L.F.	<a href="#">930-02-06</a>	<a href="#">Concrete Driveways (6" Thick)</a>	S.Y.

Item No.	PAY ITEM	Unit
930-02-08	<a href="#">Concrete Driveways (8" Thick)</a>	S.Y.
940-01	<a href="#">Handicap Ramps</a>	Each
950-01	<a href="#">Joint and Crack Sealing in Conc. Pvm't</a>	L.F.
1010-01	<a href="#">Temporary Signs and Barricades</a>	L.S.
1020-01	<a href="#">Signs</a>	S.F.
1020-02	<a href="#">U-Channel Post</a>	Each
1020-03	<a href="#">Dead End Installation (Type 1)</a>	Each
1020-04	<a href="#">Dead End Installation (Type 2)</a>	Each
1110-01-04	<a href="#">Chain Link Fence (4')</a>	L.F.
1110-02-04	<a href="#">Chain Link Pedestrian Gate (4')( Width)</a>	Each
1110-03-04	<a href="#">Chain Link Vehicular Gate (4')( Width)</a>	Each
1110-01-06	<a href="#">Chain Link Fence (6')</a>	L.F.
1110-02-06	<a href="#">Chain Link Pedestrian Gate (6')(Width)</a>	Each
1110-03-06	<a href="#">Chain Link Vehicular Gates (6')(Width)</a>	Each
1110-01-08	<a href="#">Chain Link Fence (8')</a>	L.F.
1110-02-08	<a href="#">Chain Link Pedestrian Gate (8')(Width)</a>	Each
1110-03-08	<a href="#">Chain Link Pedestrian Gate (8')(Width)</a>	Each
1120-01-04	<a href="#">Wood Fence (4')</a>	L.F.
1120-02-04	<a href="#">Wood Fence Pedestrian Gate (4')(Width)</a>	Each
1120-03-04	<a href="#">Wood Fence Vehicular Gate (4')(Width)</a>	Each
1120-01-06	<a href="#">Wood Fence (6')</a>	L.F.
1120-02-06	<a href="#">Wood Fence Pedestrian Gate )6')(Width)</a>	Each
1120-03-06	<a href="#">Wood Fence Vehicular Gate (6')(Width)</a>	Each
1120-01-08	<a href="#">Wood Fence (8')</a>	L.F.
1120-02-08	<a href="#">Wood Fence Pedestrian Gate (8')(Width)</a>	Each
1120-03-08	<a href="#">Wood Fence Vehicular Gate (8')(Width)</a>	Each
1130-01	<a href="#">Woven Wire Fence</a>	L.F.
1130-02	<a href="#">Barbed Wire Fence</a>	L.F.
1130-03	<a href="#">Combination Woven Wire and Barbed Wire</a>	L.F.
1130-04	<a href="#">Woven Wire Gates (Width)</a>	Each
1310-01-04A	<a href="#">Plastic Pavement Marking (4" Line)(Solid)</a>	L.F.
1310-01-04B	<a href="#">Plastic Pavement Marking (4" Line)(Broken)</a>	L.F.
1310-01-06	<a href="#">Plastic Pavement Marking (6" Line)</a>	L.F.
1310-01-08	<a href="#">Plastic Pavement Marking (8" Line)</a>	L.F.
1310-01-12	<a href="#">Plastic Pavement Marking (12" Line)</a>	L.F.
1310-01-24	<a href="#">Plastic Pavement Marking (24" Line)</a>	L.F.
1310-02-A	<a href="#">Plastic Pavement Symbol (Arrow)</a>	Each
1310-02-B	<a href="#">Plastic Pavement Symbol (Double Arrow)</a>	Each
1310-02-C	<a href="#">Plastic Pavement Symbol (Only)</a>	Each
1310-02-D	<a href="#">Plastic Pavement Symbol (RR Crossing)</a>	Each
1310-02-E	<a href="#">Plastic Pavement Symbol (School)</a>	Each
1310-02-F	<a href="#">Plastic Pavement Symbol (Yield)</a>	L.F.
1320-01-04A	<a href="#">Painted Pavement Marking (4" Line)(Solid)</a>	L.F.
1320-01-04B	<a href="#">Painted Pavement Marking (4" Line)(Broken)</a>	L.F.
1320-01-06	<a href="#">Painted Pavement Marking (6" Line)</a>	L.F.
1320-01-08	<a href="#">Painted Pavement Marking (8" Line)</a>	L.F.
1320-01-12	<a href="#">Painted Pavement Marking (12" Line)</a>	L.F.
1320-01-24	<a href="#">Painted Pavement Marking (24" Line)</a>	L.F.
1320-02-A	<a href="#">Painted Pavement Symbol (Arrow)</a>	Each
1320-02-B	<a href="#">Painted Pavement Symbol (Double Arrow)</a>	Each
1320-02-C	<a href="#">Painted Pavement Symbol (Only)</a>	Each
1320-02-D	<a href="#">Painted Pavement Symbol (RR Crossing)</a>	Each
1320-02-E	<a href="#">Painted Pavement Symbol (School)</a>	Each
1320-02-F	<a href="#">Painted Pavement Symbol (Yeild)</a>	L.F.

**MASTER PAY ITEM LIST (WATER)**

Item No.	PAY ITEM	Unit	Item No.	PAY ITEM	Unit
1220-01-02	PVC Water Pipe (2")	L.F.	1220-10-18	Casing Pipe - Open Cut (18")	L.F.
1220-01-02.5	PVC Water Pipe (2.5")	L.F.	1220-10-20	Casing Pipe - Open Cut (20")	L.F.
1220-01-03	PVC Water Pipe (3")	L.F.	1220-11-04	Installing Pipe - Jacking and Boring (4")	L.F.
1220-01-04	PVC Water Pipe (4")	L.F.	1220-11-06	Installing Pipe - Jacking and Boring (6")	L.F.
1220-02-04	C-900 Water Pipe (4")	L.F.	1220-11-08	Installing Pipe - Jacking and Boring (8")	L.F.
1220-02-06	C-900 Water Pipe (6")	L.F.	1220-11-10	Installing Pipe - Jacking and Boring (10")	L.F.
1220-02-08	C-900 Water Pipe (8")	L.F.	1220-11-12	Installing Pipe - Jacking and Boring (12")	L.F.
1220-02-10	C-900 Water Pipe (10")	L.F.	1220-12-0.75	Installing Pipe - Directional Bore (0.75")	L.F.
1220-02-12	C-900 Water Pipe (12")	L.F.	1220-12-01	Installing Pipe - Directional Bore (1")	L.F.
1220-03-04	Ductile Iron Water Pipe (4")	L.F.	1220-12-01.5	Installing Pipe - Directional Bore (1.5")	L.F.
1220-03-06	Ductile Iron Water Pipe (6")	L.F.	1220-12-02	Installing Pipe - Directional Bore (2")	L.F.
1220-03-08	Ductile Iron Water Pipe (8")	L.F.	1220-12-03	Installing Pipe - Directional Bore (3")	L.F.
1220-03-10	Ductile Iron Water Pipe (10")	L.F.	1220-12-04	Installing Pipe - Directional Bore (4")	L.F.
1220-03-12	Ductile Iron Water Pipe (12")	L.F.	1220-12-06	Installing Pipe - Directional Bore (6")	L.F.
1220-04-01	Polyethylene Water Pipe (1")	L.F.	1220-12-08	Installing Pipe - Directional Bore (8")	L.F.
1220-04-02	Polyethylene Water Pipe (2")	L.F.	1220-12-10	Installing Pipe - Directional Bore (10")	L.F.
1220-04-03	Polyethylene Water Pipe (3")	L.F.	1220-12-12	Installing Pipe - Directional Bore (12")	L.F.
1220-04-04	Polyethylene Water Pipe (4")	L.F.	1220-13-04	Special Bedding (Type 2)(4")	L.F.
1220-04-06	Polyethylene Water Pipe (6")	L.F.	1220-13-06	Special Bedding (Type 2)(6")	L.F.
1220-04-08	Polyethylene Water Pipe (8")	L.F.	1220-13-08	Special Bedding (Type 2)(8")	L.F.
1220-04-10	Polyethylene Water Pipe (10")	L.F.	1220-13-10	Special Bedding (Type 2)(10")	L.F.
1220-04-12	Polyethylene Water Pipe (12")	L.F.	1220-13-12	Special Bedding (Type 2)(12")	L.F.
1220-05	Ductile Iron Fittings	LB	1220-14-04	Special Bedding (Type 3)(4")	L.F.
1220-06-04	Gate Valve (4")	Each	1220-14-06	Special Bedding (Type 3)(6")	L.F.
1220-06-06	Gate Valve (6")	Each	1220-14-08	Special Bedding (Type 3)(8")	L.F.
1220-06-08	Gate Valve (8")	Each	1220-14-10	Special Bedding (Type 3)(10")	L.F.
1220-06-10	Gave Valve (10")	Each	1220-14-12	Special Bedding (Type 3)(12")	L.F.
1220-06-12	Gate Valve (12")	Each	1220-15-04	Special Bedding (Type 4)(4")	L.F.
1220-07-04	Water Service Assembly (4" Main)	Each	1220-15-06	Special Bedding (Type 4)(6")	L.F.
1220-07-06	Water Service Assembly (6" Main)	Each	1220-15-08	Special Bedding (Type 4)(8")	L.F.
1220-07-08	Water Service Assembly (8" Main)	Each	1220-15-10	Special Bedding (Type 4)(10")	L.F.
1220-07-10	Water Service Assembly (10" Main)	Each	1220-15-12	Special Bedding (Type 4)(12")	L.F.
1220-07-12	Water Service Assembly (12" Main)	Each	1220-16-04	Special Bedding (Type 5)(4")	L.F.
1220-08-0.75	Water Service Pipe (0.75")	L.F.	1220-16-06	Special Bedding (Type 5)(6")	L.F.
1220-08-01	Water Service Pipe (1")	L.F.	1220-16-08	Special Bedding (Type 5)(8")	L.F.
1220-08-01.5	Water Service Pipe (1.5")	L.F.	1220-16-10	Special Bedding (Type 5)(10")	L.F.
1220-09-06	Casing Pipe - Jacking and Boring (6")	L.F.	1220-16-12	Special Bedding (Type 5)(12")	L.F.
1220-09-08	Casing Pipe - Jacking and Boring (8")	L.F.	1220-17-04	Special Bedding (Type 6)(4")	L.F.
1220-09-10	Casing Pipe - Jacking and Boring (10")	L.F.	1220-17-06	Special Bedding (Type 6)(6")	L.F.
1220-09-12	Casing Pipe - Jacking and Boring (12")	L.F.	1220-17-08	Special Bedding (Type 6)(8")	L.F.
1220-09-14	Casing Pipe - Jacking and Boring (14")	L.F.	1220-17-10	Special Bedding (Type 6)(10")	L.F.
1220-09-16	Casing Pipe - Jacking and Boring (16")	L.F.	1220-17-12	Special Bedding (Type 6)(12")	L.F.
1220-09-18	Casing Pipe - Jacking and Boring (18")	L.F.	1220-18	Additional Bedding Material (As Directed)	C.Y.
1220-09-20	Casing Pipe - Jacking and Boring (20")	L.F.	1220-19-04	6 x 4 Tapping Sleeve and Valve	Each
1220-10-06	Casing Pipe - Open Cut (6")	L.F.	1220-19-06	6 x 6 Tapping Sleeve and Valve	Each
1220-10-08	Casing Pipe - Open Cut (8")	L.F.	1220-20-04	8 x 4 Tapping Sleeve and Valve	Each
1220-10-10	Casing Pipe - Open Cut (10")	L.F.	1220-20-06	8 x 6 Tapping Sleeve and Valve	Each
1220-10-12	Casing Pipe - Open Cut (12")	L.F.	1220-20-08	8 x 8 Tapping Sleeve and Valve	Each
1220-10-14	Casing Pipe - Open Cut (14")	L.F.	1220-21-04	10 x 4 Tapping Sleeve and Valve	Each
1220-10-16	Casing Pipe - Open Cut (16")	L.F.	1220-21-06	10 x 6 Tapping Sleeve and Valve	Each
			1220-21-08	10 x 8 Tapping Sleeve and Valve	Each
			1220-21-10	10 x 10 Tapping Sleeve and Valve	Each
			1220-22-04	12 x 4 Tapping Sleeve and Valve	Each

Item No.	PAY ITEM	Unit
220-22-06	12 x 6 Tapping Sleeve and Valve	Each
220-22-08	12 x 8 Tapping Sleeve and Valve	Each
220-22-10	12 x 10 Tapping Sleeve and Valve	Each
220-22-12	12 x 12 Tapping Sleeve and Valve	Each
1220-23	Special Crossing (Per Plan Detail)	L.S.
1220-24	Owner Furnished Material	L.S.
1220-25	Fire Hydrants	Each
1220-26	Remove and Relocate Fire Hydrants	Each

**MASTER PAY ITEM LIST (SANITARY SEWER)**

Item No.	PAY ITEM	Unit	Item No.	PAY ITEM	Unit
1230-01-04	Gravity Sewer Pipe (PVC) (4" Dia.)	L.F.	1230-11-05	Extra Depth Sanitary Manhole (5' Dia.)	V.F.
1230-01-06	Gravity Sewer Pipe (PVC) (6" Dia.)	L.F.	1230-11-06	Extra Depth Sanitary Manhole (6' Dia.)	V.F.
1230-01-08	Gravity Sewer Pipe (PVC) (8" Dia.)	L.F.	1230-11-07	Extra Depth Sanitary Manhole (7' Dia.)	V.F.
1230-01-10	Gravity Sewer Pipe (PVC) (10" Dia.)	L.F.	1230-11-08	Extra Depth Sanitary Manhole (8' Dia.)	V.F.
1230-01-12	Gravity Sewer Pipe (PVC) (12" Dia.)	L.F.	1230-12	Service Assemblies (All Sizes)	Each
1230-01-15	Gravity Sewer Pipe (PVC) (15" Dia.)	L.F.	1230-13-04	Bedding Material (Class 3) (4" Dia.)	L.F.
1230-02-08	Gravity Sewer Pipe (ABS/PVC Truss) (8" Dia.)	L.F.	1230-13-06	Bedding Material (Class 3) (6" Dia.)	L.F.
1230-02-10	Gravity Sewer Pipe (ABS/PVC Truss) (10" Dia.)	L.F.	1230-13-08	Bedding Material (Class 3) (8" Dia.)	L.F.
1230-02-12	Gravity Sewer Pipe (ABS/PVC Truss) (12" Dia.)	L.F.	1230-13-10	Bedding Material (Class 3) (10" Dia.)	L.F.
1230-02-15	Gravity Sewer Pipe (ABS/PVC Truss) (15" Dia.)	L.F.	1230-13-12	Bedding Material (Class 3) (12" Dia.)	L.F.
1230-03-04	Gravity Sewer Pipe (D.I.) (4" Dia.)	L.F.	1230-13-15	Bedding Material (Class 3) (15" Dia.)	L.F.
1230-03-06	Gravity Sewer Pipe (D.I.) (6" Dia.)	L.F.	1230-14-04	Bedding Material (Class 4) (4" Dia.)	L.F.
1230-03-08	Gravity Sewer Pipe (D.I.) (8" Dia.)	L.F.	1230-14-06	Bedding Material (Class 4) (6" Dia.)	L.F.
1230-03-10	Gravity Sewer Pipe (D.I.) (10" Dia.)	L.F.	1230-14-08	Bedding Material (Class 4) (8" Dia.)	L.F.
1230-03-12	Gravity Sewer Pipe (D.I.) (12" Dia.)	L.F.	1230-14-10	Bedding Material (Class 4) (10" Dia.)	L.F.
1230-03-14	Gravity Sewer Pipe (D.I.) (14" Dia.)	L.F.	1230-14-12	Bedding Material (Class 4) (12" Dia.)	L.F.
1230-03-16	Gravity Sewer Pipe (D.I.) (16" Dia.)	L.F.	1230-14-15	Bedding Material (Class 4) (15" Dia.)	L.F.
1230-04-04	Force Main (PVC) (4" Dia.)	L.F.	1230-15-04	Bedding Material (Class 5) (4" Dia.)	L.F.
1230-04-06	Force Main (PVC) (6" Dia.)	L.F.	1230-15-06	Bedding Material (Class 5) (6" Dia.)	L.F.
1230-04-08	Force Main (PVC) (8" Dia.)	L.F.	1230-15-08	Bedding Material (Class 5) (8" Dia.)	L.F.
1230-04-10	Force Man (PVC) (10" Dia.)	L.F.	1230-15-10	Bedding Material (Class 5) (10" Dia.)	L.F.
1230-05-04	Force Main (D.I.) (4" Dia.)	L.F.	1230-15-12	Bedding Material (Class 5) (12" Dia.)	L.F.
1230-05-06	Force Main (D.I.) (6" Dia.)	L.F.	1230-15-15	Bedding Material (Class 5) (15" Dia.)	L.F.
1230-05-08	Force Main (D.I.) (8" Dia.)	L.F.	1230-16	Clean Out Assemblies (Type 1) (All Sizes)	Each
1230-05-10	Force Main (D.I.) (10" Dia.)	L.F.	1230-17	Clean Out Assemblies (Dead End) (All Sizes)	Each
1230-06	Ductile Iron Fittings	LB	1230-18	Undercut Bedding	C.Y.
1230-07-04	HDPE Directional Bore (4" Dia.)	L.F.	1230-19-04	Single Source Point Repair (0-6) (4" Dia.)	Each
1230-07-06	HDPE Directional Bore (6" Dia.)	L.F.	1230-19-06	Single Source Point Repair (0-6) (6" Dia.)	Each
1230-07-08	HDPE Directional Bore (8" Dia.)	L.F.	1230-19-08	Single Source Point Repair (0-6) (8" Dia.)	Each
1230-07-10	HDPE Directional Bore (10" Dia.)	L.F.	1230-19-10	Single Source Point Repair (0-6) (10" Dia.)	Each
1230-07-12	HDPE Directional Bore (12" Dia.)	L.F.	1230-19-12	Single Source Point Repair (0-6) (12" Dia.)	Each
1230-08-06	Steel Casing Pipe (Open Cut) (6" Dia.)	L.F.	1230-19-15	Single Source Point Repair (0-6) (15" Dia.)	Each
1230-08-08	Steel Casing Pipe (Open Cut) (8" Dia.)	L.F.	1230-20-04	Main Line Point Repair (0-6) (4" Dia.)	Each
1230-08-10	Steel Casing Pipe (Open Cut) (10" Dia.)	L.F.	1230-20-06	Main Line Point Repair (0-6) (6" Dia.)	Each
1230-08-12	Steel Casing Pipe (Open Cut) (12" Dia.)	L.F.	1230-20-08	Main Line Point Repair (0-6) (8" Dia.)	Each
1230-08-14	Steel; Casing Pipe (Open Cut) (14" Dia.)	L.F.	1230-20-10	Main Line Point Repair (0-6) (10" Dia.)	Each
1230-08-15	Steel Casing Pipe (Open Cut) (16" Dia.)	L.F.	1230-20-12	Main Line Point Repair (0-6) (12" Dia.)	Each
1230-08-16	Steel Casing Pipe (Open Cut) (18" Dia.)	L.F.	1230-20-15	Main Line Point Repair (0-6) (15" Dia.)	Each
1230-08-18	Steel Casing Pipe (Open Cut) (20" Dia.)	L.F.	1230-21-04	Extension to Main Line Point Repair (4" Dia.)	L.F.
1230-09-06	Steel Casing Pipe (Jack and Bore) (6" Dia.)	L.F.	1230-21-06	Extension to Main Line Point Repair (6" Dia.)	L.F.
1230-09-08	Steel Casing Pipe (Jack and Bore) (8" Dia.)	L.F.	1230-21-08	Extension to Main Line Point Repair (8" Dia.)	L.F.
1230-09-10	Steel Casing Pipe (Jack and Bore) (10" Dia.)	L.F.	1230-21-10	Extension to Main Line Point Repair (10" Dia.)	L.F.
1230-09-12	Steel Casing Pipe (Jack and Bore) (12" Dia.)	L.F.	1230-21-12	Extension to Main Line Point Repair (12" Dia.)	L.F.
1230-09-14	Steel Casing Pipe (Jack and Bore) (14" Dia.)	L.F.	1230-21-15	Extension to Main Line Point Repair (15" Dia.)	L.F.
1230-09-16	Steel Casing Pipe (Jack and Bore) (16" Dia.)	L.F.	1230-22-04	Single Source Point Repair (Extra Depth) (4" Dia.)	V.F.
1230-09-18	Steel Casing Pipe (Jack and Bore) (18" Dia.)	L.F.	1230-22-06	Single Source Point Repair (Extra Depth) (6" Dia.)	V.F.
1230-09-20	Steel Casing Pipe (Jack and Bore) (20" Dia.)	L.F.	1230-22-08	Single Source Point Repair (Extra Depth) (8" Dia.)	V.F.
1230-10-04	Standard Depth Sanitary Manhole (4' Dia.)	Each	1230-22-10	Single Source Point Repair (Extra Depth) (10" Dia.)	V.F.
1230-10-05	Standard Depth Sanitary Manhole (5' Dia.)	Each	1230-22-12	Single Source Point Repair (Extra Depth) (12" Dia.)	V.F.
1230-10-06	Standard Depth Sanitary Manhole (6' Dia.)	Each	1230-22-15	Single Source Point Repair (Extra Depth) (15" Dia.)	V.F.
1230-10-07	Standard Depth Sanitary Manhole (7' Dia.)	Each	1230-23-04	Main Line Point Repair (Extra Depth) (4" Dia.)	V.F.
1230-10-08	Standard Depth Sanitary Manhole (8' Dia.)	Each	1230-23-06	Main Line Point Repair (Extra Depth) (6" Dia.)	V.F.
1230-11-04	Extra Depth Sanitary Manhole (4' Dia.)	V.F.	1230-23-08	Main Line Point Repair (Extra Depth) (8" Dia.)	V.F.

Item No.	PAY ITEM	Unit
1230-23-10	Main Line Point Repair (Extra Depth) (10" Dia.)	V.F.
1230-23-12	Main Line Point Repair (Extra Depth) (12" Dia.)	V.F.
1230-23-15	Main Line Point Repair (Extra Depth) (15" Dia.)	V.F.
1230-24-04	Extension to Main Line Point Repair (Ex. Dep)(4" Dia.)	V.F.
1230-24-06	Extension to Main Line Point Repair (Ex. Dep)(6" Dia.)	V.F.
1230-24-08	Extension to Main Line Point Repair (Ex. Dep)(8" Dia.)	V.F.
1230-24-10	Extension to Main Line Point Repair (Ex. Dep)(10" Dia.)	V.F.
1230-24-12	Extension to Main Line Point Repair (Ex. Dep)(12" Dia.)	V.F.
1230-24-15	Extension to Main Line Point Repair (Ex. Dep)(15" Dia.)	V.F.
1230-25	Connection to Existing Sewer Manhole (Any Size)	Each
1230-26	Connection to Existing Sewer Main (Any Size)	Each

**MASTER PAY ITEM LIST (GAS)**

Item No.	PAY ITEM	Unit	Item No.	PAY ITEM	Unit
1210-01-02	PE 3408 Gas Main (2")	L.F.	1210-09-02	PE 3408 Gas Service Pipe (2")	L.F.
1210-01-03	PE 3408 Gas Main (3")	L.F.	1210-10-01	Steel Gas Service Pipe (1")	L.F.
1210-01-04	PE 3408 Gas Main (4")	L.F.	1210-10-01.5	Steel Gas Service Pipe (1-1/2")	L.F.
1210-01-06	PE 3408 Gas Main (6")	L.F.	1210-10-02	Steel Gas Service Pipe (2")	L.F.
1210-01-08	PE 3408 Gas Main (8")	L.F.	1210-11-06	Casing Pipe by Jack and Bore (6")	L.F.
1210-02-02	Steel Gas Main (2")	L.F.	1210-11-08	Casing Pipe by Jack and Bore (8")	L.F.
1210-02-03	Steel Gas Main (3")	L.F.	1210-11-10	Casing Pipe by Jack and Bore (10")	L.F.
1210-02-04	Steel Gas Main (4")	L.F.	1210-11-12	Casing Pipe by Jack and Bore (12")	L.F.
1210-02-06	Steel Gas Main (6")	L.F.	1210-12-06	Casing Pipe by Open Cut (6")	L.F.
1210-02-08	Steel Gas Main (8")	L.F.	1210-12-08	Casing Pipe by Open Cut (8")	L.F.
1210-03-02	Steel Gas Main 90 Deg. Bends (2")	Each	1210-12-10	Casing Pipe by Open Cut (10")	L.F.
1210-03-03	Steel Gas Main 90 Deg. Bends (3")	Each	1210-12-12	Casing Pipe by Open Cut (12")	L.F.
1210-03-04	Steel Gas Main 90 Deg. Bends (4")	Each	1210-13-01	Directional Bore PE 3408 Gas Pipe (1")	L.F.
1210-03-06	Steel Gas Main 90 Deg. Bends (6")	Each	1210-13-01.5	Directional Bore PE 3408 Gas Pipe (1-1/2")	L.F.
1210-03-08	Steel Gas Main 90 Deg. Bends (8")	Each	1210-13-02	Directional Bore PE 3408 Gas Pipe (2")	L.F.
1210-04-02-02	Steel Gas Tees (2" to 2")	Each	1210-13-03	Directional Bore PE 3408 Gas Pipe (3")	L.F.
1210-04-02-03	Steel Gas Tees (2" to 3")	Each	1210-13-04	Directional Bore PE 3408 Gas Pipe (4")	L.F.
1210-04-02-04	Steel Gas Tees (2" to 4")	Each	1210-13-06	Directional Bore PE 3408 Gas Pipe (6")	L.F.
1210-04-02-06	Steel Gas Tees (2" to 6")	Each	1210-14-01	Special Pipe Foundation	CY
1210-04-02-08	Steel Gas Tees (2" to 8")	Each	1210-15-01-01	Hot Tap 1" Gas to 1" Gas	Each
1210-04-03-03	Steel Gas Tees (3" to 3")	Each	1210-15-01-01.5	Hot Tap 1" Gas to 1 1/2" Gas	Each
1210-04-03-04	Steel Gas Tees (3" to 4")	Each	1210-15-01-02	Hot Tap 1" Gas to 2" Gas	Each
1210-04-03-06	Steel Gas Tees (3" to 6")	Each	1210-15-01-03	Hot Tap 1" Gas to 3" Gas	Each
1210-04-03-08	Steel Gas Tees (3" to 8")	Each	1210-15-01-04	Hot Tap 1" Gas to 4" Gas	Each
1210-04-04-04	Steel Gas Tees (4" to 4")	Each	1210-15-01-06	Hot Tap 1" Gas to 6" Gas	Each
1210-04-04-06	Steel Gas Tees (4" to 6")	Each	1210-15-01-08	Hot Tap 1" Gas to 8" Gas	Each
1210-04-04-08	Steel Gas Tees (4" to 8")	Each	1210-15-1.5-1.5	Hot Tap 1.5" Gas to 1.5" Gas	Each
1210-04-06-06	Steel Gas Tees (6" to 6")	Each	1210-15-01.5-02	Hot Tap 1.5" Gas to 2" Gas	Each
1210-04-06-08	Steel Gas Tees (6" to 8")	Each	1210-15-01.5-03	Hot Tap 1.5" Gas to 3" Gas	Each
1210-04-08-08	Steel Gas Tees (8" to 8")	Each	1210-15-01.5-04	Hot Tap 1.5" Gas to 4" Gas	Each
1210-05-02	Steel Gas Valves (2") w/Box Assembly	Each	1210-15-01.5-06	Hot Tap 1.5" Gas to 6" Gas	Each
1210-05-03	Steel Gas Valves (3") w/Box Assembly	Each	1210-15-01.5-08	Hot Tap 1.5" Gas to 8" Gas	Each
1210-05-04	Steel Gas Valves (4") w/Box Assembly	Each	1210-15-02-02	Hot Tap 2" Gas to 2" Gas	Each
1210-05-06	Steel Gas Valves (6") w/Box Assembly	Each	1210-15-02-03	Hot Tap 2" Gas to 03" Gas	Each
1210-05-08	Steel Gas Valves (8") w/Box Assembly	Each	1210-15-02-04	Hot Tap 2" Gas to 4" Gas	Each
1210-06-02	PE 3408 Valves (2") w/Box Assembly	Each	1210-15-02-06	Hot Tap 2" Gas to 6" Gas	Each
1210-06-03	PE 3408 Valves (3") w/Box Assembly	Each	1210-15-02-08	Hot Tap 2" Gas to 8" Gas	Each
1210-06-04	PE 3408 Valves (4") w/Box Assembly	Each	1210-15-03-03	Hot Tap 3" Gas to 3" Gas	Each
1210-06-06	PE 3408 Valves (6") w/Box Assembly	Each	1210-15-03-04	Hot Tap 3" Gas to 4" Gas	Each
1210-06-08	PE 3408 Valves (8") w/Box Assembly	Each	1210-15-03-06	Hot Tap 3" Gas to 6" Gas	Each
1210-07-01-01	Gas Service Assemblies Type 1 (1")	Each	1210-15-03-08	Hot Tap 3" Gas to 8" Gas	Each
1210-07-01-01.5	Gas Service Assemblies Type 1 (1 - 1/2")	Each	1210-15-04-04	Hot Tap 4" Gas to 4" Gas	Each
1210-07-01-02	Gas Service Assemblies Type 1 (2")	Each	1210-15-04-06	Hot Tap 4" Gas to 6" Gas	Each
1210-07-02-01	Gas Service Assemblies Type II (1")	Each	1210-15-04-08	Hot Tap 4" Gas to 8" Gas	Each
1210-07-02-01.5	Gas Service Assemblies Type II (1-1/2")	Each	1210-15-06-06	Hot Tap 6" Gas to 6" Gas	Each
1210-07-02-02	Gas Service Assemblies Type II (2")	Each	1210-15-06-08	Hot Tap 6" Gas to 8" Gas	Each

1210-08-01	Gas Meter (275)	Each	1210-15-08-08	Hot Tap 8" Gas to 8" Gas	Each
1210-08-02	Gas Meter (415)	Each			
1210-08-03	Gas Meter (750)	Each			
1210-08-04	Gas Meter (1600)	Each			
1210-08-05	Gas Meter (Capacity)	Each			
1210-09-01	PE 3408 Gas Service Pipe (1")	L.F.			
1210-09-01.5	PE 3408 Gas Service Pipe (1-1/2")	L.F.			