

ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
2100 CLARENDON BOULEVARD, SUITE 500
ARLINGTON, VIRGINIA 22201

NOTICE OF CONTRACT AWARD

Sagres Construction Corporation	DATE ISSUED:	AUGUST 14, 2019
3680 Wheeler Avenue	CURRENT REFERENCE NO:	19-200-ITB
Suite 300		On-Call Storm Sewer
Alexandria, VA 22304	CONTRACT TITLE:	Repair

THIS IS A NOTICE OF AWARD OF CONTRACT AND NOT AN ORDER. NO WORK IS AUTHORIZED UNTIL THE VENDOR RECEIVES A VALID COUNTY PURCHASE ORDER ENCUMBERING CONTRACT FUNDS.

The contract documents consist of the terms and conditions of AGREEMENT No. 19-279-ITB including any attachments or amendments thereto.

EFFECTIVE DATE: August 14, 2019

EXPIRES: August 13, 2021

RENEWALS: (3) additional 12-month periods from August 14, 2021 to August 13, 2024

COMMODITY CODE(S): 91345, 91381

LIVING WAGE: N

PROFESSIONAL SERVICES: N

ATTACHMENTS:

AGREEMENT No. 19-200-ITB

EMPLOYEES NOT TO BENEFIT:

NO COUNTY EMPLOYEE SHALL RECEIVE ANY SHARE OR BENEFIT OF THIS CONTRACT NOT AVAILABLE TO THE GENERAL PUBLIC.

VENDOR CONTACT: DEJAN DRAGACEVAC

VENDOR TEL. NO.: (703) 924-7220

EMAIL ADDRESS: DAN@SAGRESCONSTRUCTION.COM

COUNTY CONTACT: CARLA ALAYON

COUNTY TEL. NO.: (703) 228-7730

COUNTY CONTACT EMAIL: CALAYON@ARLINGTONVA.US

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
SUITE 500, 2100 CLARENDON BOULEVARD
ARLINGTON, VA 22201**

**AGREEMENT NO. 19-200-ITB
ON-CALL STORM SEWER MAINTENANCE AND REPAIR**

THIS AGREEMENT is made, on the date of execution by the County, Sagres Construction Corporation ("Contractor") a Virginia Corporation with a place of business at 3680 Wheeler Ave, Suite 300, Alexandria, VA 22304, authorized to do business in the Commonwealth of Virginia, and the County Board of Arlington County, Virginia. The County and the Contractor, for the consideration hereinafter specified, agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents consist of:

- Agreement No. 19-200-ITB and all modifications properly incorporated into the Agreement
- Exhibit A – Arlington County Invitation to Bid No. 19-200-ITB, including DES General Conditions, Special Conditions, and Supplementary Specifications
- Exhibit B – Specifications, Drawings and Construction Notes
- Exhibit C – Price Bid of Contractor

Where the terms and provisions of this Agreement vary from the terms and provisions of the other Contract Documents, the terms and provisions of this Agreement will prevail over the other Contract Documents, and the remaining Contract Documents will be complementary to each other. If there are any conflicts, the most stringent terms or provisions will prevail.

The Contract Documents set forth the entire agreement between the County and the Contractor. The County and the Contractor agree that no representative or agent of either party has made any representation or promise with respect to the parties' agreement that is not contained in the Contract Documents. The Contract Documents may be referred to below as the "Contract" or the "Agreement".

2. SCOPE OF WORK

The Contractor will furnish all labor, materials, and equipment for the construction, maintenance, and emergency repair of storm sewer lines throughout the County (the "Project") and all other work shown, described, and required by the Contract Documents (hereinafter "the Work").

The Work shall be performed according to the standards established by the Contract Documents read together as a single specification. It shall be the Contractor's responsibility, at solely the Contractor's cost, to provide sufficient services to fulfill the purposes of the Work. Nothing in the Contract Documents shall be construed to limit the Contractor's responsibility to manage the details and execution of its Work.

3. PROJECT OFFICER

The performance of the Contractor is subject to the review and approval of the County Project Officer identified in Section 53, Notices, unless the Contractor is otherwise notified in writing.

4. CONTRACT TERM

The term of this Agreement will commence on the date of execution by the County, and shall be completed no later than twenty four (24) consecutive calendar months from the day of execution of the contract by the County ("Initial Contract Term"), subject to any written modifications as provided for in the Contract Documents. Upon completion of the Initial Term, County and Contractor may agree, through bilateral execution of a Contract Amendment, continued operations of the Contractor for not more than three (3) additional twelve (12) month periods (each a "Subsequent Contract Term"). The Initial Contract Term and any Subsequent Contract Term(s) are together the "Contract Term".

5. TIME FOR COMPLETION

County will assign work under this contract through issuance of Task Orders. Prior to each Task Order being issued, County and Contractor will discuss the scope of the Task Order and determine a mutually agreeable Final Completion date for that Task Order. Project Officer will indicate such date in the Notice to Proceed. Contractor shall complete each Task Order by the Final Completion date. Work will not reach Final Completion until it meets the requirements set forth in the General Conditions. Completion will be determined by the inspection and acceptance of the Work by the Project Officer.

Unless otherwise provided, no claims for early completion are allowed.

6. CONTRACT AMOUNT

The County will pay the Contractor in accordance with the terms of the Progress Payments and Retainage and Payment Terms sections below and at the prices shown in Exhibit C for the Contractor's completion of the Work as required by the Contract Documents provided the Work is performed to the satisfaction of and is accepted by the Project Officer. The Contractor will complete the Work for the total amount specified in this section ("Contract Amount") unless such amount is modified as provided in this Agreement. The Contract Amount includes all of the Contractor's costs and fees (profit) and is inclusive of all anticipated or known site conditions, anticipated or known materials, labor, and equipment costs, or any other costs which should reasonably have been expected by the Contract Documents.

7. PROGRESS PAYMENTS AND RETAINAGE

The County will make monthly progress payments to the Contractor upon written application by the Contractor, on the basis of a written estimate of the work performed during the preceding calendar month as approved by the Project Officer. However, 5% of each progress payment will be retained by the County until Final Completion and acceptance of all Work covered by the Agreement.

All material and work covered by partial payments will become the property solely of the County at the time the partial payment is made. However, the Contractor will have the sole responsibility, care and custody for all materials and work upon which payments have been made until Substantial Completion.

When calculating payment for materials on-site, the County shall not pay for materials which are not scheduled for incorporation into the Work within sixty (60) days from the date of application for payment.

8. PAYMENT TERMS

The Contractor must submit invoices to the County's Project Officer, who will either approve the invoice or require corrections. The County will pay the Contractor 45 days after approval of an invoice for completed work which is reasonable and allocable to the Contract. The number of the County Purchase Order pursuant to work has been performed must appear on all invoices.

9. PAYMENT OF SUBCONTRACTORS

The Contractor is obligated to take one of the two following actions within seven days after receipt of payment by the County for work performed by any subcontractor under this Contract:

- a. Pay the subcontractor for the proportionate share of the total payment received from the County attributable to the work performed by the subcontractor under this Contract; or
- b. Notify the County and the subcontractor, in writing, of the Contractor's intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

The Contractor is obligated to pay interest to the subcontractor on all amounts owed by the Contractor to the subcontractor that remain unpaid after seven days following receipt by the Contractor of payment from the County for work performed by the subcontractor under this Contract, except for amounts withheld as allowed in subsection b., above. Unless otherwise provided under the terms of this Contract, interest will accrue at the rate of 1% per month.

The Contractor must include in each of its subcontracts, if any are permitted, a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

The Contractor's obligation to pay an interest charge to a subcontractor pursuant to this section may not be construed to be an obligation of the County. A Contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

10. RELEASE AND REQUEST FOR FINAL PAYMENT

In order to receive final payment upon Final Completion of the Project and before Final Acceptance, the Contractor must submit to the Project Officer a signed original notarized copy of the Arlington County Release and Request for Final Payment form per the General Conditions.

11. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

This Contract does not obligate the County to purchase a specific quantity of items or services during Contract Term. Any quantities that are included in the Contract Documents are the present expectations of the County for the period of the Contract; and the County is under no obligation to buy that or any amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual quantities, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates in the Contract.

The County does not guarantee that the Contractor will be the exclusive provider of the goods or services covered by this Contract. The items or services covered by this Contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through those contract(s).

12. COUNTY PURCHASE ORDER REQUIREMENT

County purchases are authorized only if the County issues a Purchase Order in advance of the transaction, indicating that the ordering County agency has sufficient funds available to pay for the purchase. If the Contractor provides goods or services without a signed County Purchase Order, it does so at its own risk

and expense. The County will not be liable for payment for any purchases made by its employees that are not authorized by the County Purchasing Agent.

13. LIEN

It is expressly agreed that after any payment has been made by the County either to the Contractor for work done, or labor or material supplied under the Contract, the County will have a lien upon all material delivered to the site either by the Contractor, or for the Contractor, which is to be used in the performance of the Contract.

14. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED

During the performance of its work pursuant to this Contract:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age or disability or on any other basis prohibited by state law. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- B. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation will be deemed sufficient for meeting the requirements of this section.
- C. The Contractor will state in all solicitations or advertisements for employees that it places or causes to be placed that such Contractor is an Equal Opportunity Employer.
- D. The Contractor will comply with the provisions of the Americans with Disabilities Act of 1990 ("ADA"), which prohibits discrimination against individuals with disabilities in employment and mandates that disabled individuals be provided access to publicly and privately provided services and activities.
- E. The Contractor must include the provisions of the foregoing paragraphs in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

15. EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

In accordance with §2.2-4311.1 of the Code of Virginia, as amended, the Contractor must not during the performance of this Contract knowingly employ an unauthorized alien, as that term is defined in the federal Immigration Reform and Control Act of 1986.

16. DRUG-FREE WORKPLACE TO BE MAINTAINED BY CONTRACTOR

During the performance of this Contract, the Contractor must: (i) provide a drug-free workplace for its employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violating such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "workplace" means the site(s) for the performance of the work required by this Contract.

17. PROJECT STAFF

The County has the right to reasonably reject staff or subcontractors whom the Contractor assigns to the Project. The Contractor must then provide replacement staff or subcontractors satisfactory to the County in a timely manner and at no additional cost to the County. The day-to-day supervision and control of the Contractor's employees and its subcontractors is the sole responsibility of the Contractor.

18. FAILURE TO DELIVER

If the Contractor fails to deliver goods or services in accordance with the Contract terms and conditions, the County, after notice to the Contractor, may procure the goods or services from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor. However, if public necessity requires the use of nonconforming materials or supplies, they may be accepted at a reduction in price to be determined solely by the County.

19. UNSATISFACTORY WORK

If any of the work done, or material, goods, or equipment provided by the Contractor, is unsatisfactory to the County the Contractor must, upon notice from the County, immediately remove at the Contractor's expense such unsatisfactory work, material, goods, or equipment and replace the same with work, material, goods, or equipment satisfactory to the County. If the Contractor fails to do so after fifteen (15) days the County shall have the right to remove or replace the rejected work, material, goods, or equipment at the expense of the Contractor and offset the expense and administrative costs against any sums owed to the Contractor. This provision applies during the Contract term and during any warranty or guarantee period. At the Project Officer's discretion, rather than correction or replacement of the work, an appropriate adjustment to the Contract Amount may be made.

20. TERMINATION

The County may terminate this Contract at any time as follows: (1) for cause, if, as determined by the County, the Contractor is in breach or default or has failed to perform the Work satisfactorily; or (2) for the convenience of the County.

Upon receipt of a notice of termination, the Contractor must not place any further orders or subcontracts for materials, services or facilities; must terminate all vendors and subcontracts, except as are necessary for the completion of any portion of the Work that the County did not terminate; and must immediately deliver all documents related to the terminated Work to the County.

Any purchases that the Contractor makes after the notice of termination will be the sole responsibility of the Contractor, unless the County has approved the purchases in writing as necessary for completion of any portion of the Work that the County did not terminate.

If any court of competent jurisdiction finds a termination for cause by the County to be improper, then the termination will be deemed a termination for convenience.

A. TERMINATION FOR CAUSE, INCLUDING BREACH AND DEFAULT; CURE

1. **Termination for Unsatisfactory Performance.** If the County determines that the Contractor has failed to perform satisfactorily, then the County will give the Contractor written notice of such failure(s) and the opportunity to cure them within 15 days or any other period specified by the County ("Cure Period"). If the Contractor fails to cure within the Cure Period, the County may terminate the Contract for failure to provide satisfactory performance by providing written notice with a termination date. Upon such termination, the Contractor may apply for compensation for Contract services that the County previously accepted ("Termination Costs"), unless payment is otherwise barred by the Contract. The Contractor must submit any request for Termination Costs, with all supporting documentation, to the County Project Officer within 30 days after the expiration of the Cure Period. The County may accept or reject the request for Termination Costs, in whole or in part, and may notify the Contractor of its decision within a reasonable time.

In the event of termination by the County for failure to perform satisfactorily, the Contractor must continue to provide its services as previously scheduled through the termination date, and the County must continue to pay all fees and charges incurred through the termination date.

2. **Termination for Breach or Default.** If the County terminates the Contract for default or breach of any Contract provision or condition, then the termination will be immediate after notice of termination to the Contractor (unless the County provides for an opportunity to cure), and the Contractor will not be permitted to seek Termination Costs.

Upon any termination pursuant to this section, the Contractor will be liable to the County for costs that the County must expend to complete the Work, including costs resulting from any related delays and from unsatisfactory or non-compliant work performed by the Contractor or its subcontractors. The County will deduct such costs from any amount due to the Contractor; or if the County does not owe the Contractor, the Contractor must promptly pay the costs within 15 days of a demand by the County. This section does not limit the County's recovery of any other damages to which it is entitled by law.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt the notice of the termination.

B. TERMINATION FOR THE CONVENIENCE OF THE COUNTY

The County may terminate this Contract in whole or in part whenever the Purchasing Agent determines that termination is in the County's best interest. The County will give the Contractor at least 15 days' notice in writing. The notice must specify the extent to which the Contract is terminated and the effective termination date. The Contractor will be entitled to Termination Costs, as defined above, plus any other reasonable amounts that the parties might negotiate; but no amount will be allowed for anticipatory profits.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt of the notice of the termination.

21. INDEMNIFICATION

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless and indemnify the County and all of its elected and appointed officials, officers, current and former

employees, agents, departments, agencies, boards and commissions (collectively the "County Indemnitees") from and against any and all claims made by third parties for any and all losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability, demands or exposure resulting from, arising out of or in any way connected with the Contractor's acts or omissions, including the acts or omissions of its employees, vendors, delivery drivers and/or subcontractors, in performance or nonperformance of the Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

The Contractor agrees to defend, indemnify, and hold harmless County from any and all damages, costs, claims, expenses, suits, losses, liabilities, or obligations of any kind including without limitation, environmental assessments, evaluations, remediations, fines, penalties, and clean-up costs which may be asserted against or imposed upon, or incurred by County arising from Contractor's discharge or disposal of any hazardous or toxic materials, trash, debris, refuse, waste or other materials ("Materials") related in any way to contractor's operations herein.

22. INTELLECTUAL PROPERTY INDEMNIFICATION

The Contractor warrants and guarantees that in providing services under this Contract neither the Contractor nor any subcontractor is infringing on the intellectual property rights (including, but not limited to, copyright, patent, mask and trademark) of third parties.

If the Contractor or any of its employees or subcontractors uses any design, device, work or material that is covered by patent or copyright, it is understood that the Contract Amount includes all royalties, licensing fees, and any other costs arising from such use in connection with the Work under this Contract.

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless, and indemnify the County Indemnitees, as defined above, from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability or exposure for infringement of or on account of any trademark, copyright, patented or unpatented invention, process or article manufactured or used in the performance of this Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

23. COPYRIGHT

By this Contract, the Contractor irrevocably transfers, assigns, sets over and conveys to the County all rights, title and interest, including the sole exclusive and complete copyright interest, in any and all copyrightable works created pursuant to this Contract. The Contractor will execute any documents that the County requests to formalize such transfer or assignment.

The rights granted to the County by this section are irrevocable and may not be rescinded or modified, including in connection with or as a result of the termination of or a dispute concerning this Contract.

The Contractor may not use subcontractors or third parties to develop or provide input into any copyrightable materials produced pursuant to this Contract without the County's advance written approval and unless the Contractor includes this Copyright provision in any contract or agreement with such subcontractors or third parties related to this Contract.

24. OWNERSHIP AND RETURN OF RECORDS

This Contract does not confer on the Contractor any ownership rights or rights to use or disclose the County's data or inputs.

All drawings, specifications, blueprints, data, information, findings, memoranda, correspondence, documents or records of any type, whether written, oral or electronic, and all documents generated by the Contractor or its subcontractors as a result of this Contract (collectively "Records") are the exclusive property of the County and must be provided or returned to the County upon completion, termination, or cancellation of this Contract. The Contractor will not use or willingly cause or allow such materials to be used for any purpose other than performance of this Contract without the written consent of the County.

The Records are confidential, and the Contractor will neither release the Records nor share their contents. The Contractor will refer all inquiries regarding the status of any Record to the Project Officer or to his or her designee. At the County's request, the Contractor will deliver all Records, including hard copies of electronic records, to the Project Officer and will destroy all electronic Records.

The Contractor agrees to include the provisions of this section as part of any contract or agreement related to this Contract into which it enters with subcontractors or other third parties.

The provisions of this section will survive any termination or cancellation of this Contract.

25. CONFIDENTIAL INFORMATION

The Contractor and its employees, agents and subcontractors will hold as confidential all County information obtained under this Contract. Confidential information includes, but is not limited to, nonpublic personal information; personal health information (PHI); social security numbers; addresses; dates of birth; other contact information or medical information about a person; and information pertaining to products, operations, systems, customers, prospective customers, techniques, intentions, processes, plans and expertise. The Contractor must take reasonable measures to ensure that all of its employees, agents and subcontractors are informed of and abide by this requirement.

26. ETHICS IN PUBLIC CONTRACTING

This Contract incorporates by reference Article 9 of the Arlington County Purchasing Resolution, as well as all state and federal laws related to ethics, conflicts of interest or bribery, including the State and Local Government Conflict of Interests Act (Code of Virginia § 2.2-3100 et seq.), the Virginia Governmental Frauds Act (Code of Virginia § 18.2-498.1 et seq.) and Articles 2 and 3 of Chapter 10 of Title 18.2 of the Code of Virginia, as amended (§ 18.2-438 et seq.). The Contractor certifies that its bid was made without collusion or fraud; that it has not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor; and that it has not conferred on any public employee having official responsibility for this procurement any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

27. COUNTY EMPLOYEES

No Arlington County employee may share in any part of this Contract or receive any benefit from the Contract that is not available to the general public.

28. FORCE MAJEURE

Neither party will be held responsible for failure to perform the duties and responsibilities imposed by this Contract if such failure is due to a fire, riot, rebellion, natural disaster, war, act of terrorism or act of God that is beyond the control of the party and that makes performance impossible or illegal, unless otherwise specified in the Contract.

29. AUTHORITY TO TRANSACT BUSINESS

The Contractor must, pursuant to Code of Virginia § 2.2-4311.2, be and remain authorized to transact business in the Commonwealth of Virginia during the entire term of this Contract. Otherwise, the Contract is voidable at the sole option of and with no expense to the County.

30. RELATION TO THE COUNTY

The Contractor is an independent contractor, and neither the Contractor nor its employees or subcontractors will be considered employees, servants or agents of the County. The County will not be responsible for any negligence or other wrongdoing by the Contractor or its employees, servants or agents. The County will not withhold payments to the Contractor for any federal or state unemployment taxes, federal or state income taxes or Social Security tax or for any other benefits. The County will not provide to the Contractor any insurance coverage or other benefits, including workers' compensation.

31. ANTITRUST

The Contractor conveys, sells, assigns and transfers to the County all rights, title and interest in and to all causes of action under state or federal antitrust laws that the Contractor may have relating to this Contract.

32. REPORT STANDARDS

The Contractor must submit all written reports required by this Contract for advance review in a format approved by the Project Officer. Reports must be accurate and grammatically correct and should not contain spelling errors. The Contractor will bear the cost of correcting grammatical or spelling errors and inaccurate report data and of other revisions that are required to bring the report(s) into compliance with this section.

Whenever possible, proposals must comply with the following guidelines:

- printed double-sided on at least 30% recycled-content and/or tree-free paper
- recyclable and/or easily removable covers or binders made from recycled materials (proposals with glued bindings that meet all other requirements are acceptable)
- avoid use of plastic covers or dividers
- avoid unnecessary attachments or documents or superfluous use of paper (e.g. separate title sheets or chapter dividers)

33. AUDIT

The Contractor must retain all books, records and other documents related to this Contract for at least five years, or such period of time required by the County's funding partner(s), if any, whichever is greater,

after the final payment and must allow the County or its authorized agents to examine the documents during this period and during the Contract Term. The Contractor must provide any requested documents to the County for examination within 15 days of the request, at the Contractor's expense. Should the County's examination reveal any overcharging by the Contractor, the Contractor must, within 30 days of County's request, reimburse the County for the overcharges and for the reasonable costs of the County's examination, including, but not limited to, the services of external audit firm and attorney's fees; or the County may deduct the overcharges and examination costs from any amount that the County owes to the Contractor. If the Contractor wishes to destroy or dispose of any records related to this Contract (including confidential records to which the County does not have ready access) within five years after the final payment, or such period of time required by the County's funding partner(s), if any, whichever is greater, the Contractor must give the County at least 30 days' notice and must not dispose of the documents if the County objects.

34. ASSIGNMENT

The Contractor may not assign, transfer, convey or otherwise dispose of any award or any of its rights, obligations or interests under this Contract without the prior written consent of the County.

35. AMENDMENTS

This Contract may not be modified except by written amendment executed by persons duly authorized to bind the Contractor and the County.

36. ARLINGTON COUNTY PURCHASING RESOLUTION AND COUNTY POLICIES

Nothing in this Contract waives any provision of the Arlington County Purchasing Resolution, which is incorporated herein by reference, or any applicable County policy.

37. DISPUTE RESOLUTION

All disputes arising under this Agreement or concerning its interpretation, whether involving law or fact and including but not limited to claims for additional work, compensation or time, and all claims for alleged breach of contract must be submitted in writing to the Project Officer as soon as the basis for the claim arises. In accordance with the Arlington County Purchasing Resolution, claims denied by the Project Officer may be submitted to the County Manager in writing no later than 60 days after the final payment. The time limit for a final written decision by the County Manager is 30 days. Procedures concerning contractual claims, disputes, administrative appeals and protests are contained in the Arlington County Purchasing Resolution. The Contractor must continue to work as scheduled pending a decision of the Project Officer, County Manager, County Board or a court of law.

38. APPLICABLE LAW, FORUM, VENUE, AND JURISDICTION

This Contract is governed in all respects by the laws of the Commonwealth of Virginia; and the jurisdiction, forum and venue for any litigation concerning the Contract or the Work is in the Circuit Court for Arlington County, Virginia, and in no other court.

39. ARBITRATION

No claim arising under or related to this Contract may be subject to arbitration.

40. NONEXCLUSIVITY OF REMEDIES

All remedies available to the County under this Contract are cumulative, and no remedy will be exclusive of any other at law or in equity.

41. NO WAIVER

The failure to exercise a right provided for in this Contract will not be a subsequent waiver of the same right or of any other right.

42. SEVERABILITY

The sections, paragraphs, clauses, sentences, and phrases of this Contract are severable; and if any section, paragraph, clause, sentence or phrase of this Contract is declared invalid by a court of competent jurisdiction, the rest of the Contract will remain in effect.

50. ATTORNEY'S FEES

In the event that the County prevails in any legal action or proceeding brought by the County to enforce any provision of this Contract, the Contractor will pay the County's reasonable attorney's fees and expenses.

43. SURVIVAL OF TERMS

In addition to any statement that a specific term or paragraph survives the expiration or termination of this Contract, the following sections also survive: INDEMNIFICATION; INTELLECTUAL PROPERTY INDEMNIFICATION; RELATION TO COUNTY; OWNERSHIP AND RETURN OF RECORDS; AUDIT; COPYRIGHT; DISPUTE RESOLUTION; APPLICABLE LAW AND JURISDICTION; ATTORNEY'S FEES, AND CONFIDENTIAL INFORMATION.

44. HEADINGS

The section headings in this Contract are inserted only for convenience and do not affect the substance of the Contract or limit the sections' scope.

45. AMBIGUITIES

The parties and their counsel have participated fully in the drafting of this Agreement; and any rule that ambiguities are to be resolved against the drafting party does not apply. The language in this Agreement is to be interpreted as to its plain meaning and not strictly for or against any party.

46. NOTICES

Unless otherwise provided in writing, all legal notices and other formal communications required by this Contract are deemed to have been given when either (a) delivered in person; (b) delivered by an agent, such as a delivery service; or (c) deposited in the United States mail, postage prepaid, certified or registered and addressed as follows:

TO THE CONTRACTOR:

Dejan Dragacevac, Vice President
Sagres Construction Corporation
3680 Wheeler Ave, Suite 300,
Alexandria, VA 22304

TO THE COUNTY:

Carla Alayon, Project Officer
Arlington County, Water, Sewer & Streets Bureau
Dept. of Environmental Services
4200 28th St S
Arlington, VA 22206

AND

Sharon T. Lewis, M.A., MPS, VCO, CPPB, Purchasing Agent
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 500
Arlington, Virginia 22201

47. NON-DISCRIMINATION NOTICE

Arlington County does not discriminate against faith-based organizations.

48. INSURANCE, PAYMENT AND PERFORMANCE BONDS

The Contractor shall maintain the required insurance coverage and payment and performance bonds as set forth in the Invitation to Bid through completion of the Contract, including all warranty and guarantee periods.

56. COUNTERPARTS

This Agreement may be executed in one or more counterparts and all of such counterparts shall together constitute one and the same instrument. Original signatures transmitted and received via facsimile or other electronic transmission (e.g., PDF or similar format) are true and valid signatures for all purposes hereunder and shall be effective as delivery of a manually executed original counterpart.

WITNESS these signatures:

THE COUNTY BOARD OF ARLINGTON
COUNTY, VIRGINIA

AUTHORIZED
SIGNATURE: _____

NAME Meloni Hurley

TITLE: Assistant Purchasing Agent

DATE: 8/14/2019

SAGRES CONSTRUCTION CORPORATION

AUTHORIZED
SIGNATURE: _____

NAME Dejan Dragacevac

TITLE: Vice President

DATE: 8/9/2019

EXHIBIT A

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
2100 CLARENDON BOULEVARD, SUITE 500
ARLINGTON, VA 22201
(703) 228-3410**

INVITATION TO BID NO. 19-200-ITB

SEALED BIDS WILL BE RECEIVED IN HAND IN THE OFFICE OF THE BID CLERK, SUITE 511, 2100 CLARENDON BOULEVARD, ARLINGTON, VIRGINIA 22201, UNTIL 3:00 P.M. ON THE 14TH DAY OF MAY, 2019 FOR:

MAINTENANCE OF STORM SEWER LINES, STREAMS, CHANNELS AND APPURTENANCES ON AN AS NEEDED BASIS

At the time, date and place stated above, bids will be publicly opened.

Bid Surety in the amount of not less than \$13,750.00 of the bid must be submitted with the bid. Performance and Payment Bonds in the amount of \$275,000.00 of the award will be required of the successful bidder.

YOU MAY DOWNLOAD AN ELECTRONIC COPY OF THIS SOLICITATION AND ATTACHMENTS AT NO COST FROM WWW.EVA.VIRGINIA.GOV.

NOTICE: ANY BIDDER ORGANIZED AS A STOCK OR NONSTOCK CORPORATION, LIMITED LIABILITY COMPANY, BUSINESS TRUST, OR LIMITED PARTNERSHIP OR REGISTERED AS A LIMITED LIABILITY PARTNERSHIP MUST BE AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VIRGINIA PRIOR TO SUBMITTING A BID (REFER TO AUTHORITY TO TRANSACT BUSINESS SECTION IN THE SOLICITATION FOR FURTHER INFORMATION)

Arlington County reserves the right to reject any and all bids, cancel this solicitation, and to waive any informalities or irregularities in procedure. A bidder's submission of a bid indicates acceptance of these terms.

Arlington County, Virginia
Office of the Purchasing Agent

Igor Scherbakov, CPPB
Procurement Officer

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I. INFORMATION FOR BIDDERS

1. QUESTIONS AND ADDENDA

All communications relating to this solicitation must be e-mailed to **Igor Scherbakov** in the Office of the Purchasing Agent, at **ischerbakov@arlingtonva.us**. For a question to be considered, the subject line of the e-mail must state the following: **ITB No. 19-200-ITB Questions**. Questions should be succinct and must include the submitter's name, title, company name, company address, and telephone number. Prior to the award of a contract resulting from this solicitation, bidders are prohibited from contacting any County staff other than those assigned to the Office of the Purchasing Agent.

NO QUESTIONS WILL BE CONSIDERED IF THEY ARE SUBMITTED WITHIN THE TEN (10) CALENDAR DAYS IMMEDIATELY PRECEDING THE DEADLINE FOR RECEIPT OF BIDS.

If any questions or responses require revisions to this solicitation, such revisions will be by formal Addendum only. Bidders are cautioned not to rely on any written, electronic, or oral representations made by any County representative or other person, including the County's technical contact, that appear to change any portion of the solicitation unless the change is subsequently ratified by a written Addendum to this solicitation issued by the Office of the Purchasing Agent.

2. INTEREST IN MORE THAN ONE BID AND COLLUSION

Reasonable grounds for believing that a Bidder is interested in more than one bid for a solicitation, including both as a Bidder and as a subcontractor for another Bidder, or that collusion exists between two or more Bidders, will result in rejection of all affected bids. However, an individual or entity acting only as a subcontractor may be included as a subcontractor on bids of two or more different Bidders. Bidders rejected under the above provision will also be disqualified if they respond to a re-solicitation for the same work.

3. TRADE SECRETS OR PROPRIETARY INFORMATION

Trade secrets or proprietary information that a bidder or contractor submits in connection with a procurement transaction may be exempted from public disclosure under the Virginia Freedom of Information Act ("VFOIA"). However, the bidder or contractor must invoke VFOIA protection clearly and in writing on the Bid Form for County review. The Bid Form must include at least the following: (1) the data or other materials sought to be protected and (2) specific reasons why the material is confidential or proprietary. It is the bidder's sole responsibility to defend such exemptions if challenged in a court of competent jurisdiction.

4. DEBARMENT STATUS

The Bidder must indicate on the Bid Form whether it or any of its principals is currently debarred from submitting bids to the County or to any other state or political subdivision and whether the Bidder is an agent of any person or entity that is currently debarred from submitting bids to the County or to any other state or political subdivision. An affirmative response may be considered grounds for rejection of the bid.

5. AUTHORITY TO TRANSACT BUSINESS

Any Bidder organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership must be authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia, or as otherwise required by law. The proper and full legal name of the entity and the identification number issued to the Bidder by the Virginia State Corporation Commission must be included on the Bid Form. Any Bidder that is not required to be authorized to transact business in the Commonwealth must include in its bid a statement describing why the Bidder is not required to be so authorized. The County may require a Bidder to provide documentation that 1) clearly identifies the complete name and legal form of the entity and 2) establishes that the entity is authorized by the State Corporation Commission to transact business in the Commonwealth of Virginia. Failure of a Bidder to provide such documentation will be a ground for rejection of the bid or cancellation of any award. For further information refer to the Commonwealth of Virginia State Corporation Commission website at: www.scc.virginia.gov.

6. ARLINGTON COUNTY BUSINESS LICENSES

The successful Bidder must comply with the provisions of Chapter 11 ("Licenses") of the Arlington County Code, if applicable. For information on the provisions of that Chapter and its applicability to this solicitation, contact the Arlington County Business License Division, Office of the Commissioner of the Revenue, at 2100 Clarendon Blvd., Suite 200, Arlington, Virginia, 22201, tel. (703) 228-3060, or e-mail mailto: business@arlingtonva.us.

7. VIRGINIA CONTRACTOR LICENSE

For all work that is classified as being performed by "Contractors" as defined by the Virginia State Board for Contractors, a Class A, B, or C License is required.

If a contract for performing or managing construction, removal, repair or improvements is for \$120,000 or more, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$750,000 or more, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS A CONTRACTOR."

If a contract for performing or managing construction, removal, repair or improvements is for \$10,000 or more, but less than \$120,000, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$150,000 or more, but less than \$750,000, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS B CONTRACTOR."

If a contract for performing construction, removal, repair or improvements is for \$1,000 or more, but no more than \$10,000 or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is less than \$150,000, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS C CONTRACTOR." Class C contractors shall not include electrical, plumbing, and heating, ventilation and air conditioning contractors.

For further information, contact the State Board for Contractors, 2 South Ninth Street, Richmond, VA 23219, (804) 367-8511.

8. BID FORM SUBMISSION

The bidder must submit its bid on the form provided in this solicitation. One copy of the Bid Form, marked "ORIGINAL" must contain an original longhand signature. The bidder must also submit a photocopy of the signed Bid Form. Both copies must be submitted by hand in a sealed envelope or package no later than the date and time deadline specified in this solicitation to:

Arlington County Government
Office of the Bid Clerk
Suite 511
2100 Clarendon Boulevard,
Arlington, Virginia, 22201

The exterior of the envelope or package must indicate the name of the bidder, the scheduled bid opening date and time, and the number of the Invitation to Bid. Bids submitted by facsimile or electronically will not be accepted.

Timely submission is solely the responsibility of the bidder. The County will reject bids received after the deadline. A bid will also be rejected if the Bid Form is not signed in the designated space by a person authorized to legally bind the bidder.

Modification of or additions to the Bid Form may be cause for rejection of the bid; however, Arlington County reserves the right to decide in its sole discretion whether or not to reject such a bid as nonresponsive. As a precondition to bid acceptance, Arlington County may request that a bidder withdraw or modify any such modifications or additions which do not affect quality, quantity, price, or delivery.

Bids and all documents submitted to Arlington County by a bidder become the property of the County upon receipt.

9. ERRORS IN EXTENSION

Where the unit price and the extension price are at variance, the unit price will prevail.

10. EXCEPTIONS

Conditional or qualified bids containing exceptions, unless specifically allowed in the solicitation, are subject to rejection in whole or in part as nonresponsive.

11. NONCONFORMING TERMS AND CONDITIONS

If a bid contains alternate terms and conditions that do not conform to the terms and conditions in this solicitation, the bid will be subject to rejection for nonresponsiveness. The County reserves the right to permit a bidder to withdraw nonconforming terms and conditions from its bid prior to the County's determination of nonresponsiveness.

12. BIDDERS' RESPONSIBILITY TO INVESTIGATE

Before submitting a bid, each bidder must make all investigations necessary to ascertain all conditions and requirements affecting the full performance of the contract and to verify any representations made by the County upon which the bidder will rely. No pleas of ignorance of such conditions and requirements will relieve the successful bidder from its obligation to comply in every detail with all provisions and requirements of the contract or will be accepted as a basis for any claim for any monetary consideration on the part of the successful bidder.

13. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

Each bidder is responsible for ascertaining the nature and locations of the Work of the solicitation, and for investigating the general and local conditions and factors which can affect the work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stage, tides, or similar physical conditions at the site;
- d. the conformation and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

Each bidder is responsible for investigating the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work publicly or otherwise available, as well as from the drawings and specifications made a part of this solicitation.

The locations of existing utilities, including underground utilities, which may affect the work are indicated on the drawings or in the specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these drawings or specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of operations. The bidder shall make all necessary investigations to determine the existence and locations of such utilities.

The County assumes no responsibility for any conclusions or interpretations made by the bidder based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which could affect the work by any of its officers or agents before the execution of the contract, unless that understanding or representation is expressly stated in the Contract.

14. INCOMPLETE DOCUMENTS

Each bidder is responsible for having determined the accuracy and/or completeness of the solicitation documents upon which it relied in making its bid, and has an affirmative obligation to notify the Arlington County Purchasing Agent immediately upon discovery of an apparent or suspected inaccuracy, error in, or omission of any pages, drawings, sections, or addenda whose omission from the documents was apparent from a reference or page numbering or other indication in the solicitation documents.

If a bidder downloads an electronic version of the solicitation documents, that potential bidder is responsible for determining the accuracy and/or completeness of the electronic documents, and ensuring that the electronic documents used in preparing the bid are the most current version of solicitation documents issued by the County.

If the successful bidder proceeds with any activity that may be affected by an inaccuracy, error in, or omission in the solicitation documents of which it is aware but has not notified the Arlington County Purchasing Agent, the bidder hereby agrees to perform any activity described in the missing or incomplete documents at bidder's sole expense and at no additional cost to Arlington County.

15. ERRONEOUS OR INFEASIBLE REQUIREMENTS

Each bidder is responsible for having determined the feasibility of the work required, and shall notify the County Purchasing Agent immediately upon discovery of any apparent erroneous, contradictory, incomplete, or infeasible requirements or directions contained in the Solicitation Documents. If a bidder fails to notify the County of such conditions immediately upon discovery, the bidder assumes all responsibility for any and all work required to satisfy the contract requirements at no additional cost to the County and within the Time for Completion.

16. QUALIFICATION OF BIDDERS

In order to be considered responsible and responsible, Bidders shall have the experience described below, and provide the supporting documentation as instructed.

COMPANY QUALIFICATIONS:

Bidders shall have at least three (3) continuous years of experience with storm sewer maintenance. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Bidder's obtained project experience shall consist of the following:

Bidders shall provide a list of 3 similar recently completed projects involving work related to the maintenance of storm sewer. For each project, Bidders shall list the following information:

- Project Name
- Project description and Bidder's scope of work within the project
- Project manager's name, telephone number and email address
- Work start date, scheduled completion, and actual completion date
- Initial contract cost and final contract cost

The experience of the contractor owner(s) may be imputed to a newly formed company/Contractor provided the Contractor owner(s) has/have at least five (5) years of demonstrated experience of reliability and meets the criteria set forth herein.

In addition, the Purchasing Agent may require a bidder to demonstrate that it has the necessary facilities, ability, and financial resources to comply with the contract and furnish the service, material or goods specified herein in a satisfactory manner before the award of any contract. A bidder may also be required to provide past history and references. Failure to qualify according to the foregoing requirements will result in bid rejection.

17. ALTERNATE BID

Bidders who have other items they wish to offer in lieu of, or in addition to, what is required by this solicitation shall submit a separate bid clearly marked "ALTERNATE BID". Alternate bids will be automatically deemed nonresponsive. Such bids will, however, be examined and may result in either cancellation of all bids in order to permit rewriting of the solicitation to include the alternate item in a rebid or the alternate item may be considered for future requirements.

18. INFORMALITIES

The County reserves the right to waive minor defects or variations from the exact requirements of the solicitation in a bid insofar as those defects or variations do not affect the price, quality, quantity, or delivery schedule of the services being procured. If insufficient information is submitted for Arlington County to properly evaluate a bid or a bidder; the County may request such additional information after bid opening, provided that the information requested does not change the price, quality, quantity, or delivery schedule for the services being procured.

19. USE OF BRAND NAMES/SUBSTITUTES

Unless identified as a "No Substitute" item in the solicitation, the name of a certain brand, make or manufacturer does not restrict bidders to that specific brand, make or manufacturer. The use of the brand, make or manufacturer's identification is intended to convey the general type, style, character, and quality of the article described. When a brand name is specified and followed by the phrase "or approved equal," the brand name product may be substituted if a suitable equivalent considering quality, workmanship, economy of operation, and suitability for the intended use, is accepted by the County Purchasing Agent.

For those items not identified as "No Substitute", and followed by the phrase "or approved equal," the County has established the following procedure for determining the equivalency of a particular item:

Bidder Submission of Proposed Equivalent Item(s):

- 1) Bidder shall submit to the County its proposed item(s) for determination of their equivalency to the Brand Name(s) specified.

- 2) Each proposed item must be described on a separate page, indicating the appropriate specification section number, product or fabrication or installation method to be replaced, and specifics of the proposed item. Attach any technical information, photographs, brochures and the relevant data listed below that supports the proposed item and will permit the County to fairly determine acceptability of the item proposed:
 - a. Reasons why the specified product cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the product specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Architects and owners, if requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Statement of impact on the construction schedule. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - i. Cost information.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

- 3) The County will consider factors provided in the project technical specifications, such as relative costs, equivalency of features, serviceability, and the design of the item proposed..
- 4) All pages of the submission shall be marked with the name, address and contact information of the bidder, and sent to the Office of the Purchasing Agent to arrive prior to the question deadline established in Section I., paragraph I. ADDITIONAL INFORMATION. E-mail transmittals will be accepted at ischerbakov@arlingtonva.us.

County Review of Proposed Equivalent Item(s):

- 1) Approved item(s) will be added to the solicitation, in the form of an Addendum to the solicitation, and forwarded to all bidders of record.
- 2) Bidders whose item(s) have not been approved will be so advised in writing simultaneously with the issuance of the Addendum.

20. NEW MATERIAL

Unless otherwise provided for in this solicitation, all goods, materials, supplies, or components offered to the County under this bid solicitation must be new, not used or reconditioned, and are not of such age or so deteriorated as to impair their usefulness or safety and that the goods, materials, supplies, or components offered are current production models of the respective manufacturer. If a bidder believes that furnishing used or reconditioned goods, materials, supplies or components will be in the County's interest, the bidder shall notify the County Purchasing Agent in writing no later than fifteen (15) calendar days prior to the date set for opening of bids. The notice shall include the reasons for the request and any benefits which may accrue to the County if the Purchasing Agent authorizes the bidding of used or reconditioned goods, materials, supplies or components.

21. BID WITHDRAWAL PRIOR TO BID OPENING

No bid can be withdrawn after it is filed with the Bid Clerk unless the bidder makes a request in writing to the Purchasing Agent prior to the time set for the opening of bids.

22. WITHDRAWAL OF BID FROM CONSIDERATION AFTER BID OPENING

After the opening of a bid, a bidder may withdraw its bid from consideration if the price of the bid is substantially lower than other bids due solely to a mistake therein, provided the bid is submitted in good faith, the mistake is a clerical mistake as opposed to a judgment mistake, and is actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. No partial withdrawals of bids will be permitted after the time and date set for the bid opening. The bidder must give notice in writing to the Arlington County Purchasing Agent of a claim of right to withdraw a bid and provide all original work papers, documents and other materials used in the preparation of the bid sought to be withdrawn, within two (2) business days after the date of bid opening. A bid may also be withdrawn if the County fails to award or issue a notice of intent to award the bid within ninety (90) days after the date fixed for opening bids.

23. METHOD OF AWARD

The County will award to the lowest responsive and responsible bidder.

The lowest bidder will be determined by the Grand Total as in indicated in the Pricing Sheet.

24. NOTICE OF DECISION TO AWARD

When the County has made a decision to award a contract(s), the County will send a Notice of Decision to Award to all Bidders using the e-mail addresses provided on the Bid Form.

25. INSURANCE REQUIREMENTS

Each bidder must be able to demonstrate proof of the specific coverage requirements and limits applicable to this solicitation. If the bidder is not able to do so, it may propose alternate insurance coverage for consideration by the County. Written requests for consideration of alternate coverage must be received by the County Purchasing Agent at least 10 working days prior to bid due date. If the County permits alternate coverage, an amendment to the Insurance Checklist will be issued prior to the time and date set for receipt of bids.

26. SURETY REQUIRED

A. BID SURETY:

A fully completed and properly executed original Bid Bond, cashier's check, certified check, money order, or cash escrow in the amount of thirteen thousand seven hundred and fifty dollars (\$13,750.00) made payable to the Treasurer of Arlington County shall accompany each bid. The Bid Surety will be retained until after the award to the successful bidder. The Bid Surety of the successful bidder will be retained until completion of the Contract or the posting of a Performance Bond, whichever occurs sooner. A bid submitted without a proper bid surety will be rejected.

B. FAILURE TO EXECUTE:

The failure of a bidder to accept an award and file acceptable Performance and Payment Bonds within fifteen (15) days after notice of intent to award will cause cancellation of the award and the forfeiture of the Bid Surety to the County.

C. PERFORMANCE SURETY:

A fully completed and properly executed original Performance Bond in the amount of two hundred and seventy five thousand (\$275,000.00) will be required of the successful bidder to ensure satisfactory completion of the work. The bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Performance Bond shall be renewable annually in the original amount through the completion of the Contract, including all warranty and guarantee periods.

D. PAYMENT BOND:

A fully completed and properly executed original Payment Bond in the amount of two hundred and seventy five thousand (\$275,000.00), will be required of the successful bidder to ensure payment of all persons who have and fulfill contracts for the Contractor for performing labor, providing equipment, or providing material in the performance of the work provided for in the Contract. The Bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Payment Bond shall be renewable annually in the original amount for the duration of the Contract.

27. EXECUTION OF CONTRACT

Within fifteen days after the Contract is presented to the successful Bidder for signature, the Contractor must deliver to the County Purchasing Agent the original of the executed Agreement and executed performance and payment bonds and required certificate of insurance. Failure to do so shall constitute a default, and the County may award the Contract to the next lowest responsive and responsible bidder or solicit new bids. The County may then charge against the Contractor the difference between the amount of the Contract award and the amount for which a Contract is subsequently executed, up to the total amount of the Contractor's bid security.

28. EXPENSES INCURRED IN PREPARING BID

All expenses related to a bid are the sole responsibility of the bidder.

29. OPTIONAL ESCROW AGREEMENT

If the successful bidder so elects, the bidder may utilize an escrow account for utilization of the retainage funds pursuant to § 2.2-4334 of the Code of Virginia. The bidder must indicate on the Bid Form whether or not it elects the escrow account procedure.

FOLLOWING THIS PAGE IS THE AGREEMENT THAT WILL BE ENTERED INTO BETWEEN THE COUNTY AND THE CONTRACTOR. THE AGREEMENT IS PART OF THIS SOLICITATION. THIS AGREEMENT IS SUBJECT TO REVIEW BY THE COUNTY ATTORNEY PRIOR TO BEING SUBMITTED FOR CONTRACTOR'S SIGNATURE.

II. AGREEMENT AND CONTRACT TERMS AND CONDITIONS

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
SUITE 500, 2100 CLARENDON BOULEVARD
ARLINGTON, VA 22201**

AGREEMENT NO. 19-200-ITB

THIS AGREEMENT is made, on the date of execution by the County, between Contractor's name, Contractor's address ("Contractor") a name of state type of entity authorized to do business in the Commonwealth of Virginia, and the County Board of Arlington County, Virginia. The County and the Contractor, for the consideration hereinafter specified, agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents consist of:

- Agreement No. 19-200-ITB and all modifications properly incorporated into the Agreement
- Exhibit A – Arlington County Invitation to Bid No. 19-200-ITB, including DES General Conditions, Special Conditions, and Supplementary Specifications
- Exhibit B – Specifications, Drawings and Construction Notes
- Exhibit C – Price Bid of Contractor

Where the terms and provisions of this Agreement vary from the terms and provisions of the other Contract Documents, the terms and provisions of this Agreement will prevail over the other Contract Documents, and the remaining Contract Documents will be complementary to each other. If there are any conflicts, the most stringent terms or provisions will prevail.

The Contract Documents set forth the entire agreement between the County and the Contractor. The County and the Contractor agree that no representative or agent of either party has made any representation or promise with respect to the parties' agreement that is not contained in the Contract Documents. The Contract Documents may be referred to below as the "Contract" or the "Agreement".

2. SCOPE OF WORK

The Contractor will furnish all labor, materials, and equipment for the construction of rehabilitation of Lee Reservoir underground 3mg concrete water tanks 1 & 2 (the "Project") and all other work shown, described, and required by the Contract Documents (hereinafter "the Work").

The Work shall be performed according to the standards established by the Contract Documents read together as a single specification. It shall be the Contractor's responsibility, at solely the Contractor's cost, to provide sufficient services to fulfill the purposes of the Work. Nothing in the Contract Documents shall be construed to limit the Contractor's responsibility to manage the details and execution of its Work.

3. PROJECT OFFICER

4. The performance of the Contractor is subject to the review and approval of the County Project Officer identified in Section 53, Notices, unless the Contractor is otherwise notified in writing.

5. CONTRACT TERM

The term of this Agreement will commence on the date of execution by the County, and shall be completed no later than twenty four (24) consecutive calendar months from the day of execution of the contract by the County ("Initial Contract Term"), subject to any written modifications as provided for in the Contract Documents. Upon completion of the Initial Term, County and Contractor may agree, through bilateral execution of a Contract Amendment, continued operations of the Contractor for not more than three (3) additional twelve (12) month periods (each a "Subsequent Contract Term"). The Initial Contract Term and any Subsequent Contract Term(s) are together the "Contract Term".

6. TIME FOR COMPLETION

County will assign work under this contract through issuance of Task Orders. Prior to each Task Order being issued, County and Contractor will discuss the scope of the Task Order and determine a mutually agreeable Final Completion date for that Task Order. Project Officer will indicate such date in the Notice to Proceed. Contractor shall complete each Task Order by the Final Completion date. Work will not reach Final Completion until it meets the requirements set forth in the General Conditions. Completion will be determined by the inspection and acceptance of the Work by the Project Officer.

Unless otherwise provided, no claims for early completion are allowed.

7. CONTRACT AMOUNT

The County will pay the Contractor in accordance with the terms of the Progress Payments and Retainage and Payment Terms sections below and at the prices shown in Exhibit C, but not more than \$_____ for the Contractor's completion of the Work as required by the Contract Documents provided the Work is performed to the satisfaction of and is accepted by the Project Officer. The Contractor will complete the Work for the total amount specified in this section ("Contract Amount") unless such amount is modified as provided in this Agreement. The Contract Amount includes all of the Contractor's costs and fees (profit) and is inclusive of all anticipated or known site conditions, anticipated or known materials, labor, and equipment costs, or any other costs which should reasonably have been expected by the Contractor Documents.

8. PROGRESS PAYMENTS AND RETAINAGE

The County will make monthly progress payments to the Contractor upon written application by the Contractor, on the basis of a written estimate of the work performed during the preceding calendar month as approved by the Project Officer. However, 5% of each progress payment will be retained by the County until Final Completion and acceptance of all Work covered by the Agreement.

All material and work covered by partial payments will become the property solely of the County at the time the partial payment is made. However, the Contractor will have the sole responsibility, care and custody for all materials and work upon which payments have been made until Substantial Completion.

When calculating payment for materials on-site, the County shall not pay for materials which are not scheduled for incorporation into the Work within sixty (60) days from the date of application for payment.

9. PAYMENT TERMS

The Contractor must submit invoices to the County's Project Officer, who will either approve the invoice or require corrections. The County will pay the Contractor 45 days after approval of an invoice for completed work which is reasonable and allocable to the Contract. The number of the County Purchase Order pursuant to work has been performed must appear on all invoices.

10. PAYMENT OF SUBCONTRACTORS

The Contractor is obligated to take one of the two following actions within seven days after receipt of payment by the County for work performed by any subcontractor under this Contract:

- a. Pay the subcontractor for the proportionate share of the total payment received from the County attributable to the work performed by the subcontractor under this Contract; or
- b. Notify the County and the subcontractor, in writing, of the Contractor's intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

The Contractor is obligated to pay interest to the subcontractor on all amounts owed by the Contractor to the subcontractor that remain unpaid after seven days following receipt by the Contractor of payment from the County for work performed by the subcontractor under this Contract, except for amounts withheld as allowed in subsection b., above. Unless otherwise provided under the terms of this Contract, interest will accrue at the rate of 1% per month.

The Contractor must include in each of its subcontracts, if any are permitted, a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

The Contractor's obligation to pay an interest charge to a subcontractor pursuant to this section may not be construed to be an obligation of the County. A Contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

11. RELEASE AND REQUEST FOR FINAL PAYMENT

In order to receive final payment upon Final Completion of the Project and before Final Acceptance, the Contractor must submit to the Project Officer a signed original notarized copy of the Arlington County Release and Request for Final Payment form per the General Conditions.

12. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

This Contract does not obligate the County to purchase a specific quantity of items or services during Contract Term. Any quantities that are included in the Contract Documents are the present expectations of the County for the period of the Contract; and the County is under no obligation to buy that or any amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual quantities, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates in the Contract.

The County does not guarantee that the Contractor will be the exclusive provider of the goods or services covered by this Contract. The items or services covered by this Contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through those contract(s).

13. COUNTY PURCHASE ORDER REQUIREMENT

County purchases are authorized only if the County issues a Purchase Order in advance of the transaction, indicating that the ordering County agency has sufficient funds available to pay for the purchase. If the Contractor provides goods or services without a signed County Purchase Order, it does so at its own risk and expense. The County will not be liable for payment for any purchases made by its employees that are not authorized by the County Purchasing Agent.

14. LIEN

It is expressly agreed that after any payment has been made by the County either to the Contractor for work done, or labor or material supplied under the Contract, the County will have a lien upon all material delivered to the site either by the Contractor, or for the Contractor, which is to be used in the performance of the Contract.

15. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED

During the performance of its work pursuant to this Contract:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age or disability or on any other basis prohibited by state law. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- B. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation will be deemed sufficient for meeting the requirements of this section.
- C. The Contractor will state in all solicitations or advertisements for employees that it places or causes to be placed that such Contractor is an Equal Opportunity Employer.
- D. The Contractor will comply with the provisions of the Americans with Disabilities Act of 1990 ("ADA"), which prohibits discrimination against individuals with disabilities in employment and mandates that disabled individuals be provided access to publicly and privately provided services and activities.
- E. The Contractor must include the provisions of the foregoing paragraphs in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

16. EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

In accordance with §2.2-4311.1 of the Code of Virginia, as amended, the Contractor must not during the performance of this Contract knowingly employ an unauthorized alien, as that term is defined in the federal Immigration Reform and Control Act of 1986.

17. DRUG-FREE WORKPLACE TO BE MAINTAINED BY CONTRACTOR

During the performance of this Contract, the Contractor must: (i) provide a drug-free workplace for its employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and

specifying the actions that will be taken against employees for violating such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "workplace" means the site(s) for the performance of the work required by this Contract.

18. PROJECT STAFF

The County has the right to reasonably reject staff or subcontractors whom the Contractor assigns to the Project. The Contractor must then provide replacement staff or subcontractors satisfactory to the County in a timely manner and at no additional cost to the County. The day-to-day supervision and control of the Contractor's employees and its subcontractors is the sole responsibility of the Contractor.

19. FAILURE TO DELIVER

If the Contractor fails to deliver goods or services in accordance with the Contract terms and conditions, the County, after notice to the Contractor, may procure the goods or services from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor. However, if public necessity requires the use of nonconforming materials or supplies, they may be accepted at a reduction in price to be determined solely by the County.

20. UNSATISFACTORY WORK

If any of the work done, or material, goods, or equipment provided by the Contractor, is unsatisfactory to the County the Contractor must, upon notice from the County, immediately remove at the Contractor's expense such unsatisfactory work, material, goods, or equipment and replace the same with work, material, goods, or equipment satisfactory to the County. If the Contractor fails to do so after fifteen (15) days the County shall have the right to remove or replace the rejected work, material, goods, or equipment at the expense of the Contractor and offset the expense and administrative costs against any sums owed to the Contractor. This provision applies during the Contract term and during any warranty or guarantee period. At the Project Officer's discretion, rather than correction or replacement of the work, an appropriate adjustment to the Contract Amount may be made.

21. TERMINATION

The County may terminate this Contract at any time as follows: (1) for cause, if, as determined by the County, the Contractor is in breach or default or has failed to perform the Work satisfactorily; or (2) for the convenience of the County.

Upon receipt of a notice of termination, the Contractor must not place any further orders or subcontracts for materials, services or facilities; must terminate all vendors and subcontracts, except as are necessary for the completion of any portion of the Work that the County did not terminate; and must immediately deliver all documents related to the terminated Work to the County.

Any purchases that the Contractor makes after the notice of termination will be the sole responsibility of the Contractor, unless the County has approved the purchases in writing as necessary for completion of any portion of the Work that the County did not terminate.

If any court of competent jurisdiction finds a termination for cause by the County to be improper, then the termination will be deemed a termination for convenience.

A. TERMINATION FOR CAUSE, INCLUDING BREACH AND DEFAULT; CURE

1. Termination for Unsatisfactory Performance. If the County determines that the Contractor has failed to perform satisfactorily, then the County will give the Contractor written notice of such failure(s) and the opportunity to cure them within 15 days or any other period specified by the County ("Cure Period"). If the Contractor fails to cure within the Cure Period, the County may terminate the Contract for failure to provide satisfactory performance by providing written notice with a termination date. Upon such termination, the Contractor may apply for compensation for Contract services that the County previously accepted ("Termination Costs"), unless payment is otherwise barred by the Contract. The Contractor must submit any request for Termination Costs, with all supporting documentation, to the County Project Officer within 30 days after the expiration of the Cure Period. The County may accept or reject the request for Termination Costs, in whole or in part, and may notify the Contractor of its decision within a reasonable time.

In the event of termination by the County for failure to perform satisfactorily, the Contractor must continue to provide its services as previously scheduled through the termination date, and the County must continue to pay all fees and charges incurred through the termination date.

2. Termination for Breach or Default. If the County terminates the Contract for default or breach of any Contract provision or condition, then the termination will be immediate after notice of termination to the Contractor (unless the County provides for an opportunity to cure), and the Contractor will not be permitted to seek Termination Costs.

Upon any termination pursuant to this section, the Contractor will be liable to the County for costs that the County must expend to complete the Work, including costs resulting from any related delays and from unsatisfactory or non-compliant work performed by the Contractor or its subcontractors. The County will deduct such costs from any amount due to the Contractor; or if the County does not owe the Contractor, the Contractor must promptly pay the costs within 15 days of a demand by the County. This section does not limit the County's recovery of any other damages to which it is entitled by law.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt the notice of the termination.

B. TERMINATION FOR THE CONVENIENCE OF THE COUNTY

The County may terminate this Contract in whole or in part whenever the Purchasing Agent determines that termination is in the County's best interest. The County will give the Contractor at least 15 days' notice in writing. The notice must specify the extent to which the Contract is terminated and the effective termination date. The Contractor will be entitled to Termination Costs, as defined above, plus any other reasonable amounts that the parties might negotiate; but no amount will be allowed for anticipatory profits.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt of the notice of the termination.

22. INDEMNIFICATION

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless and indemnify the County and all of its elected and appointed officials, officers, current and former employees, agents, departments, agencies, boards and commissions (collectively the “County Indemnitees”) from and against any and all claims made by third parties for any and all losses, damages, injuries, fines, penalties, costs (including court costs and attorneys’ fees), charges, liability, demands or exposure resulting from, arising out of or in any way connected with the Contractor’s acts or omissions, including the acts or omissions of its employees, vendors, delivery drivers and/or subcontractors, in performance or nonperformance of the Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys’ fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

The Contractor agrees to defend, indemnify, and hold harmless County from any and all damages, costs, claims, expenses, suits, losses, liabilities, or obligations of any kind including without limitation, environmental assessments, evaluations, remediations, fines, penalties, and clean-up costs which may be asserted against or imposed upon, or incurred by County arising from Contractor’s discharge or disposal of any hazardous or toxic materials, trash, debris, refuse, waste or other materials (“Materials”) related in any way to contractor’s operations herein.

23. INTELLECTUAL PROPERTY INDEMNIFICATION

The Contractor warrants and guarantees that in providing services under this Contract neither the Contractor nor any subcontractor is infringing on the intellectual property rights (including, but not limited to, copyright, patent, mask and trademark) of third parties.

If the Contractor or any of its employees or subcontractors uses any design, device, work or material that is covered by patent or copyright, it is understood that the Contract Amount includes all royalties, licensing fees, and any other costs arising from such use in connection with the Work under this Contract.

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless, and indemnify the County Indemnitees, as defined above, from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorneys’ fees), charges, liability or exposure for infringement of or on account of any trademark, copyright, patented or unpatented invention, process or article manufactured or used in the performance of this Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys’ fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

24. COPYRIGHT

By this Contract, the Contractor irrevocably transfers, assigns, sets over and conveys to the County all rights, title and interest, including the sole exclusive and complete copyright interest, in any and all copyrightable works created pursuant to this Contract. The Contractor will execute any documents that the County requests to formalize such transfer or assignment.

The rights granted to the County by this section are irrevocable and may not be rescinded or modified, including in connection with or as a result of the termination of or a dispute concerning this Contract.

The Contractor may not use subcontractors or third parties to develop or provide input into any copyrightable materials produced pursuant to this Contract without the County's advance written approval and unless the Contractor includes this Copyright provision in any contract or agreement with such subcontractors or third parties related to this Contract.

25. OWNERSHIP AND RETURN OF RECORDS

This Contract does not confer on the Contractor any ownership rights or rights to use or disclose the County's data or inputs.

All drawings, specifications, blueprints, data, information, findings, memoranda, correspondence, documents or records of any type, whether written, oral or electronic, and all documents generated by the Contractor or its subcontractors as a result of this Contract (collectively "Records") are the exclusive property of the County and must be provided or returned to the County upon completion, termination, or cancellation of this Contract. The Contractor will not use or willingly cause or allow such materials to be used for any purpose other than performance of this Contract without the written consent of the County.

The Records are confidential, and the Contractor will neither release the Records nor share their contents. The Contractor will refer all inquiries regarding the status of any Record to the Project Officer or to his or her designee. At the County's request, the Contractor will deliver all Records, including hard copies of electronic records, to the Project Officer and will destroy all electronic Records.

The Contractor agrees to include the provisions of this section as part of any contract or agreement related to this Contract into which it enters with subcontractors or other third parties.

The provisions of this section will survive any termination or cancellation of this Contract.

26. CONFIDENTIAL INFORMATION

The Contractor and its employees, agents and subcontractors will hold as confidential all County information obtained under this Contract. Confidential information includes, but is not limited to, nonpublic personal information; personal health information (PHI); social security numbers; addresses; dates of birth; other contact information or medical information about a person; and information pertaining to products, operations, systems, customers, prospective customers, techniques, intentions, processes, plans and expertise. The Contractor must take reasonable measures to ensure that all of its employees, agents and subcontractors are informed of and abide by this requirement.

27. ETHICS IN PUBLIC CONTRACTING

This Contract incorporates by reference Article 9 of the Arlington County Purchasing Resolution, as well as all state and federal laws related to ethics, conflicts of interest or bribery, including the State and Local Government Conflict of Interests Act (Code of Virginia § 2.2-3100 et seq.), the Virginia Governmental

Frauds Act (Code of Virginia § 18.2-498.1 et seq.) and Articles 2 and 3 of Chapter 10 of Title 18.2 of the Code of Virginia, as amended (§ 18.2-438 et seq.). The Contractor certifies that its bid was made without collusion or fraud; that it has not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor; and that it has not conferred on any public employee having official responsibility for this procurement any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

28. COUNTY EMPLOYEES

No Arlington County employee may share in any part of this Contract or receive any benefit from the Contract that is not available to the general public.

29. FORCE MAJEURE

Neither party will be held responsible for failure to perform the duties and responsibilities imposed by this Contract if such failure is due to a fire, riot, rebellion, natural disaster, war, act of terrorism or act of God that is beyond the control of the party and that makes performance impossible or illegal, unless otherwise specified in the Contract.

30. AUTHORITY TO TRANSACT BUSINESS

The Contractor must, pursuant to Code of Virginia § 2.2-4311.2, be and remain authorized to transact business in the Commonwealth of Virginia during the entire term of this Contract. Otherwise, the Contract is voidable at the sole option of and with no expense to the County.

31. RELATION TO THE COUNTY

The Contractor is an independent contractor, and neither the Contractor nor its employees or subcontractors will be considered employees, servants or agents of the County. The County will not be responsible for any negligence or other wrongdoing by the Contractor or its employees, servants or agents. The County will not withhold payments to the Contractor for any federal or state unemployment taxes, federal or state income taxes or Social Security tax or for any other benefits. The County will not provide to the Contractor any insurance coverage or other benefits, including workers' compensation.

32. ANTITRUST

The Contractor conveys, sells, assigns and transfers to the County all rights, title and interest in and to all causes of action under state or federal antitrust laws that the Contractor may have relating to this Contract.

33. REPORT STANDARDS

The Contractor must submit all written reports required by this Contract for advance review in a format approved by the Project Officer. Reports must be accurate and grammatically correct and should not contain spelling errors. The Contractor will bear the cost of correcting grammatical or spelling errors and inaccurate report data and of other revisions that are required to bring the report(s) into compliance with this section.

Whenever possible, proposals must comply with the following guidelines:

- printed double-sided on at least 30% recycled-content and/or tree-free paper
- recyclable and/or easily removable covers or binders made from recycled materials (proposals with glued bindings that meet all other requirements are acceptable)

- avoid use of plastic covers or dividers
- avoid unnecessary attachments or documents or superfluous use of paper (e.g. separate title sheets or chapter dividers)

34. AUDIT

The Contractor must retain all books, records and other documents related to this Contract for at least five years, or such period of time required by the County's funding partner(s), if any, whichever is greater, after the final payment and must allow the County or its authorized agents to examine the documents during this period and during the Contract Term. The Contractor must provide any requested documents to the County for examination within 15 days of the request, at the Contractor's expense. Should the County's examination reveal any overcharging by the Contractor, the Contractor must, within 30 days of County's request, reimburse the County for the overcharges and for the reasonable costs of the County's examination, including, but not limited to, the services of external audit firm and attorney's fees; or the County may deduct the overcharges and examination costs from any amount that the County owes to the Contractor. If the Contractor wishes to destroy or dispose of any records related to this Contract (including confidential records to which the County does not have ready access) within five years after the final payment, or such period of time required by the County's funding partner(s), if any, whichever is greater, the Contractor must give the County at least 30 days' notice and must not dispose of the documents if the County objects.

35. ASSIGNMENT

The Contractor may not assign, transfer, convey or otherwise dispose of any award or any of its rights, obligations or interests under this Contract without the prior written consent of the County.

36. AMENDMENTS

This Contract may not be modified except by written amendment executed by persons duly authorized to bind the Contractor and the County.

37. ARLINGTON COUNTY PURCHASING RESOLUTION AND COUNTY POLICIES

Nothing in this Contract waives any provision of the Arlington County Purchasing Resolution, which is incorporated herein by reference, or any applicable County policy.

38. DISPUTE RESOLUTION

All disputes arising under this Agreement or concerning its interpretation, whether involving law or fact and including but not limited to claims for additional work, compensation or time, and all claims for alleged breach of contract must be submitted in writing to the Project Officer as soon as the basis for the claim arises. In accordance with the Arlington County Purchasing Resolution, claims denied by the Project Officer may be submitted to the County Manager in writing no later than 60 days after the final payment. The time limit for a final written decision by the County Manager is 30 days. Procedures concerning contractual claims, disputes, administrative appeals and protests are contained in the Arlington County Purchasing Resolution. The Contractor must continue to work as scheduled pending a decision of the Project Officer, County Manager, County Board or a court of law.

39. APPLICABLE LAW, FORUM, VENUE, AND JURISDICTION

This Contract is governed in all respects by the laws of the Commonwealth of Virginia; and the jurisdiction, forum and venue for any litigation concerning the Contract or the Work is in the Circuit Court for Arlington County, Virginia, and in no other court.

40. ARBITRATION

No claim arising under or related to this Contract may be subject to arbitration.

41. NONEXCLUSIVITY OF REMEDIES

All remedies available to the County under this Contract are cumulative, and no remedy will be exclusive of any other at law or in equity.

42. NO WAIVER

The failure to exercise a right provided for in this Contract will not be a subsequent waiver of the same right or of any other right.

43. SEVERABILITY

The sections, paragraphs, clauses, sentences, and phrases of this Contract are severable; and if any section, paragraph, clause, sentence or phrase of this Contract is declared invalid by a court of competent jurisdiction, the rest of the Contract will remain in effect.

50. ATTORNEY'S FEES

In the event that the County prevails in any legal action or proceeding brought by the County to enforce any provision of this Contract, the Contractor will pay the County's reasonable attorney's fees and expenses.

44. SURVIVAL OF TERMS

In addition to any statement that a specific term or paragraph survives the expiration or termination of this Contract, the following sections also survive: INDEMNIFICATION; INTELLECTUAL PROPERTY INDEMNIFICATION; RELATION TO COUNTY; OWNERSHIP AND RETURN OF RECORDS; AUDIT; COPYRIGHT; DISPUTE RESOLUTION; APPLICABLE LAW AND JURISDICTION; ATTORNEY'S FEES, AND CONFIDENTIAL INFORMATION.

45. HEADINGS

The section headings in this Contract are inserted only for convenience and do not affect the substance of the Contract or limit the sections' scope.

46. AMBIGUITIES

The parties and their counsel have participated fully in the drafting of this Agreement; and any rule that ambiguities are to be resolved against the drafting party does not apply. The language in this Agreement is to be interpreted as to its plain meaning and not strictly for or against any party.

47. NOTICES

Unless otherwise provided in writing, all legal notices and other formal communications required by this Contract are deemed to have been given when either (a) delivered in person; (b) delivered by an agent, such as a delivery service; or (c) deposited in the United States mail, postage prepaid, certified or registered and addressed as follows:

TO THE CONTRACTOR:

TO THE COUNTY:

_____, Project Officer

AND

Sharon T. Lewis, M.A., MPS, VCO, CPPB, Purchasing Agent
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 500
Arlington, Virginia 22201

48. NON-DISCRIMINATION NOTICE

Arlington County does not discriminate against faith-based organizations.

49. INSURANCE, PAYMENT AND PERFORMANCE BONDS

The Contractor shall maintain the required insurance coverage and payment and performance bonds as set forth in the Invitation to Bid through completion of the Contract, including all warranty and guarantee periods.

56. COUNTERPARTS

This Agreement may be executed in one or more counterparts and all of such counterparts shall together constitute one and the same instrument. Original signatures transmitted and received via facsimile or other electronic transmission (e.g., PDF or similar format) are true and valid signatures for all purposes hereunder and shall be effective as delivery of a manually executed original counterpart.

WITNESS these signatures:

THE COUNTY BOARD OF ARLINGTON
COUNTY, VIRGINIA

CONTRACTOR

AUTHORIZED
SIGNATURE: _____

AUTHORIZED
SIGNATURE: _____

NAME _____
TITLE: PURCHASING AGENT

NAME _____
TITLE: _____

DATE: _____

DATE: _____

III. ARLINGTON COUNTY CONSTRUCTION GENERAL CONDITIONS

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A. INTRODUCTION TO TERMS

- 1) The term "Agreement" means the completed and signed Form of Contract Agreement.
- 2) The term "Award Date" means the date of execution of the Agreement by the Purchasing Agent.
- 3) The term "Business Day" shall refer to any day that the County is open for general business.
- 4) The term "Calendar Day" means any day of twenty-four hours measured from midnight to the next midnight. Included are weekends and holidays. When the term "Day" is used it shall be assumed to refer to a Calendar Day unless otherwise specified.
- 5) The term "Change Order" means a written order to the Contractor, signed by the Project Officer and the Contractor, which authorizes a change in the Work, and/or adjustment to the Contract Amount and/or an adjustment to the Time for Completion. A Change Order once signed by all the parties is incorporated into and becomes part of the Contract.
- 6) The term "Commencement Date" means the date on which the Time for Completion will commence for the Contractor to begin to perform his obligations under the Contract Documents as provided in the Notice to Proceed.
- 7) The term "Construction Change Directive" means a written order issued by the County directing a change in the Work prior to agreement on adjustment, if any, in the Contract Amount or Contract Time, or both.
- 8) The term "Contract Documents" means the Agreement and all the documents and Exhibits and/or Attachments identified therein which shall include the Drawings and the Specifications, and all modifications including amendments and subsequent Change Orders thereto properly incorporated in the Contract.
- 9) The terms "County" and "Contractor" shall mean the respective parties to the Contract. They shall be treated throughout the Contract Documents as though each were of the singular number and masculine gender. Only one Contractor is recognized as a party to this Contract.
- 10) The term "Critical Path Method or CPM" means a step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time-frame problems and process bottlenecks. An activity on the critical path cannot be started until its predecessor activity has been completed. is delayed then the entire project is delayed.

- 11) The term "Delay" means an event or condition that results in a work activity starting or being completed later than originally planned.
- 12) The term "Drawings" means all drawings pertaining to the Contract, including the Contract Drawings and Construction Notes which show and describe the locations, character, dimensions, and details of the Work to be performed under the contract.
- 13) The term "Final Acceptance" shall mean the date on which the County issues the final payment for the Work.
- 14) The term "Final Completion" shall mean the condition when the County agrees that all the Work has been fully completed in accordance with the Contract Documents and is acceptable. The date of the Final Completion of the Work under the Contract is the date on which Final Completion is accomplished.
- 15) The term "Float" shall represent the amount of time that a task in a project network or sequence can be delayed without causing a delay to: subsequent tasks ("free float") or project completion date ("total float"). Float shall belong to the County and shall be used for the successful completion of the Project within the Time for Completion.
- 16) The term "Notice to Proceed" shall mean a written notice issued by the County to the Contractor stating the Commencement Date. The Notice to Proceed will specify the Time for Completion of the Contract.
- 17) The term "Project" means the entire proposed construction to be executed as stipulated in the Contract Documents
- 18) The term "Project Officer" means the County Project Officer assigned by the Director of the County Department responsible for the project, or the Director's designee. When a designee to act on behalf of the Project Officer is used by the County, the name of the designee and the duties and authority of such designee will be identified in the Contract Documents or in a written notice to the Contractor from the Project Officer responsible for the project. The designee may be a professional architect or engineer or other person employed by the County to perform construction services administration, design services, or project oversight.
- 19) The term "Punch List" means unfinished items of the construction of the Project, which unfinished items of construction are minor or insubstantial details of construction, mechanical adjustment or decoration remaining to be performed, the non-completion of which would not materially affect use of the Project, and which are capable of being completed within the time specified for Final Completion after Substantial Completion has been achieved.

- 20) The term "Request for Information" (RFI) means a request originated by the Contractor requesting clarification or additional information from the Project Officer and/or Architect/Engineer concerning information in the construction documents where the Contractor believes there is insufficient information or a conflict in the documents. RFI's shall be submitted by the Contractor sufficiently in advance of the Work to provide time for assessment and response without delay of the Work. Responses to RFI's shall not be construed as authorization for a Change Order.
- 21) The term "Schedule of Values" means a listing of the Contractor's total contract value by Construction Specifications Institute (CSI) divisions, including Division 1, Contractor's General Conditions.
- 22) The term "Site" refers to that portion of the property on which the Work is to be performed or which has otherwise been set aside for use by the Contractor.
- 23) The terms "Special Conditions" mean the written statements modifying or supplementing the Technical Specifications or General Conditions for requirements or conditions peculiar to the Contract.
- 24) The term "Specifications" means and shall include the Technical Specifications, the Special Conditions and all written agreements and instructions pertaining to the performance of the Work.
- 25) When used, the term "Stipulated Price Item" means and includes an item of Work, unanticipated or of unknown quantity at the time of issuance of the solicitation for a Bid and determined to be executed, based on the actual field conditions during the progress of Work under the Contract. The Unit Price for the "Stipulated Price Item", as identified in the "Stipulated Price Items" section of the Bid Form, is predetermined by the County as the current reasonably workable rate for the Item inclusive of all necessary labor, equipment, materials, overheads (provision and installation), and the contractor's profit.
- 26) The term "Subcontractor", shall include only those having a direct contract with the Contractor, and it shall include those who furnish material worked to a special design according to the plans and specifications for this Work but shall not include those who merely furnish material not so worked.
- 27) The term "Substantial Completion" shall mean the condition when the County agrees that the Work, or a specific portion thereof, is sufficiently complete, in accordance with the Contract Documents, so that it can be utilized by the County for the purposes for which it was intended. The date of Substantial Completion of the Work under the Contract is the milestone date on which Substantial Completion condition is accomplished.

- 28) The term "Technical Specifications" means that part of the Contract Documents that describe the quality of materials, method of installation, standard of workmanship, and the administrative and procedural requirements for the performance of the Work under the contract.
- 29) The term "Time for Completion" shall mean the time period set forth in the Agreement.
- 30) The term "Work" shall mean the services performed under this Contract including, but not limited to, furnishing labor, and furnishing and installing materials and equipment required to complete the Project specified in the Contract Documents.

B. DRAWINGS, SPECIFICATIONS, RELATED DATA AND RECORDS KEEPING

1. INTENT OF THE DRAWINGS AND SPECIFICATIONS
 - a. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, water haulage, light power, transportation, superintendence, temporary construction of all kinds, and other services and facilities of every nature whatsoever that are necessary to execute and deliver the Work, complete and usable within the scope of the Contract with all parts in working order, and all connections properly made.
 - b. The general character and scope of the Work are illustrated by the Drawings and listed in the Specifications. Any additional drawings and or other instructions deemed necessary by the Project Officer or designee will be furnished to the Contractor when required for the Work and shall be incorporated into the Contract Documents.
 - c. Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that direction, requirements, permission, or review of Project Officer or designee is intended unless stated otherwise. As used herein, "provide" shall be understood to mean "provide complete in place", that is, "furnish and install."
 - d. Unless otherwise specifically noted, the word "similar" where it occurs in the Drawings, shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their locations and their connection with other parts of the Work.
 - e. Materials or work described in words which, so applied, have a well-known technical, construction industry, or trade meaning, shall be held to refer to the recognized technical or trade meaning.

f. The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all documents. In case of conflicting variance between the Contract Documents, the Order of Precedence stated in the Agreement shall govern. Figured dimensions on the plans shall be used; drawings shall not be scaled.

2. DISCREPANCIES AND ERRORS

If the Contractor discovers any discrepancies between the Drawings and Specifications and the site conditions or any errors or omissions in the Drawings or Specifications, the Contractor shall at once, but in no event later than three calendar days after discovery of the discrepancy or error, report them in writing to the Project Officer or designee. If the Contractor proceeds with any work that may be affected by such discrepancies, errors, or omissions, after their discovery, but before a clarification is provided, such work shall be at the Contractor's risk and expense. Issues affecting critical path activities shall be made known to the Project Officer or designee within one business day after discovery.

3. DIFFERING SITE CONDITIONS

The Contractor shall immediately, and before the conditions are further disturbed, give notice to the Project Officer of subsurface or latent physical conditions at the site which differ materially from those indicated in this Contract, or previously unknown physical conditions discovered at the site of an unusual nature and which differ materially from those ordinarily expected to be encountered at the site. Such notice shall be followed by a written notice provided within 48 hours of discovery.

The Project Officer will investigate the site conditions promptly after receiving the notice. If the conditions do materially differ to the extent that an increase or decrease would result in the Contractor's cost of the Work, or the time required for performing any part of the Work under the contract, an equitable adjustment may be made under this clause and the Contract modified in writing accordingly.

No request by the Contractor for an adjustment to the Contract under this clause shall be allowed, unless the Contractor has given the written notice required. If the Contractor proceeds with any work that may be affected by such differing site conditions before giving notice to the Project Officer as set forth herein, such work shall be at the Contractor's sole risk and expense.

No request by the Contractor for an adjustment to the contract for differing site conditions shall be allowed if made after Final Payment under the Contract.

4. COPIES FURNISHED

Except as provided for otherwise, copies of the Drawings and Specifications reasonably necessary for the execution of the Work will be furnished to the Contractor. One electronic copy of the Contract Drawings and Specifications will be provided by the Project Officer or designee to the Contractor.

5. USE OF CADD FILES

The Contractor may request Electronic CADD files related to the Work or the Project. The CADD files will be provided by the County only if the Contractor completes the Arlington County Electronic CADD Drawing Release Form, which form is then incorporated by reference into this Contract. Use of CADD files is at the Contractor's own risk and in no way alleviates Contractor's responsibility for the Work to conform to the Plans and Specifications.

6. DOCUMENTS ON THE JOBSITE

The Contractor shall keep on the site of the Project a copy of the Drawings and Specifications updated to include all authorized revisions and RFI responses, and shall at all times give the County and its authorized representatives access thereto. The Contractor shall mark up the Drawings on a daily basis in red. The drawings shall be submitted to the County at Substantial Completion as the Record marked up set.

7. OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All Drawings and Specifications and copies thereof furnished by the County are the property of the County and shall not be used on other projects. All copies of the Drawings and Specifications except the signed Contract sets shall be returned to the Project Officer or designee at Final Completion.

8. SUBMITTALS

- a. The term "submittals", as used herein, shall include fabrications, erection and setting drawings, manufacturers' standard drawings, schedules, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, and other descriptive data pertaining to the materials and equipment as required to demonstrate compliance with the Contract requirements.
- b. Unless other specified in the Specifications the Contractor shall submit for the review of the Project Officer or designee a listing of all submittals required by the Specifications or requested by the Project Officer or designee within fifteen (15) calendar days after receipt of the

Notice to Proceed. This listing shall include due dates for each required submittal, coordinated with the project schedule such that adequate time is allotted for review and potential resubmittals, fabrication and delivery without causing delay. The Contractor bears all risk for delay associated with submittals not received in a timely manner.

- c. Submittals shall be submitted in such number of copies as established in the Specifications. Each submission shall be accompanied by a letter of transmittal, listing the contents of the submission and identifying each item by reference to specification section or drawing. All submittals shall be clearly labeled with the name of the project and such information as may be necessary to enable their complete review by the Project Officer or designee. Catalog plates and other similar material that cannot be so labeled conveniently shall be bound in suitable covers bearing the identifying data.
- d. Submittals shall be accompanied by all required certifications and other such supporting material, and shall be submitted in sequence or groups that all related items can be checked together. When submittals cannot be checked because a submission is not complete, or because submittals on related items have not been received by the Project Officer or designee, then such submittals will be returned without action or will be held, not checked, until the missing material is received. Incomplete or defective submittals shall not be considered to have been submitted. Failure to deliver submittals within the specified time will not be grounds for additional time or compensation.
- e. Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for review and acceptance and shall bear the Contractor's certification that the Contractor has checked and approved them as complying with all relevant information in the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor without action and will not be considered as a formal submission.
- f. If shop drawings show variations from the Drawings and Specifications because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in the Contractor's letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Drawings and Specifications even though shop drawings have been accepted.
- g. The Project Officer or designee shall review the shop drawings with reasonable promptness. Review and/or acceptance of shop drawings will be general for conformance with the design concept of the Project and compliance with the information given in the Contract Documents,

and will not include quantities, detailed dimensions, nor adjustments of dimensions to actual field conditions. Acceptance shall not be construed as permitting any departure from Contract requirements, as authorization of any increase in price nor as relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist. Review is not intended to relieve the contractor of full responsibility for the accuracy and completeness of the plans and calculations, or for the complete compliance with the contract documents. Contractor is solely responsible for the means and methods of the construction, including temporary items proposed for use.

9. SAMPLES

The Contractor shall submit to the Project Officer or designee, all samples required by the Specifications or requested by the Project Officer or designee. Samples shall be submitted in single units only, unless the Contractor desires additional units for the Contractor's own use. Each sample shall bear a label indicating what the material represented, the name of the producer and the title of the Project. Acceptance of a sample shall be only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents, and only for the characteristics or use named in such acceptance. Such acceptance shall not be construed to change or modify any Contract requirements or the Contract Price. Materials and equipment incorporated in the Work shall match the accepted samples. The Contractor shall be responsible for researching the availability of the specified product in the dimensions and colors specified at no additional cost to the County. Failure of the Contractor to identify specified products that are not commercially produced within the time required for submittal transmittal in order to meet the project schedule shall not be entitled to additional time or compensation.

10. TESTS

Any specified tests of materials and finished articles shall be made by bureaus, laboratories or agencies approved by the Project Officer or designee and the certified reports of such tests shall be submitted to the Project Officer or designee. All tests shall be in compliance with the Specifications. All costs in connection with the testing and test failures shall be borne by the Contractor. Failure of any material to pass the specified tests or any test performed by the Project Officer or designee, will be sufficient cause for refusal to consider, under this Contract, any further materials of the same brand or make of that material. Samples of various materials delivered on the site or in place may be taken by the Project Officer or designee for testing. Samples failing to meet the Contract requirements will automatically void previous acceptance of the items tested. The Contractor will not be compensated for additional time and/or cost incurred in finding an acceptable replacement or the removal and replacement of the defective item.

11. MATERIALS AND EQUIPMENT LIST

- a. Unless otherwise specified in the Specifications, within thirty (30) days of the Commencement Date the Contractor shall submit to the Project Officer or designee a complete list of materials and equipment proposed for use in connection with the Project. Partial lists submitted from time to time will not be considered unless specifically approved by the Project Officer or designee.
- b. After any material or piece of equipment has been approved through submittal process, no change in brand or make will be permitted unless satisfactory written evidence is presented to prove that the manufacturer cannot make scheduled delivery of the accepted material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that acceptance of such other material is in the best interest of the County. The Contractor is solely responsible for the cost and time required to obtain and install a suitable replacement.

12. STANDARDS, SUBSTITUTIONS

- a. Any material specified by reference to the number, symbol or title of a specific standard, such as a Commercial Standard, a Federal Specification, a Trade Association Standard, or other similar standard, shall comply with the requirements in the latest revision of the standards or specification and any amendment or supplement, except as limited to type, class or grade, or as modified in such reference. The standard referred to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications.
- b. Reference in the Specifications or on the Drawings to any article, device, product, material, fixture, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as eliminating from competition other products of equal or better quality by other approved manufacturers. Otherwise, applications for acceptance of substitutions for the specified items will be considered only upon request of the Contractor, not of individuals, trades or suppliers, and only for a specific purpose; no blanket acceptance will be granted. No acceptance of a substitution shall be valid unless it is in written form and signed by the Project Officer or designee.
- c. If any proposed substitution will affect a correlated function, adjacent construction or the work of other contractors, then the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional expense to the County or an extension of the contract time, if and when accepted. Detail drawings and other information necessary to show and explain the proposed

modifications shall be submitted with the request for acceptance of the substitution.

13. SURVEYS AND CONTROLS

Unless otherwise specified, the Contractor shall establish all baselines for the location of the principal component parts of the Work, establish a suitable number of benchmarks adjacent to the Work, and develop all detail surveys necessary for construction by a professional land surveyor licensed in the Commonwealth of Virginia. The Contractor shall carefully preserve benchmarks, reference points and stakes, and in the case of destruction thereof by the Contractor or due to the Contractor's negligence or the negligence of any subcontractor or supplier, the Contractor shall be responsible for expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the loss or disturbance of such benchmarks, reference points and stakes. The Contractor shall within 30 days of NTP perform a full site survey to verify all control points shown on the drawings against existing conditions within the site limits. Any discrepancies found during this effort shall be made known immediately to the Project Officer. Failure to perform this survey and provide proof and acceptance of Project datum, control points, and existing benchmarks will not give rise to any extensions to contract time or amount. The cost of all necessary surveying services shall be considered incidental to the work and, unless otherwise specified, shall be included in the cost of the Work.

14. RECORD DRAWINGS

Record drawings shall be the responsibility of the Contractor. The Contractor shall maintain and mark up one set of prints of the applicable Contract Drawings to portray record construction. The prints shall be neatly and clearly marked in red to show all variations between the Work actually provided and that indicated on the Contract Drawings, and all utilities encountered in the Work. All drafting shall conform to good drafting practice and shall include such supplementary notes, legends and details as may be necessary for legibility and clear portrayal of the record construction. These drawings shall be marked promptly upon any approved change to the Work or discovery of any undocumented utility or obstruction and shall be submitted to the Project Officer or designee in sufficient time to be approved no later than thirty (30) calendar days after the Substantial Completion Date. The final record drawings approved by the Project Officer or designee shall be submitted in paper copy and .pdf format electronic files prior to Final Completion. Unless otherwise required under the Contract Documents, incorporation of red-lined changes into CADD format shall be the responsibility of the Architect and/or Engineer of Record, with the exception being any documents prepared by the Contractor in CADD, the record version of which shall also be provided to the County in CADD format by the Contractor. Final payments will be held until the complete set of red-line drawings are submitted to and approved by the Project Officer.

C. COUNTY, COUNTY PROJECT OFFICER, AND CONTRACTOR RELATIONS

1. STATUS OF COUNTY PROJECT OFFICER OR DESIGNEE

The Project Officer or designee shall be the County's representative during the construction period. All Contractor instructions or requests shall be issued from or submitted through the Project Officer or designee. The Project Officer or designee shall have authority to suspend the Work whenever such suspension may be necessary in the responsible opinion of the Project Officer or designee to ensure the proper execution of the Contract. The Project Officer or designee shall also have authority to reject all work and materials that do not conform to the Contract and to decide questions that arise in the execution of the Work. The County Project Officer or designee will, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work.

2. LIMITATION ON COUNTY'S RESPONSIBILITIES

The County shall not supervise, direct, or have control or authority over, nor be responsible for: The Contractor's means, methods, techniques, sequences or procedures of construction; the safety precautions and programs related to safety, or the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

3. DISPUTES

- a. All disputes or claims arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of Contract shall be submitted in writing to the Project Officer or designee as set forth in these General Conditions. Such claims must set forth in detail the amount of the claim, and shall state the facts surrounding it in sufficient detail to identify it together with its character and scope.
- b. Claims denied by the Project Officer shall be processed in accordance with the procedures outlined in Sections 7-107, Contractual Disputes and 7-108, Legal Actions of the Arlington County Purchasing Resolution and the Dispute Resolution paragraph in the Agreement.
- c. The Contractor shall not cause a delay in the work pending a decision of the Project Officer or designee, County Manager, County Board, or court, except by prior written approval of the Project Officer or designee.

4. INSPECTION OF WORK

The Project Officer or designee and representatives of any public authority having jurisdiction shall, at all times, have access to the Work while in progress. The Contractor shall provide suitable facilities for such access and for proper observation of the Work and shall conduct all special tests required by the Specifications, the Project Officer or designee's instructions, and any laws, ordinances or the regulations of any public authority applicable to the work. Nothing in this section shall abrogate or otherwise limits or relieves the Contractor's independent duty to inspect the Work.

5. INSPECTION OF MATERIALS

All articles, materials, and supplies purchased by the Contractor for the Work are subject to inspection upon delivery to the site and during manufacturing or fabrication. The County reserves the right to return for full credit, at the risk and expense of the Contractor, all or part of the articles, materials, or supplies furnished contrary to Specifications and instructions. Nothing in this section shall abrogate or otherwise limit or relieve the Contractor's independent duty to inspect materials.

6. EXAMINATION OF COMPLETED WORK

If the Project Officer or designee requests it, the Contractor, at any time before acceptance of the Work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the Specifications. Should the work thus exposed or examined prove acceptable, then 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, then the uncovering, removing and replacing shall be at the Contractor's expense.

7. RIGHT TO SUSPEND WORK

The County shall have the authority to suspend the Work, in whole or in part, for such periods and such reasons as the County may deem necessary or desirable. Any such suspension shall be in writing to the Contractor and the Contractor shall obey such order immediately and not resume the Work until so ordered in writing by the County. No such suspension of the Work shall be the basis for a claim by the Contractor for any increase in the Contract Amount provided that the suspension is for a reasonable time under the circumstances then existing. If the suspension of Work is caused by the County's belief that non-conforming work is being installed, and subsequent investigation proves that the Work was non-conforming, the Contractor shall not be awarded additional time or costs.

8. RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10-day period after receipt of written notice from the County or such shorter time as may be reasonable under the circumstances, to commence and continue correction of such default or neglect with diligence and promptness, the County may, without prejudice to other remedies the County may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the County's expenses, and any additional architect or engineering costs necessary by Contractor's default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the County upon demand.

9. CONTRACTOR MANAGEMENT PERSONNEL

The Contractor shall keep a competent superintendent and any necessary assistants on the Site at all times during progress of the Work and such persons shall be satisfactory to the Project Officer or designee. The superintendent or project manager shall not be changed except with the Project Officer or designee's consent. If the Project Officer determines that the superintendent or project manager is no longer satisfactory, then

the superintendent or project manager must be replaced within 15 days of the Project Officer's written notice with a replacement superintendent or project manager with equal or superior qualifications and subject to Project Officer approval.

The superintendent and project manager shall represent the Contractor and all directions given to such persons shall be as binding as if given to the Contractor. The Contractor shall at all times enforce strict discipline and good order among the workers performing under this Contract, and shall not employ on the Work any person not reasonably proficient in the Work assigned. Persons permitted to perform Work under Contractor, or any subcontractor, or sub-subcontractor, shall meet all employment eligibility, safety training, security or drug/alcohol testing requirements required by law or by the County. Any person not complying with all such requirements shall be immediately removed from the Site.

10. DRUG-FREE POLICY

The Contractor is responsible for ensuring that the Site remains a drug-free site. Contractor will require that employees undergo random drug/alcohol screening on a quarterly interval. Any employee who fails the test must be removed from the Site immediately. Random screening shall be performed by a third party licensed to do so in the Commonwealth of Virginia. The Contractor shall provide its random testing policy and schedule to the Project Officer within 30 days of Notice to Proceed. The Contractor will include this provision in every subcontract relating to this Contract. Any infraction by an employee of the Drug-Free policy shall be reported to the Project Officer within 24 hours.

11. LANDS BY COUNTY

The County shall provide access to the lands shown on the Drawings upon which the Work under the Contract is to be performed and to be used for rights of way and for access. In case all the lands, rights-of-way or easements have not been obtained as herein contemplated before construction begins, then the Contractor shall begin its work on such lands and rights-of-way that the County has acquired access to. No additional time or compensation shall be awarded to the Contractor for modifying work location and sequence provided other locations are available for work.

Contractor shall verify the acquisition of all off-site easements and Rights-of-Way prior to the start of off-site construction. Restore all off-site easements to the conditions existing prior to the start of work.

12. LANDS BY CONTRACTOR

If the Contractor requires additional land or lands for temporary construction facilities and for storage of materials and equipment other than the areas available on the site or right-of-way, or as otherwise furnished by the County, then the Contractor shall provide such other lands and access thereto entirely at the Contractor's own expense and without liability to the County. The Contractor shall not enter upon private property for any purpose without prior written permission of all of the persons and entities who own the property. The Contractor shall provide copies of all agreements to the County and shall include language in the agreement indemnifying and holding the County harmless

for any damages, repairs, restoration or fees associated with the use of the property. Upon termination of the agreement, the Contractor shall provide to the County a fully executed release from the property owner.

13. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall continuously maintain and protect all of its Work from damage and shall protect the County's property from damage or loss arising in connection with this Contract until Substantial Completion. After Substantial Completion, the maintenance or protection of any incomplete or remedial Work identified on the punch list that requires maintenance or protection in order to allow for the final completion and acceptance of such Work shall be the responsibility of the Contractor until Final Completion. The Contractor shall make good any such damage or loss, except such as may be caused by agents or employees of the County. Failure to adequately protect the Work shall not be grounds for additional compensation for any maintenance and/or repairs to such Work.
- b. The Contractor shall not place upon the Work, or any part thereof, any loads which are not consistent with the design strength of that portion of the Work.
- c. The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, etc., along and adjacent to the street and/or right-of-way, and shall use every precaution to prevent damage to pipes, conduits and other underground structures, curbs, pavements, etc., except those to be removed or abandoned in place and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. Any damage which occurs by reason of the operations under this Contract, whether shown or not on the approved construction plans, shall be completely repaired or replaced to the County's satisfaction by the Contractor at the Contractor's expense.
- d. Prior to commencing construction activity at the Site, the Contractor shall videotape the Site and an additional fifty (50) feet outside the perimeter of the Site. Contractor shall submit a copy of high resolution digital recording on a DVD or flash drive to the County. The recording shall be stable, continuous, and contain all items within the limits of Work. Submission of the DVD to the County shall be a condition precedent to any obligation of the County to consider an Application for Payment. The DVD shall be the property of the County, and the County shall be permitted to reproduce such DVD's and use the same for any purpose without limitation or claim of ownership or compensation from any party. Contractor shall incorporate the cost of the preconstruction

survey in the bid amount or the unit prices of the bid items, as applicable. No additional payment will be made by the County.

- e. The Contractor shall shore, brace, underpin, secure, and protect, as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site that may be affected in any way by excavations or other operations connected with the work required under this Contract. The Contractor shall be responsible for giving any and all required notices to owners or occupants of any adjoining or adjacent property or other relevant parties before commencement of any work. Contractor shall provide all engineering (signed and sealed) for items listed in this section per the Specifications. The Contractor shall indemnify and hold the County harmless from any damages on account of settlements or loss of all damages for which the County may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- f. In an emergency affecting the safety of life or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Project Officer or designee, or the County, is hereby permitted to act, at the Contractor's discretion, to prevent such threatened loss or injury, and the Contractor shall so act without appeal, if so instructed or authorized.

14. SEPARATE CONTRACTS

- a. The County reserves the right to let other contracts in connection with this Project. The Contractor shall afford other contractors reasonable access to the Project including storage of their materials and the execution of their work, and shall properly connect and coordinate its work with the work of other such contractors.
- b. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Project Officer or designee any defects in such work that renders it unsuitable for such proper execution and results. The Contractor's failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the Contractor's work, except as to defects which may develop in other contractor's work after its execution.
- c. If the Contractor or any of the Contractor's subcontractors or employees cause loss or damage to any separate contractor on the Work, the Contractor agrees to settle or make every effort to settle or compromise with such separate contractor. If such separate contractor sues the County on account of any loss so sustained, the County shall notify the Contractor, who shall indemnify and save the County

harmless against any expense, claim or judgment arising therefrom, including reasonable attorney's fees.

- d. In case of a dispute arising between two or more separate contractors engaged on adjacent work as to the respective rights of each under their respective contracts, the Project Officer shall determine the rights of the parties.

15. SUBCONTRACTS

- a. Unless otherwise specified, the Contractor shall, within fifteen (15) calendar days after the execution of the Contract by the County, provide to the Project Officer or designee, in writing, the names of all subcontractors proposed for the principal parts of the Work and for such others as requested by the Project Officer or designee, and shall not employ any subcontractors that the Project Officer or designee may object to as incompetent or unfit after an appropriate determination of the subcontractor's ability. No proposed subcontractor will be disapproved except for cause.
- b. The Contractor shall make no substitutions for any subcontractor previously selected/approved unless first submitted to the County for approval.
- c. The Contractor shall be as fully responsible to the County for the acts and omissions of the Contractor's subcontractors as the Contractor is for the acts and omissions of persons directly employed by the Contractor.
- d. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions of the Contract, Special Provisions and other Contract Documents comprising the Contract insofar as such documents are applicable to the work of subcontractors.
- e. Nothing contained in the Contract shall be construed to create any contractual relation between any subcontractor and the County, nor shall it establish any obligation on the part of the County to pay to, or see to the payment of any sums to any subcontractor. The County will not discuss, negotiate or otherwise engage in any contractual disputes with any subcontractor.
- f. If requested by the County, the Contractor shall replace any subcontractor at no cost to the County within 30 days of the Project Officers written notice or as otherwise specified. No additional time or compensation will be provided in the event a subcontractor is removed due to non-compliance of the requirements outlined within the Contract.

16. ELIMINATED ITEMS

If any item(s) in the Contract are determined to be unnecessary for the proper completion of the Work contracted, the Project Officer or designee may, upon written notice to the Contractor, eliminate such item(s) from the Contract. Payment will not be

made for such item(s) so eliminated; except that the Contractor will be compensated for the actual cost of any work performed and the net cost of materials purchased before the item(s) was eliminated from the Contract, including freight and tax costs, as evidenced by invoice. No additional compensation will be made for overhead or anticipated profit. The County will receive the full unit price credit for work eliminated prior to production or installation.

17. COUNTY ORDINANCES

The Contractor shall comply with all applicable County ordinances, including but not limited to: the *Noise Control, Erosion & Sediment Control, Storm Water Management, and Chesapeake Bay Preservation ordinances (Chapters 15, 57, 60, and 61 of the County Code)*.

D. MATERIALS AND WORKMANSHIP

1. MATERIALS FURNISHED BY THE CONTRACTOR

Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new. All work shall be accomplished by persons qualified in the respective trades.

2. IBC AND VUSBC REQUIREMENTS

The Contractor certifies that all material supplied or used under this Contract meets all current International Building Code (IBC) requirements and the requirements of the Virginia Uniform Statewide Building Code (VUSBC); and further certifies that, if the material delivered or used in the performance of the work is found to be deficient in any of the applicable state or national code requirements, all costs necessary to bring the material into compliance with the requirements shall be borne by the Contractor. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor under this Contract.

3. ADA COMPLIANCE

The Contractor shall ensure that all Work performed under this Agreement is completed in accordance with the Contract Documents, including Work intended to meet the accessibility requirements of the Americans with Disabilities Act (ADA).

The Contractor is not required to ascertain whether the Contract Documents meet ADA design standards and guidelines. However, should the Contractor discover any non-conformity with such requirements, the Contractor shall immediately inform the County and its design consultant, if applicable, to allow for corrective action.

The Contractor shall defend and hold the County harmless from any expense or liability arising from the Contractor's non-compliance in meeting its obligations herein. The Contractor shall be responsible for all costs related to permitting delays, redesign, corrective Work, and litigation relating to such non-compliance.

4. MANUFACTURER'S DIRECTIONS

Manufactured articles, material, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's

directions as accepted by the Project Officer or designee, unless herein specified to the contrary.

5. WARRANTY

All material provided to the County shall be fully guaranteed by the Contractor against manufacturing defects within the period of the manufacturer's standard warranty. Such defects shall be corrected by the Contractor at no expense to the County. The Contractor shall provide all manufacturers' warranties to the Project Officer by the date of Final Completion.

All Work is guaranteed by the Contractor against defects resulting from the use of inferior or faulty materials. The Contractor warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects or inferior or faulty workmanship, or work not in accordance with the Contract Documents for one (1) year from the date of Substantial Completion or as set forth in the Specifications of the work by the County in addition to and irrespective of any manufacturer's or supplier's warranty.

No date other than Substantial Completion or as set forth in the Specifications shall govern the effective date of the Warranty, unless that date is agreed upon by the County and the Contractor in advance and in a signed writing.

The Contractor shall promptly correct any defective work or materials after receipt of a written notice from the County to do so. If the Contractor fails to proceed promptly or use its best efforts and due diligence to complete such compliance as quickly as possible, the County may have the materials or work corrected and the Contractor and its Sureties shall be liable for all expenses and costs incurred by the County.

Nothing contained in this section shall be construed to establish a period of limitations with respect to other obligations the Contractor may have under this Contract.

6. INSPECTION AND ACCEPTANCE OF MATERIALS

Inspection and acceptance by the County will be at the work site in Arlington County, Virginia and within ten (10) calendar days of delivery unless otherwise provided for in the Contract Documents. The County will not inspect, accept, or pay for any materials stored or delivered off-site by the Contractor, except as provided by the Payment for Stored Materials clause of these General Conditions and other requirements of the Contract Documents. The County's right of inspection shall not be deemed to relieve the Contractor of its obligation to ensure that all articles, materials and supplies are consistent with Specifications and instructions and are fit for their intended use. The County reserves the right to conduct any tests or inspections it may deem appropriate before acceptance. The Contractor shall be responsible for maintaining all materials and supplies in the condition in which they were accepted until they are used in the work.

The Contractor is to coordinate its work and request inspections in such a manner as to minimize the cost to the County without impacting the overall schedule of the Project within reason. All costs associated with re-inspection shall be borne by the Contractor.

7. CONTRACTOR'S TITLE TO MATERIALS

No materials or supplies for the work shall be purchased by the Contractor or any subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that it has good title to, and that it will require all subcontractors to warrant that they have good title to, all materials and supplies for which the Contractor invoices for payment. The County may request proof of title or payment prior to acceptance of the Contractor's invoice.

8. TITLE TO MATERIALS AND WORK COVERED BY PARTIAL PAYMENTS

All material and work covered by partial payments made by the County will become the property solely of the County at the time the partial payment is made. However, risk of loss or damage to all items shall be the responsibility of the Contractor until Final Acceptance by the County. This provision will not be construed as relieving the Contractor from having sole responsibility for all materials and work upon which payments have been made and for the restoration of any damaged work or replacement or repair at the County's option of any damaged materials. This provision will not be construed as a waiver of the County's right to require fulfillment of all terms of the Agreement, including full rights under the terms of the Warranty provisions of the Agreement, nor shall payment indicate acceptance of the materials or work.

9. CONNECTING WORK

The Contractor shall do all cutting, patching, or digging of the Contractor's work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors as shown upon or reasonably implied by the Drawings and Specifications for the completed Project and shall make good after them as the Project Officer or designee may direct. This work will be performed in a workmanlike manner utilizing proper care and equipment to achieve proper line and grade. The Contractor shall not endanger any work by cutting, patching, or digging, or otherwise, and shall not cut or alter the work of any other contract except with the prior written consent of the Project Officer or designee.

10. REJECTED WORK AND MATERIALS

- a. Any of the Work or materials, goods, or equipment which do not conform to the requirements of the Contract Documents, or are not equal to samples accepted by the Project Officer or designee, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall be rejected and replaced immediately so as not to cause delay to the Project or work by others. Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be removed and the work shall be re-executed by the Contractor at the Contractor's expense. The fact that the Project Officer or designee may have previously overlooked such defective work shall not constitute acceptance of any part of it.
- b. If the Contractor fails to proceed at once with the replacement of rejected material and/or the correction of defective workmanship when notified to do so by the Project Officer or designee, the County may, by contract or otherwise,

replace such material or correct such workmanship and charge the cost to the Contractor. This clause applies during the Contract and during any warranty or guarantee period.

- c. The Contractor shall be responsible for managing, addressing within a timely manner, and formally closing out all notices of non-compliance issued by the inspector of record, Arlington County Inspection Services, or the Design Team. The Contractor shall be solely liable for any costs or time associated with the corrective action to address any notices of non-compliance. The Contractor must work directly with the entity issuing the notice of non-compliance.
- d. If the Project Officer or designee deems it expedient not to require correction of work which has been damaged or not done in accordance with the Contract, an appropriate adjustment to the Contract Price may be made.

11. PROHIBITION AGAINST ASBESTOS CONTAINING MATERIALS

No goods or equipment provided to the County or construction material installed shall contain asbestos. If a Contractor or supplier provides or installs any goods, equipment, supplies, or materials that contain asbestos in violation of this prohibition, the Contractor shall be responsible for all costs related to the immediate removal and legal disposal of the goods, equipment or materials containing asbestos and replacement with County-approved alternate. The Contractor shall be responsible for all goods, equipment, supplies or materials installed or provided by any of its employees, agents or subcontractors in connection with the work under this contract. The Contractor shall also reimburse to the County all costs of such goods, equipment, supplies or materials installed if not corrected by the Contractor.

E. LEGAL RESPONSIBILITY AND PUBLIC SAFETY

1. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and locations of the work of the Contract, and that it has investigated and satisfied itself as to the general and local conditions and factors which can affect the Work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- d. the information and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

The Contractor, by executing the Contract, represents that it has reviewed and understands the Contract Documents and has notified the County of and obtained clarification of any discrepancies which have become apparent during the bidding period. During the Contract, the Contractor must promptly notify the County in writing of any apparent errors, inconsistencies, omissions, ambiguities, construction impracticalities or code violations discovered as a result of the Contractor's review of the Contract Documents including any differences between actual and indicated

dimensions, locations and descriptions, and must give the County timely notice in writing of same and of any corrections, clarifications, additional Drawings or Specifications, or other information required to define the Work in greater detail or to permit the proper progress of the Work. The Contractor must provide similar notice with respect to any variance between its review of the Site and physical data and Site conditions observed. If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered, without prompt written notice to the County and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all related claims are specifically waived.

The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the County, as well as from the Drawings and Specifications made a part of this Contract. Unless otherwise specified, all existing structures, materials and obstructions that interfere with the new construction shall be removed and disposed of as part of this Contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work without additional expense to the County.

The locations of existing utilities, including underground utilities, which may affect the Work, are indicated on the Drawings or in the Specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these Drawings or Specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of the operations. The Contractor shall make all necessary investigations to determine the existence and locations of such utilities. Should uncharted or incorrectly charted utilities be encountered during performance of the Work, notify the Project Officer or designee immediately for instructions. The Contractor will be held responsible for any damage to and maintenance and protection of existing utilities and structures, of both public and private ownership. However, if it is determined that such existing utility lines or structures require relocation or reconstruction or any other work beyond normal protection, then such additional work will be ordered under the terms of the clause entitled "Changes in Work." At all times, cooperate with the County and utility companies to keep utility services and facilities in operation.

The County assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of this Contract, unless that understanding or representation is expressly stated in this Contract.

2. PUBLIC CONVENIENCE

The Contractor shall at all times so conduct its Work as to ensure the least possible obstruction to traffic (vehicular, bicycle and pedestrian) and inconvenience to the general public, County employees, and the residents in the vicinity of the Work. Traffic shall be maintained in accordance with the approved MOT plan. No road, street or sidewalk shall be closed to the public except with the permission of the Project Officer or designee and or proper governmental authority. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor and included in the cost of the Work to ensure the use of sidewalks, trails, and transit facilities compliant with all applicable ADA and other regulations, as well as the proper functioning of all gutters, drainage inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Project Officer or designee.

3. SAFETY AND ACCIDENT PREVENTION

The Contractor shall comply with, and ensure that the Contractor's employees and subcontractors comply with, all current applicable local, state and federal policies, regulations and standards relating to safety and health, including, by way of illustration and not limitation, the U.S. Department of Labor's Occupational Safety and Hazard Administration (OSHA) Construction Industry Regulations, the standards of the Virginia Occupational Safety and Health program of the Department of Labor and Industry for General Industry and for the Construction Industry, the Federal Environmental Protection Agency Standards and the applicable standards of the Virginia Department of Environmental Quality.

The Contractor shall provide, or cause to be provided, all technical expertise, qualified personnel, equipment, tools and material to safely accomplish the Work specified to be performed by the Contractor and subcontractor(s).

The Contractor shall identify to the County Project Officer at least one on-site person who is the Contractor's competent, qualified, and authorized safety officer on the worksite and who is, by training or experience, familiar with and trained in policies, regulations and standards applicable to the work being performed. The competent, qualified and authorized person must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, shall be capable of ensuring that applicable safety regulations are complied with, and shall have the authority and responsibility to take prompt corrective measures, which may include removal of the Contractor's personnel from the work site.

The Contractor shall provide to the County, within 7 days of issuance of the Notice to Proceed, a copy of the Contractor's written safety policies and safety procedures applicable to the scope of work. Failure to provide this information within may result in cancellation of the Contract.

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all injury to persons and damage to property either on or off the site, which occur as a result of the Contractor's prosecution of the Work.

The Contractor shall take or cause to be taken such additional safety and health measures as the County may determine to be reasonably necessary. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the current version of "Manual of Accident Prevention" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws. The Contractor is directed to the "Rules and Regulations Governing Construction, Demolition and All Excavation" and adopted by the Safety Codes Commission of Virginia, 1966, or latest edition, covering requirements for shoring, bracing, and sheet piling of trench excavations.

4. HAZARDOUS MATERIALS

Arlington County is subject to the Hazard Communication Standard, 29 CFR §1910.1200 (Standard). The Contractor agrees that it will provide or cause to be provided Safety Data Sheets (SDS) required under the Standard for all hazardous materials supplied to the County or used in the performance of the work. Such SDS shall be delivered to the County no later than the time of actual delivery of any hazardous materials to the County or use of such material in the performance of work under the Contract by the Contractor or its subcontractors, whichever occurs first. Container labeling meeting the requirements of the Standard shall be appropriately affixed to the shipping or internal containers. The County reserves the right to refuse shipments of hazardous materials not appropriately labeled, or when SDS have not been received prior to or at the time of receipt of the shipment for use by the County or for use by the Contractor in the performance of the Contract, or whenever the material is delivered in a manner inconsistent with any applicable law or regulation. Any expenses incurred due to the refusal or rejection of SDS are the responsibility of the Contractor. The Contractor shall comply with all federal, state, and local laws governing the storage, transportation, and use of toxic and hazardous materials. The Contractor shall maintain onsite an up to date SDS binder for all material used and delivered to the Project. The County Project Officer or his designee shall be allowed access to the SDS book at all times.

5. HAZARDOUS WASTE

Hazardous Waste Generator/Hazardous Waste Disposal: The County Board of Arlington County, Virginia and the Contractor shall be listed as Co-generators. The Contractor shall assume all the duties pertaining to the Waste Generator, including signing the Waste Shipment Record ("WSR") and manifest. The Contractor shall supply the County Project Officer with the executed original Owner's Copy of the WSR, as required by applicable regulatory agencies within 35 days from the time the waste was accepted by the initial waste transporter, and prior to request for final payment. A separate WSR shall be submitted for each shipment to the disposal site.

Delayed Waste Shipment Records: The Contractor shall report in writing to the EPA Region III office within 45 days if an executed copy of the WSR is not received from the operator of the disposal site. The report to the EPA regional office shall include a copy of the original WSR and a cover letter signed by the Contractor stating the efforts taken to locate the hazardous waste shipment and the results of those efforts.

Temporary Hazardous Waste Storage Prohibited: The Contractor shall not temporarily store hazardous waste unless pre-approved by the County in writing. If so approved, hazardous waste stored off-site in a temporary facility shall be monitored and records shall be kept on the number of containers, size, and weight. The Contractor shall inform the County when the hazardous waste is to be transported to the final disposal site. The County has the right to inspect the temporary site at any time. The Contractor shall submit copies of all relevant manifests, Waste Shipment Record(s), and landfill receipts to the County Project Officer prior to the request for final payment. All paperwork shall be signed by the Contractor and disposal site operator as required.

6. ASBESTOS

Whenever and wherever during the course of performing any work under this Contract the Contractor discovers the presence of asbestos or suspects that asbestos is present, the Contractor shall stop work immediately, secure the area, notify the County Project Officer immediately and await positive identification of the suspect material. During the downtime in such a case, the Contractor shall not disturb any surrounding surfaces but shall protect the area with suitable dust covers. Work shall not proceed without an Asbestos-Related Work Authorization executed by the County Asbestos Program Manager.

7. CROSSING UTILITIES

When construction crosses highways, railroads, streets, waterways, or utilities under the jurisdiction of State, County, City, or other public agency, public utility, or private entity, the Contractor shall secure written permission where necessary from the proper authority before executing such new construction. A copy of such written permission must be filed with the County before any work is started. The Contractor shall be required to furnish a release from the proper authority before Final Acceptance of the Work.

8. OVERHEAD HIGH VOLTAGE LINES SAFETY ACT

If any work required herein will be performed within ten feet of an overhead high voltage line, the provisions of Virginia Statute 59.1-406, et. seq., "Overhead High Voltage Line Safety Act" (Act) shall apply. The "person or contractor responsible for the work to be done", as that term is used in the Act, will be interpreted to mean the Contractor. The Contractor shall notify the owner or operator of the high voltage line in the manner prescribed in Section 59.1-411 of the Act in sufficient time prior to the time work is to be commenced to avoid any delays in the work. The County will not pay for lost time, profits, or permit any extension of the work for any delays caused by the failure of the Contractor to make such arrangements in a timely manner. All costs for the work shall be paid by the Contractor. The County shall reimburse the Contractor for the actual reasonable cost paid to the owner or operator of the high voltage line by the Contractor on presentation to the County by the Contractor of original invoices from the

owner or operator of the high voltage line in the same manner as for other Contractor invoices submitted for work performed. Retention, if applicable to the Contract, shall not be withheld from the payment to the Contractor by the County for this work. No processing, administrative, or other charges above the actual amount charged by the owner or operator of the high voltage line shall be paid to the Contractor by the County.

9. SANITARY PROVISIONS

The Contractor shall provide and maintain such sanitary accommodations for the use of the Contractor's employees and those of its subcontractors as may be necessary to comply with the requirements and regulations of OSHA and of the local and State departments of health.

10. SITE CLEAN-UP AND WASTE DISPOSAL

The Contractor shall frequently remove and properly dispose of all refuse, rubbish, scrap materials, and debris from the site resulting from the Contractor's operations during the performance of this contract. The Contractor shall ensure the work site presents a neat and orderly appearance at all times. The Contractor shall isolate any and all dumpsters, trash cans and recycling bins provided for the Project from public use until Final Acceptance.

Unless otherwise stated, the Contract Amount and any unit prices shall include all costs and fees for removal and disposal of all waste and debris, whether disposed of at a County site or at any other location.

The Contractor shall remove all surplus material, false work, temporary structures including foundations thereof, and debris resulting from the Contractor's operations at work completion and before Final Acceptance. The County shall reserve the right to remove the surplus material, false work, temporary structures including foundations and debris. The County will restore the site to a neat, orderly condition if the Contractor fails to do so. The County shall be entitled to offset such cost against any sums owed by the County to the Contractor under this Contract.

11. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

When the Project includes an approved SWPPP, the Contractor shall strictly abide by this plan which includes: a Pollution Prevention (P2) Plan, an Erosion and Sediment Control (E&S) Plan, and a Stormwater Management Plan. If the Contractor proposes to deviate from this approved plan, it shall be the Contractor's responsibility to coordinate and obtain approval from the County Project Officer prior to implementing any changes.

No separate payment shall be made by the County for SWPPP implementation, with the exception of E&S items as specified on the E&S plans or listed as pay items. The Contractor shall not be entitled to any additional payment for changes to the SWPPP which are the result of the Contractor's work schedule or resource allocation, weather delays, or other factors not controlled by the County.

F. PROGRESS AND COMPLETION OF THE WORK

1. NOTICE TO PROCEED

The Contractor shall be given written Notice to Proceed with the Work. Such Notice to Proceed shall state the date on which the Work is to be commenced, and every calendar day thereafter shall be counted in computing the actual Time for Completion.

2. TIME FOR COMPLETION

It is hereby understood and mutually agreed by and between the Contractor and the County that the Commencement Date, the rate of progress, and the Time for Completion of the Work to be done hereunder are essential conditions of the Contract. The Contractor agrees that the Work shall be started promptly upon receipt of a written Notice to Proceed in accordance with the accepted schedule. The Work shall be prosecuted regularly, diligently, and uninterruptedly at a rate of progress that will ensure full completion of the Project within the Time for Completion specified in the Contract Documents.

3. SCHEDULE OF COMPLETION

Unless otherwise specified, the Contractor shall within 10 business days after the Award Date, or prior to the pre-construction meeting, whichever occurs first, submit schedules which show the order in which the Contractor proposes to carry on the Work, with dates for starting and completing the various activities of the Work. The Contractor shall submit an updated schedule monthly with the request for partial payment. Review and acceptance by the County of the Contractor's schedule of completion shall in no way relieve the Contractor of its responsibility to complete the Work within the contract time. If the Work falls behind the schedule, the County may require the Contractor to prepare and submit, at no extra cost to the County, a recovery schedule indicating by what means the Contractor intends to regain compliance with the schedule. The recovery schedule must be submitted to the County for review by the date indicated in the County's written demand.

4. CONDITIONS FOR COMPLETION

- a. **SUBSTANTIAL COMPLETION:** The Work will be considered Substantially Complete when all of the following conditions have been met and accepted by the Project Officer, and a Certificate of Substantial Completion has been issued:
1. The Contractor has provided formal notice that the Work is substantially complete, and the Project Officer has agreed that the condition of the Work warrants a Substantial Completion inspection;
 2. The Contractor has provided a Punch List and that list has been reviewed and approved by the Project Officer. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents;

3. Final test reports as required by the Contract and certificates of inspection and approval required for use and occupancy;
 4. Fire Marshal's report, if applicable;
 5. Approval forms and transfer documents for all utilities;
 6. All life safety systems, including fire alarms, visual and audios alarms, fire detectors and fire alarm annunciator system, sprinkler systems, and all mechanical and electrical systems are complete and working in an automatic mode, and the County has been adequately trained in the operation of the systems;
 7. The HVAC system Testing and Balancing Report and build air quality test results as required for LEED certification have been accepted by the Project Officer;
 8. Operation and Maintenance Manuals have been submitted for review;
 9. All documents and verification of training required in accordance with any Commissioning Plan;
 10. Mark-ups of construction drawings showing the Record or "Record" condition have been submitted for review and approval by the Project Officer;
 12. Entrances and egress pathways have been constructed and can remain clear of construction activities;
 13. A Certificate of Occupancy has been issued for the space by the County's Inspection Services Division;
 14. All Commissioning has performed and completed to the satisfaction of the Project Officer; and
 15. Schedule to complete the Punch List and value of Work not yet complete.
- b. Upon the Contractor providing notice that the Work is substantially complete, the Project Officer or designee will invite all relevant parties to perform an inspection of the Work, and any noted deficiencies or incomplete items not indicated on the Contractor's punch list will be added. All punch list items, whether generated by the Contractor or any other party on behalf of the County, shall be completed within thirty (30) days of the date of Substantial Completion, unless otherwise agreed to by the County due to seasonal or other extenuating circumstances.

c. FINAL COMPLETION: The Work will be considered Finally Complete when all of the following conditions have been met and accepted and a Final Completion Notice has been issued by the Project Officer:

1. The Contractor has provided formal notice that the Work is complete, and the Project Officer has agreed that the condition of the Work warrants a Final Completion inspection;
2. All construction deficiencies and punch list items have been closed and all construction deficiencies corrected and accepted by the Project Officer;
3. All spare parts and attic stock have been delivered, stored in an orderly manner in a space designated by the Project Officer and a complete inventory list has been verified and accepted by the Project Officer;
4. All warranties and manufacturer certificates and contact information for parties providing warranties have been delivered and accepted by the Project Officer;
5. All final Operating and Maintenance manuals have been delivered and approved and accepted by the Project Officer;
6. All final Record Drawings in .pdf format on a CD delivered and accepted by the Project Officer;
7. All commissioning has been completed and any open construction items in the commissioning agent's report have been closed and accepted by the Project Officer; and
8. All LEED documents and submittals, if applicable, to be provided by the Contractor or sub-contractors have been submitted and accepted by the Project Officer.

5. USE OF COMPLETED PORTIONS

The County shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding that the time for completing the entire Work or such portions may not have expired; but taking such possession and use shall not be deemed an acceptance of any work not done in accordance with the Contract Documents. If the Contractor claims that such prior use increases the cost or delays, the completion of remaining work, or causes refinishing of completed work, the Contractor may submit a claim for compensation or extension of time, or both.

G. MEASUREMENT AND PAYMENT

1. PAYMENTS TO CONTRACTOR

The County will make partial payments, less retainage, to the Contractor monthly on the basis of the Contractor's written estimate of the work performed during the preceding calendar month as approved by the Project Officer or designee.

The Contractor's application for payment shall indicate the amount of work completed to date in a format consistent with the accepted bid and as indicated below:

- a. Lump Sum: For lump sum contracts, the Contractor shall provide to the Project Officer a Schedule of Values, and the application for payment will reflect the Schedule of Values and the amount of work completed in those units.

For contracts that include multiple lump sum line items, the application for payment shall reflect the percentage of work completed for each lump sum item. If requested by the Project Officer, the Contractor shall provide a Schedule of Values for each lump sum line item in the contract.

- b. Unit Price: The schedule of unit prices in the accepted bid shall be used as the basis for preparing the estimates, and each partial payment shall represent the total value of all units of work completed, computed at the unit prices stated in the Contract, less the aggregate of previous payments.

At the discretion of the Project Officer, payments may alternatively be based on actual quantities and site measurements taken in the field by County staff using the Contract Unit Prices.

If Stipulated Price Items are included in the contract, Work on such Stipulated Price Items shall be carried out only upon written order by the Project Officer. The payment for a Stipulated Price Item shall be made by the County to the Contractor at the related unit price specified in the 'Stipulated Price Items' section of the Bid Form on the same basis as the payment for any other regular Bid Item.

In addition to the amount of work completed to date, the application for payment shall indicate the aggregate of all previous payments for each line item, the retainage previously withheld, and the total payment requested this period.

The Contractor's application for payment will not be reviewed or processed unless an updated schedule is attached. The pay application shall also contain a certification by the Contractor that due and payable amounts have been paid by the Contractor, including payments to subcontractors, for work which previous payment was received by the Contractor from the County.

2. PAYMENT FOR STORED MATERIALS

When requested in writing by the Contractor, payment allowances may be made for material secured for use on the Project and secured at the project site. Such payments

will only be made for materials scheduled for incorporation into the work within sixty (60) days.

Payment for materials stored offsite may be considered at the discretion of the Project Officer. Any such request shall be made in writing, and the Contractor shall provide photographs of materials stored offsite, bills of sale, and proof of insurance on the premises at which off-site materials are stored with the application for payment. Payment for stored materials may also be subject to additional requirements contained elsewhere in the Contract Documents.

3. PAYMENTS WITHHELD

The Project Officer or designee may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate for payment to the extent necessary to protect the County from loss on account of defective work not remedied or withhold payment for violation of any contract term or condition not remedied after sufficient notice given to the Contractor.

Any such withholding shall not result in any liability to the Contractor for damages.

4. COUNTY ORDERED CHANGES IN WORK

The County, without invalidating the Contract, may order extra Work or make changes by addition, deletion or revision in the Work, with the total Contract Amount being adjusted accordingly if applicable. Any change that will increase the Contract Amount more than 10% will require notice to sureties and require that Performance and Payment Bonds be increased by the Contractor. The increased Performance and Payment Bonds must be sent to the County's Office of the Purchasing Agent within 15 calendar days of the County's approval of such change. All such work shall be executed under the conditions of the original Contract, except that modification of the Time for Completion caused thereby shall be made at the time of approving such change.

a. The Project Officer or designee shall have authority to make minor changes in the Work by verbal order when such changes do not involve extra cost and are not inconsistent with the purpose of the Project. Otherwise, except in an emergency endangering life or property, no extra Work or change shall be made unless in pursuance of a written Construction Change Directive or Change Order and no claim for an addition to the Contract Amount or Contract Time shall be valid unless so ordered.

b. The Contractor shall review any County requested or directed change and shall respond in writing within 14 days after receipt of the proposed change stating the effect of the proposed change upon Contractor's work, including any increase or decrease in Contract time and price. The Contractor shall furnish the County an itemized breakdown of the quantities and prices used in computing the proposed change. The Contractor shall also furnish any sketches, drawings, and or pictures to properly explain the change or impact to the Project Officer. It is the sole responsibility of the Contractor to provide adequate change order backup to satisfy the Project Officer.

- c. The value of any such extra work or change shall be proposed by the Contractor in one or more of the following ways: (a) by estimate in a lump sum; (b) by cost and fixed fee; (c) by unit price additions or deletions of quantities stated in the unit price contract; or (d) by any other method permitted under the Arlington County Purchasing Resolution. The Project Officer will determine the method appropriate based on the nature of the changes.
- d. If none of the aforementioned methods is agreed upon the Contractor shall proceed with the work without delay under force account, provided the Contractor receives a Construction Change Directive. In such case, the Contractor shall keep and present in such form as the Project Officer or designee may direct, a correct account of the cost, together with vouchers. The Project Officer or designee shall be permitted to verify such records on a daily basis and may require such additional records as are necessary to determine the cost of the change to the Work. The Project Officer or designee shall certify to the amount due to the Contractor, including a reasonable lump sum allowance for overhead and profit. A complete accounting of the extra cost shall be made within 14 days after completion of the work involved in the claim. Refer to Paragraph G.5, *Force Account Work*, below for a description of allowable costs when work is performed under force account.
- e. A cost proposal for a change in the Work shall provide a complete breakdown itemizing the estimated quantities and costs of labor, materials, and equipment (base cost) required in addition to any markup used. The allowable percentage markups for overhead and profit for a non-force account change to the Work performed by the Contractor's own forces or performed by the Subcontractor shall be negotiated based on the nature, size, and complexity of the Work involved but shall not exceed the percentages for each category listed below.
 - 1) Subcontractor's markup for overhead and profit for the work it performs in a change to the Work shall be a maximum of fifteen (15%).
 - 2) Contractor's markup for overhead and profit on the Subcontractor's base cost in a change to the Work shall be a maximum of ten percent (10%).
 - 3) Contractor's markup for overhead and profit (including bonds and insurance) for work it performs in a change to the Work shall be a maximum of fifteen percent 15%.
 - 4) The markup for overhead and profit of a sub-subcontractor at any tier on a change to the Work it performs shall be a maximum of fifteen percent (15%). The Contractor and all intervening tiers of subcontractors' markup on such sub-subcontractor's base cost in the change to the Work shall not exceed a total of ten percent (10%).
- f. Base Cost is defined as the total of labor, material, and equipment costs, it does not include markup for overhead and profit. The labor costs include only the

costs of employees directly constructing or installing the change in the Work and exclude the costs of employees coordinating or managing the work.

- g. The allowable percentage markups for overhead and profit stated above shall compensate the Contractor, subcontractor, and sub-subcontractor for all other costs associated with or relating to the change to the Work including by way of illustration and not limitation, general conditions, supervision, field engineering, coordination, insurance, bond(s), use of small tools, incidental job costs, and all other general and administrative home and field office expenses.
- h. Allowable costs for changes in the Work shall not include home office expenses including payroll costs for the Contractor's officers, executives, administrators, project managers, estimators, clerks timekeepers, and other administrative personnel employed by the Contractor, whether at the Site or in the Contractor's principal or branch office for general administration of the Work. These costs are deemed overhead included in the percentage markups in Subsection (e) above.
- i. If the change to the Work also changes the Time for Completion by adding days to perform the Work, an itemized accounting of the following Site direct overhead expenses for the change to the time may be considered as allowable costs for compensation in addition to the base cost indicated above:
 - 1) site superintendent's pro-rata salary
 - 2) temporary site office trailer expense
 - 3) temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilet facilities.

All other direct and indirect overhead expenses are considered covered by and included in Subsection (e) markups above. In no case shall subcontractor extended overhead be submitted or considered. The County does not have a direct contractual relationship with any subcontractor or supplier and therefore will not direct, discuss or negotiate with subcontractors employed by the Contractor.

- j. If Contractor requests an extension to the Time for Completion due to changes in the Work it must provide to the Project Officer adequate documentation substantiating its entitlement for the time extension. The documentation must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior changes to the Work, not just an increase or decrease in the time needed to complete a portion of the total Work. In the event a Critical Path Method (CPM) schedule is required by the Contract, no extension to the Time for Completion shall be granted unless the additional or change to the Work increases the length of the critical path beyond the Time for Completion as demonstrated on the approved CPM schedule or bar chart schedule. Any Float belongs to Arlington County. A written statement in addition to a CPM analysis shall be prepared explaining how no other sequence of work activities could have been performed to

decrease the impact or eliminate the impact altogether. If requested by the Project Officer the Contractor must provide alternate documentation detailing the claim to the County's satisfaction.

5. FORCE ACCOUNT WORK

A Force Account may be used at the County's discretion and only when either 1) agreement on the valuation of a change cannot be made using the methods described in the preceding paragraph, *County Ordered Changes in the Work*, or 2) the County cannot firmly establish an applicable and acceptable estimate for the cost of the work because the level of effort necessary to perform and complete the work cannot be reasonably estimated or anticipated but can only be determined by performing the work. Because of the significant burden on the County to monitor and control the work, Force Account work is not a preferred method, and it shall be the responsibility of the Contractor to provide all necessary documentation and justification of costs. The rates for labor, equipment and materials to be used in cases of work performed on a force account basis will be compensated as documented below. No costs other than those explicitly listed below shall be allowed:

- a. Labor: Before any Force Account work begins, the Contractor shall submit for approval to the Project Officer the proposed hourly rates and associated labor costs (benefits and payroll burden) for all laborers and forepersons to be engaged in the work. The number of laborers and forepersons engaged in the work will be subject to regulation by the Project Officer and shall not exceed the number that the Project officer deems most practical and economical for the work. For all labor and forepersons in direct charge of the force account work, excluding general superintendence, compensation will be as follows:
 - 1) Certified Pay Rate: The Contractor will receive the actual rate of wage or scale as set forth in his most recent payroll for each classification of laborers, and forepersons who are in direct charge of the specific operation. The time allowed for payment will be the number of hours such workers are actually engaged in the work. If overtime work is authorized by the County, payment will be at the normal overtime rate set forth in the Contractor's most recent payroll.
 - 2) Benefits: The Contractor will be entitled to receive the actual cost for any fringe benefits that are regularly provided to the classes of laborers and forepersons engaged in the work and that are not included in the certified pay rate.
 - 3) Payroll Burden: The Contractor will be entitled to receive the actual cost for all costs associated with required payroll taxes and payroll benefits not covered in 2) above, including:
 - Social Security Tax
 - Medicare Tax
 - Unemployment Tax
 - Worker's Compensation Insurance

- Contractor's Public Liability Insurance
 - Contractor's Property Damage Liability Insurance
- 4) If the Contractor is unable to provide the necessary documentation for Benefits and Payroll Burden as identified above, the Contractor will be entitled to an additive of 20% of the Certified Hourly Pay Rate as full and final compensation for Benefits and Payroll Burdens
 - 5) Overhead and Profit: The Contractor will be entitled to an additive of 10% on all properly documented and approved costs established in paragraphs 1), 2), 3), and 4) above for all administrative, overhead, and profit associated with labor costs.
 - 6) Subsistence and lodging allowances may be allowed by the Project Officer at the actual and documented costs for lodging and meals if the following conditions are met and the applicable rates and authorization for such costs are established prior to beginning the work. No additives for overhead, administrative, profit, or any other costs will be permitted for subsistence and lodging.
 - i. The specific Force Account work is outside the scope of the original contract, requires mobilization of a separate crew not intended to be used on the original contract, and the Contractor's base location is more than 50 miles from the work site, or
 - ii. Forces which have been working on the Contract will be used for the Force Account work and have been routinely staying overnight during the life of the Project, and the Force Account Work will warrant an extension of the contract time, and the distance from the Contractor's base location to the work site is more than 50 miles
 - b. Materials: The Contractor will receive the actual cost of materials accepted by the Project Officer that are delivered and used for the work including taxes, transportation, and handling charges paid by the Contractor, not including labor and equipment rentals as herein set forth, to which 15 percent (15%) of the cost will be added for administration and profit. The Contractor shall make every reasonable effort to take advantage of trade discounts offered by material suppliers. Any discount received shall pass through to the County. Salvageable temporary construction materials will be retained by the County, or their appropriate salvage value shall be credited to the County, at the County's discretion.
 - c. Equipment: For all equipment other than small tools, the Contractor will be entitled to rental rates as established herein, and agreed to in writing before the work is begun. Transportation costs directly attributable to Force Account work will be as stated below. Small tools will be considered any equipment which has a new cost of \$1000 or less, and will not be eligible for any compensation. The Contractor shall provide the Project Officer a list of all equipment to be used in

the work. For each piece of equipment, the list shall include the serial number; date of manufacture; location from which equipment will be transported; and, for rental equipment, the rental rate and name of the company from which it is rented. The number and types of equipment engaged in the work will be subject to regulation by the Project Officer as deemed to be the most practical and economical for the work. No compensation will be allowed for equipment which is inoperable due to mechanical failure. Compensation for equipment shall be as follows:

- 1) Hourly Base Equipment Rental Rates (Owned Equipment) – For equipment authorized for use in the Force Account work that is owned by the Contractor, the Contractor shall be entitled to an Hourly Base Rental Rate as detailed in the following paragraphs. The Hourly Base Rental Rate for Contractor owned equipment will not exceed 1/176 of the monthly rates of the schedule shown in the *Rental Rate Blue Book* modified in accordance with the *Rental Rate Blue Book* rate adjustment tables that are current at the time the force account is authorized. The rates for equipment not listed in the *Rental Rate Blue Book* schedule shall not exceed the hourly rate being paid for such equipment by the Contractor at the time of the force account authorization. In the absence of such rates, prevailing rates being paid in the area where the authorized work is to be performed shall be used.
- 2) Hourly Base Equipment Rental Rates (Rented Equipment) – If the Contractor does not possess or have readily available equipment necessary for performing the force account work and such equipment is rented from a source other than a company that is an affiliate of the Contractor, payment will be based on actual invoice rates when the rates are reasonably in line with established rental rates for the equipment in question and are approved by the Project Officer.
- 3) Hourly Operating Rates – Hourly Operating Rates shall be as established in the Blue Book estimated operating cost per hour. This operating cost will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling, and oiling), small tools, and any and all incidentals. If rental rates for the equipment being used in the work are not listed in the Blue Book or otherwise readily available, the Hourly Operating Cost will be 15% of the established Hourly Base Rental Rate. If invoices for Rental Equipment include the furnishing of fuel, lubricants, repair, and servicing, then the Contractor will not be entitled to any Hourly Operating costs for that equipment.
- 4) Equipment Usage - Equipment usage will be measured by time in hours of actual time engaged in the performance of the work. The Contractor shall be entitled to the applicable Hourly Base Equipment Rental Rate and Hourly Operating Rate for all approved Equipment Usage.

- 5) Equipment Standby – Standby time is defined as the period of time equipment authorized for Force Account work by the Project Officer is available on-site for the work but is idle for reasons not the fault of the Contractor or normally associated with the efficient and necessary use of that equipment in the overall operation of the work at hand. Hourly rates for Contractor owned equipment on standby, will be at 50 percent (50%) of the rate paid for equipment performing work. Operating costs will not be allowed for equipment on Standby. When equipment is performing work less than 40 hours for any given week and is on standby, payment for standby time will be allowed for up to 40 hours, minus hours performing work. Payment for Standby will be allowed only for working days. Payment for Standby will not be made for the time that equipment is on the Project in excess of 24 hours prior to its actual performance in the force account work.
- 6) Transporting Costs – When it is necessary to obtain equipment exclusively for Force Account work from sources beyond the Project limits and the Project Officer authorizes the transporting of such equipment to the Project site, the cost of transporting the equipment will be allowed as an expense. Where the transport requires the use for a hauling unit, the allowable expense will consist only of the actual cost incurred for the use of the hauling equipment, or the applicable Blue Book cost, whichever is less. When equipment is transferred under its own power, the allowable Transporting cost shall be 50% of the Hourly Base Equipment Rental Rate.
- 7) Overhead and Profit – The Contractor shall be entitled to an additive of 10% on all appropriate and approved Equipment Rental, Operating, and Transporting costs as defined above.

d. Subcontracting: The Contractor shall receive the cost of work performed by a subcontractor as determined in (a), (b), and (c) above. In addition, the Contractor will be allowed an allowance per the schedule below for administrative costs and profit.

Total Cost of Subcontract Work: Rate Schedule

\$0 - \$10,000	10%
> \$10,000	\$1,000 + 5 % above \$10,000

e. Other Costs: The Contractor shall not be entitled to any costs associated with Force Account Work other than those specifically identified in this section.

f. Statements: Payments will not be made for work performed on a force account basis until the Contractor has furnished the Project Officer duplicate itemized statements of all costs of such work detailed as follows:

- 1. Payroll indicating name, classification, date, daily hours, total hours, rate, and extension of each laborer, foreperson

2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of equipment
3. Quantities of materials, prices, and extensions
4. Transportation of materials
5. Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the Force Account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock; that the quantity claimed was actually used; and that the price, transportation, and handling claimed represented his actual cost.

6. CLAIMS FOR EXTRA COST

If the Contractor claims that any event will give rise to a claim for an increase in the Contract Amount or that any instructions from the Project Officer, by drawings or otherwise, will incur him extra cost under the Contract, then, except in emergencies endangering life or property, it shall give the Project Officer written notice thereof no later than three (3) days of the event or instruction. The Contractor thereafter must provide to the Project Officer a full cost proposal within 14 days detailing the amount of additional compensation claimed, together with the basis therefore and documentation supporting the claimed amount. No such claims shall be valid unless so made. If the Project Officer agrees that such event or instructions involve extra cost to the Contractor, any additional compensation will be determined by one of the methods provided in the Changes in Work paragraph of these General Conditions as selected by the Project Officer. All pricing and supporting documentation requirements of the Changes in the Work clause shall apply to claims for extra cost deemed valid under this paragraph.

7. DAMAGES FOR DELAY; EXTENSION OF TIME OTHER THAN FOR WEATHER

The Contractor's relief for any claim for delay which is unreasonable, or caused by the acts and omissions of the County, or due to causes within the County's control, shall be an extension of the Time for Completion and/or the Contractor's direct costs which result from the delay, but only to the extent any damages for delay were actually caused by the County. The Contractor must give the Project Officer written notice of such delay and damages at the time they were incurred but in no event later than three (3) calendar days following the perceived onset of the delay. The Contractor's written notice shall specify the nature the delay claimed by the Contractor, the cause of the delay, and the anticipated impact of the delay on the Contractor's work schedule. The Contractor thereafter must provide to the Project Officer a full claim within 14 days after cessation of the delay detailing the amount of additional contract time or compensation claimed, together with the basis therefor and documentation supporting the claim.

If the Contractor is entitled to compensation for delay which is unreasonable, or caused by the acts and omissions of the County, or due to causes within the County's control, and where there is no change in the Work, an itemized accounting of the following direct site overhead expenses will be considered as allowable costs to be used in

determining the compensation due the Contractor: site superintendent prorata salary, temporary site office expense, temporary site facilities, and temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilets. A fifteen percent (15%) markup of these expenses will be allowed to compensate the Contractor for home office and other direct or indirect overhead expenses.

If the Contractor submits a claim for damages pursuant to this Section, the Contractor shall be liable to the County for a percentage of all costs incurred by the County in investigating, analyzing, negotiating and litigating the claim, which percentage shall be equal to the percentage of the Contractor's total delay claim that is determined through litigation to be false or to have no basis in law or fact (Virginia Code §2.2-4335).

The Contractor's sole relief on any claims for delay which is reasonable, or not caused by the acts or omissions of the County, or due to causes not within the County's control, or Force Majeure, shall be an extension of the Time for Completion provided the Contractor gave the Project Officer timely written notice at the inception of such delay.

No extension of the Time for Completion or additional compensation, if applicable, will be granted for any delay unless the Contractor demonstrates the claimed delay directly impacts the Critical Path of the accepted CPM schedule or bar chart schedule, whichever is applicable, and any float has been consumed. Claims for compensation for direct costs which result from delay must be substantiated by adequate documentation clearly showing that the Work delayed was on the critical path of the approved CPM schedule or on the sequence of Work on the approved bar chart schedule, as modified, and that the additional costs incurred by the Contractor are directly attributable to the delay in the Work claimed.

8. TIME EXTENSIONS FOR WEATHER

The Contractor's sole relief on any claims for delay which is caused by abnormal weather shall be an extension of the Time for Completion provided the Contractor gave the Project Officer written notice no later than five (5) calendar days after the onset of such delay and provided the weather affected the Critical Path. A fully-documented claim for a time extension under this Section must be submitted no later than thirty (30) calendar days after the cessation of the delay. It shall be the Contractor's responsibility to provide the necessary documentation to satisfy the Project Officer that the weather conditions claimed were encountered, which may include daily reports by the Contractor, copies of notification of weather days to the Project Officer, NOAA backup, and pictures from each day claimed.

The Time for Completion will not be extended due to inclement weather conditions which are normal, as defined below, for Arlington County. The Time for Completion includes an allowance for workdays (based on five (5) day workweek) which according to historical data may not be suitable for construction work. The Contractor may request extension to the Time for Completion if it can demonstrate unusual and disruptive weather conditions per the requirements below:

- a. That one or more of the Weather Conditions listed below was encountered;
and,

- b. The occurrence of the Weather Condition(s) resulted in an inability to prosecute work which would have otherwise been performed on the day(s) the Weather Condition(s) occurred; and,
- c. The work which was not able to be completed was on the Critical Path and could not be completed **only** due to the Weather Condition(s) claimed.

The Project Officer will determine the Contractor’s entitlement to an extension of the Time for Completion. A time extension of no more than one (1) day will be granted for one (1) day of lost work which satisfies the requirements above, regardless of the number of Weather Conditions encountered. The Contractor’s sole relief shall be an extension of the Time for Completion and no claim for an increase in Contract Amount will be allowed.

The Weather Conditions listed below will be the only basis for consideration by the County, based upon the requirements listed above, as an extension of the Time for Completion due to inclement weather or weather-related site conditions.

Weather Condition #1: Unusually Heavy Precipitation - Figure 1 illustrates the anticipated monthly inclement weather due to precipitation (Rain Days). If the number of days with precipitation in excess of 0.10”, as recorded at Washington Reagan National Airport, exceeds the anticipated Rain Days, the Contractor will be entitled to an extension of one (1) day on the Time for Completion for every day in excess of the Rain Days illustrated in Figure 1. The anticipated value of Rain Days for partial months at the beginning and end of the Contract shall be evaluated on a pro-rated basis.

FIGURE 1

Average days with precipitation of 0.1” or more

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7	6	7	6	8	6	7	6	6	5	6	6

Weather days are not exclusive to the individual months that they represent in Figure 1. If weather days are not used in a previous month(s) they can be used to offset weather delays in subsequent months. This will be reviewed on a case by case basis and is subject to reconciliation at the end of the Project.

Condition #2: Temperature – The Contractor may be entitled to an additional day for every day that the recorded high temperature at Washington Reagan National Airport is 32 degrees Fahrenheit or less, that has not already been incurred under Weather Condition #1 above. This condition does not apply to vertical construction as defined by the Arlington County Vertical Construction Standards.

9. RELEASE OF LIENS

The County, before making final payment, shall require the Contractor to furnish a complete release of all liens arising out of this Contract. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the County, to indemnify him against any lien. If any lien remains unsatisfied after all payments have been made, the Contractor shall refund to the County all money that the latter may be compelled to pay in discharging such lien. However, the County may make

payments in part or in full to the Contractor without requiring the releases or receipts, and the payments so made shall not impair the obligations of any Surety or Sureties on any bond or bonds furnished under this Contract.

10. FINAL PAYMENT

After the Contractor has completed all work and corrections to the satisfaction of the Project Officer or designee and delivered all maintenance and operating instructions, schedules, quantities, bonds, certificates of inspection maintenance record documents, and other items required as final payment submittal documents, the Contractor may make application for final payment following the procedure for progress payments. The Final Application for Payment shall be accompanied by all documents required in the Contract, including a complete and signed and notarized copy of the Final Payment Release Form as follows:

RELEASE AND REQUEST FOR FINAL PAYMENT

CONTRACT NUMBER: _____ CONTRACTOR NAME: _____

FINAL PAYMENT AMOUNT: _____

The Contractor hereby requests final payment in the amount indicated on the above referenced Contract. The Contractor agrees that its acceptance of final payment releases and forever discharges Arlington County and its officers, employees, servants and agents from any and all actions, claims, demands and liability of whatever nature now existing or which may hereafter arise as a result of or in connection with the above referenced Contract.

The Contractor certifies that all of the debts for labor, materials, and equipment incurred in connection with the above referenced Contract have been fully paid.

AUTHORIZED SIGNATURE DATE: _____

The date of Final Acceptance is the date on which the County issues the final payment for the work performed.

COMMONWEALTH OF VIRGINIA

COUNTY OF ARLINGTON

On this the ____ day of _____, 20__, before me, personally appeared _____, who acknowledged himself/herself to be _____ in the above instrument, and that he/she, as such _____, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing his/her name by himself/herself as _____.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

My Commission Expires: _____

VI. INSURANCE REQUIREMENTS

Review this section carefully with your insurance agent or broker prior to submitting a bid or proposal. See the Insurance Checklist (part of the Bid or Proposal Forms) for specific coverages applicable to this Contract. The term "Contract," as used in this section, shall mean the fully executed Agreement covering the work entered into between the County and the Contractor.

1. General

- 1.1 The Contractor shall provide insurance as specified in the Insurance Checklist found on the last page of the bid or proposal form.
- 1.2 The Contract with the Contractor will not be executed by the County until the Contractor has obtained, at its own expense, all of the insurance called for hereunder and such insurance has been approved by the County; additionally, the Contractor shall not allow any subcontractor to start work on any subcontract until all insurance required of the subcontractor has been so obtained and approved by the Contractor. The Contractor shall submit to the County Purchasing Agent copies of all required endorsements and documentation of coverage consistent with the requirements herein or, alternately, at the County's request, certified copies of the required insurance policies in compliance with the insurance requirements. All endorsements and documentation shall state this Contract's number and title.
- 1.3 The Contractor shall require all subcontractors to maintain during the term of this Agreement, Commercial General Liability insurance, Business Automobile Liability insurance, and Workers' Compensation, Employers' Liability insurance, or any other insurance required by the Contract in the same manner and form as specified for the Contractor. The Contractor shall furnish subcontractors' evidence of insurance and copies of endorsements to the County Purchasing Agent immediately upon request by the County and/or prior to the subcontractor's performance of work related to this Contract.
- 1.4 If there is a material change or reduction in coverage, nonrenewal of any insurance coverage or cancellation of any insurance coverage required by this contract, the Contractor shall notify the Purchasing Agent immediately. It is the Contractor's responsibility to notify the County upon receipt of a notice indicating that the policy will not be renewed or will be materially changed. Any policy on which the Contractor has received notification from an insurer that the policy has or will be cancelled or materially changed or reduced must be immediately replaced with another policy consistent with the terms of this Contract and in such a manner that there is no lapse in coverage, and the County immediately notified of the replacement. Not having the required insurance throughout the Contract Term is considered a material breach of this Contract and grounds for termination. The Contractor shall also obtain an endorsement providing to the County thirty (30) days advance notice of cancellation or nonrenewal (ten days for nonpayment of premium). A copy of that endorsement shall be provided to the County Purchasing Agent prior to the execution of this Contract or any Contract extension thereafter.

- 1.5 No acceptance and/or approval of any insurance by the County shall be construed as relieving or excusing the Contractor, any surety, or any bond, from any liability or obligation imposed under this Agreement.
- 1.6 Arlington County, and its officers, elected and appointed officials, employees, and agents are to be named as additional insureds under all coverages except Workers' Compensation, Professional Liability, and Automobile Liability, and the endorsement must clearly identify the County as an additional insured permitted to enjoy all the benefits under the applicable policy of insurance. The certified policy, if requested, must so state coverage afforded under this paragraph shall be primary as respects the County, its officers, elected and appointed officials, agents and employees. The following definition of the term "County" applies to all policies issued under the Contract and to all applicable endorsements:
- "The County Board of Arlington County and any affiliated or subsidiary Board, Authority, Committee, or Independent Agency (including those newly constituted), provided that such affiliated or subsidiary Board, Authority, Committee, or Independent Agency is either a Body Politic created by the County Board of Arlington County, Virginia, or one in which controlling interest is vested in Arlington County; and Arlington County Constitutional Officers."
- 1.7 The Contractor shall be responsible for the work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances, and property of any description used in connection with the work. The Contractor assumes all risks for direct and indirect damage or injury to the property or persons used or employed on or in connection with the Work contracted for, and of all damage or injury to any person or property wherever located, resulting from any action, omission, commission or operation under the Contract, or in connection in any way whatsoever with the contracted work.
- 1.8 The insurance coverage required shall remain in force throughout the Contract Term or as otherwise stated in the Contract Documents or these Insurance Requirements. If the Contractor fails to provide acceptable evidence of current insurance within seven (7) days of written notice at any time during the Contract Term, the County shall have the absolute right to terminate the Contract without any further obligation to the Contractor.
- 1.9 Contractual and other liability insurance provided under this Contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the County from supervising or inspecting the work as to the end result. The Contractor shall assume all on-the-job responsibilities as to the control of persons directly employed by it and of the subcontractors and any persons employed by the subcontractor.
- 1.10 If any policy contains a warranty stating that coverage is null and void (or words to that effect) if the Contractor does not comply with the most stringent regulations governing the work, such policy shall be modified so that coverage shall be afforded in all cases except for the Contractor's willful or intentional noncompliance with applicable government regulations.
- 1.11 All policies shall include the following language: "The insolvency or bankruptcy of the insured or of the insured's estate will not relieve the insurance company of its obligations under this policy."

- 1.12 All policy forms must “Pay on behalf of” rather than “Indemnify” the insured.
- 1.13 Nothing contained in these Insurance Requirements or the Contract Documents shall be construed as creating any contractual relationship between any subcontractor and the County. The Contractor shall be as fully responsible to the County for the acts and omissions of its subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by it.
- 1.14 Precaution shall be exercised by the Contractor at all times for the protection of persons, (including employees) and property. All existing structures, utilities, roads, services, trees and shrubbery shall be protected against damage or interruption of service at all times by the Contractor and its subcontractors during the term of the Contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its work under the Contract.
- 1.15 For any claims related to this work, The Contractor’s insurance shall be deemed primary and non-contributory to all other applicable coverage and in particular with respect to Arlington County, its representatives, officials, employees, and agents. Any insurance or self-insurance maintained by Arlington County shall be excess and noncontributory of the Contractor’s insurance. The Contractor shall waive its right of subrogation for all insurance claims.
- 1.16 If the Contractor does not meet the insurance requirements set forth by the Contract Documents, alternate insurance coverage or self-insurance, satisfactory to the Purchasing Agent, may be considered. Written requests for consideration of alternate coverages including the Contractor’s most recent actuarial report and a copy of its self-insurance resolution to determine the adequacy of the insurance funding must be received by the County Purchasing Agent at least ten (10) working days prior to the date set for receipt of bids or proposals. If the County denies the request for alternate coverages, the specified coverages will be required to be submitted. If the County permits alternate coverage, an amendment to the Insurance Requirements will be prepared and distributed prior to the time and date set for receipt of bids or proposals.
- 1.17 All required insurance coverages must be acquired from insurers authorized to do business in the Commonwealth of Virginia and acceptable to the County. The insurers must also have a policyholders' with a rating of “A-VII” in the latest edition of the A.M. Best Co.’s Insurance Reports, unless the County grants specific approval for an exception, in the same manner as described in 1.16 above.
- 1.18 The Contractor shall be responsible for payment of any deductibles applicable to the coverages.
- 1.19 The Contractor must disclose the amount of any deductible or self-insurance component applicable to the General Liability, Automobile Liability, Professional Liability, Intellectual Property or any other policies, if any. The County reserves the right to request additional information to determine if the Contractor has the financial capacity to meet its obligations under a deductible. Thereafter, at its option, the County may require a lower deductible, funds equal to the deductible be placed in escrow, a certificate of self-insurance, collateral, or other mechanism in the amount of the deductible to ensure additional protection for the County.

2. Contractor's Insurance:

2.1 The Contractor shall purchase the following insurance coverages, including the terms, provisions and limits shown in the Insurance Checklist.

2.1.1 Commercial General Liability - Such Commercial General Liability policy shall include any or all of the following as indicated on the Checklist:

- i. General aggregate limit is to apply per project;
- ii. Premises/Operations;
- iii. Actions of Independent Contractors;
- iv. Products/Completed Operations to be maintained for five (5) years after completion of the Work;
- v. Contractual Liability, including protection for the Contractor from claims arising out of liability assumed under this Contract;
- vi. Personal Injury Liability including, including but not limited to, coverage for offenses related to employment and copyright infringement;
- vii. Explosion, Collapse, or Underground (XCU) hazards.

2.1.2 Business Automobile Liability, including coverage for any owned, hired, or non-owned motor vehicles, Uninsured Motorists coverage, and automobile contractual liability.

2.1.3 Workers' Compensation - statutory benefits as required by Virginia law or the U.S. Longshoremen's and Harbor Workers' Compensation Act, or other laws as required by labor union agreements, including standard Other States coverage; Employers' Liability coverage. The policy shall not contain any provision or definition which would serve to eliminate third party action over claims, including exclusion for bodily injury to an employee of the insured, employees of the premises owner, or employees of the general contractor to which the insured is subcontracted; or employees of the insured's subcontractor.

2.2 The Contractor shall take reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to, its employees on the job, and others. The Contractor shall comply with all applicable provisions of federal, state and municipal safety laws, insurance requirement's, standard industry practices, the requirements of the operations and this contract, the Contractor, directly through its subcontractors, shall effect and properly maintain at all times, as required by the conditions and progress of the work, necessary safeguards for safety and protection of the public, including securing areas, posting danger signs, placarding, labeling or posting other forms of warning against hazards.

3. Commercial General or other Liability Insurance - Claims-made Basis:

3.1 If Commercial General or other liability insurance purchased by the Contractor has been issued on a claims-made basis, the Contractor must comply with the following additional conditions. The limits of liability and the extensions to be included as described in the Insurance Checklist remain the same. The Contractor must either:

- i. Agree to provide insurance, copies of the endorsement and certified documentation evidencing the above coverages and naming the County as an additional insured for a period of five (5) years after final payment under the Contract. Such documentation shall evidence a retroactive date, no later than the beginning of the Contractors or subcontractors' work under this Contract, or
- ii. Purchase an extended (minimum five [5] years) reporting period endorsement for the policy or policies in force during the term of this Contract and evidence the purchase of this extended reporting period endorsement by means of a copy of the endorsement itself. The extended reporting period will begin upon final payment under the Contract.

VII. ATTACHMENTS AND FORMS

ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT

INVITATION TO BID NO.19-200-ITB

B I D F O R M

SUBMIT TWO (2) FULLY-COMPLETED AND SIGNED BID FORMS TO THE OFFICE OF THE BID CLERK, SUITE 511, 2100 CLARENDON BLVD., ARLINGTON, VIRGINIA 22201 (ONE FORM SHALL CONTAIN AN ORIGINAL LONGHAND SIGNATURE; THE OTHER SHALL BE A PHOTOCOPY OF THE SIGNED ORIGINAL)

BIDS WILL BE OPENED AT 3:00 P.M., ON THURSDAY, MAY 14, 2019

FOR PROVIDING MAINTENANCE OF STORM SEWER LINES, STREAMS, CHANNELS AND APPURTENANCES ON AN AS NEEDED BASIS ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, TERMS AND CONDITIONS OF THIS SOLICITATION

SUBMITTED BY:

(legal name of entity)

AUTHORIZED SIGNATURE:

PRINT NAME AND TITLE:

ADDRESS:

CITY/STATE/ZIP:

TELEPHONE NO.:

**E-MAIL
ADDRESS:**

**THIS ENTITY IS INCORPORATED
IN:**

THIS ENTITY IS A:

*(check the applicable
option)*

CORPORATION

LIMITED PARTNERSHIP

GENERAL PARTNERSHIP

UNINCORPORATED ASSOCIATION

LIMITED LIABILITY COMPANY

SOLE PROPRIETORSHIP

**IS BIDDER AUTHORIZED TO TRANSACT BUSINESS IN THE
COMMONWEALTH OF VIRGINIA?**

YES NO

**IDENTIFICATION NO. ISSUED TO THE ENTITY BY THE
SCC:**

Any Bidder exempt from Virginia State Corporation Commission (SCC) authorization requirement must include a statement with its bid explaining why it is not required to be so authorized.

VIRGINIA CONTRACTOR'S LICENSE NUMBER: _____

ENTITY'S DUN & BRADSTREET D-U-N-S NUMBER: *(if available)* _____

IS YOUR FIRM OR ANY OF ITS PRINCIPALS CURRENTLY DEBARRED FROM SUBMITTING BIDS TO ARLINGTON COUNTY, VIRGINIA, OR ANY OTHER STATE OR POLITICAL SUBDIVISION? YES NO

BIDDER STATUS: MINORITY OWNED: WOMAN OWNED: NEITHER:

The undersigned certifies that (Bidder Name) _____ is currently registered with the Virginia State Board of Contractors as required by the Code of Virginia. Certificate Number _____ for a Class _____ License was issued on the _____ day of _____, 20____. The undersigned further certifies that the registration fee and all renewal fees required under law have been paid.

MINIMUM BIDDER QUALIFICATIONS:

- Proof of THREE (3) continuous years of experience with maintenance of storm sewer lines projects. The experience shall be work of similar size and scope.
- Bidders shall provide a list of 3 similar recently completed projects involving work related to the maintenance of storm sewer. For each project, Bidders shall list the following information:
 - Project Name
 - Project description and Bidder's scope of work within the project
 - Project manager's name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost

COMPLETE THE PRICING SHEET PROVIDED WITH THE BID DOCUMENTS AS ATTACHMENT A TO ITB NO. 19-200-ITB AND SUBMIT IT WITH YOUR BID.

FAILURE TO SUBMIT THE PRICING SHEET WITH THE BID WILL DEEM THE BIDDER NONRESPONSIVE.

THE UNDERSIGNED UNDERSTANDS AND ACKNOWLEDGES THE FOLLOWING:

THE OFFICIAL COPY OF THE SOLICITATION DOCUMENTS, WHICH INCLUDES ANY ADDENDA, IS THE ELECTRONIC COPY THAT IS AVAILABLE FROM THE COMMONWEALTH OF VIRGINIA'S eVA WEBSITE AT: [HTTP://WWW.EVA.VIRGINIA.GOV.](http://www.eva.virginia.gov)

POTENTIAL BIDDERS ARE RESPONSIBLE FOR DETERMINING THE ACCURACY AND COMPLETENESS OF ALL SOLICITATION DOCUMENTS THEY RECEIVE FROM ANY SOURCE, INCLUDING THE COUNTY.

The undersigned acknowledges receipt of the following Addenda:

ADDENDUM NO. 1 DATE: _____ INITIAL: _____

ADDENDUM NO. 2 DATE: _____ INITIAL: _____

ADDENDUM NO. 3 DATE: _____ INITIAL: _____

TRADE SECRETS OR PROPRIETARY INFORMATION:

Trade secrets or proprietary information submitted by a Bidder in connection with a procurement transaction will not be subject to public disclosure under the Virginia Freedom of Information Act. Pursuant to Section 4-111 of the Arlington County Purchasing Resolution, however, a Bidder seeking to protect submitted data or materials from disclosure must, before or upon submission of the data or materials, identify the data or materials to be protected and state the reasons why protection is necessary.

Please mark one:

- No, the bid that I have submitted does not contain any trade secrets and/or proprietary information.
- Yes, the bid that I have submitted does contain trade secrets and/or proprietary information.

If Yes, you must clearly identify below the exact data or materials to be protected and list all applicable page numbers, sections, and paragraphs of the bid that contain such data or materials:

State the specific reason(s) why protection is necessary and why the identified information constitutes a trade secret or is proprietary:

If you fail above to identify the data or materials to be protected or to state the reason(s) why protection is necessary, you will not have invoked the protection of Section 4-111 of the Purchasing Resolution.

Accordingly, upon the award of a contract, the bid will be open for public inspection consistent with applicable law.

CERTIFICATION OF NON-COLLUSION: The undersigned certifies that this bid is not the result of or affected by (1) any act of collusion with another person engaged in the same line of business or commerce (as defined in Virginia Code §§ 59.1-68.6 *et seq.*) or (2) any act of fraud punishable under the Virginia Governmental Frauds Act (Virginia Code §§ 18.2-498.1 *et seq.*).

CONTACT PERSON AND MAILING ADDRESS FOR DELIVERY OF NOTICES

Provide the name and address of the person who is designated to receive notices and other communications regarding this solicitation. Refer to the "Notices" section in the draft Contract Terms and Conditions for information regarding delivery of notices.

NAME: _____

ADDRESS: _____

E-MAIL: _____

INSURANCE CHECKLIST

CERTIFICATE OF INSURANCE MUST SHOW ALL COVERAGE AND ENDORSEMENTS MARKED "X".

COVERAGES REQUIRED

COVERAGE MINIMUM(S)

- 1. Workers' Compensation Statutory limits of Virginia
- 2. Employer's Liability \$100,000 accident, \$100,000 disease, \$500,000 disease policy limit
- 3. Commercial General Liability \$1,000,000 CSL BI/PD each occurrence, \$2 Million annual aggregate
- 4. Premises/Operations \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- 5. Automobile Liability \$1 Million BI/PD each accident, Uninsured Motorist
- 6. Owned/Hired/Non-Owned Vehicles \$1 Million BI/PD each accident, Uninsured Motorist
- 7. Independent Contractors \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- 8. Products Liability \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- 9. Completed Operations \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- 10. Contractual Liability (Must be shown on Certificate) \$500,000 CSL BI/PD each occurrence,
\$1 Million annual aggregate
- 11. Personal and Advertising Injury Liability. \$1 Million each offense, \$1 Million annual aggregate
- 12. Umbrella Liability \$1 Million Bodily Injury, Property Damage and Personal Injury
- 13. Per Project Aggregate
- 14. Professional Liability
 - a. Architects and Engineers \$1 Million per occurrence/claim
 - b. Asbestos Removal Liability \$2 Million per occurrence/claim
 - c. Medical Malpractice \$1 Million per occurrence/claim
 - d. Medical Professional Liability \$ Limits as set forth in Virginia Code 8.01.581.15
- 15. Miscellaneous E&O \$1 Million per occurrence/claim
- 16. Motor Carrier Act End. (MCS-90) \$1 Million BI/PD each accident, Uninsured Motorist
- 17. Motor Cargo Insurance
- 18. Garage Liability \$1 Million Bodily Injury, Property Damage per occurrence
- 19. Garagekeepers Liability \$500,000 Comprehensive, \$500,000 Collision
- 20. Inland Marine-Bailee's Insurance \$ _____
- 21. Moving and Rigging Floater Endorsement to CGL
- 22. Crime and Employee Dishonesty Coverage \$ _____
- 23. Builder's Risk Provide Coverage in the full amount of Contract, including any amendments
- 24. XCU Coverage Endorsement to CGL
- 25. USL&H Federal Statutory Limits
- 26. Carrier Rating shall be A.M. Best Co.'s Rating of A-VII or better or equivalent
- 27. Notice of Cancellation, nonrenewal or material change in coverage shall be provided to County at least 30 days prior to action.
- 28. The County shall be an Additional Insured on all policies except Workers Compensation and Auto and Professional Liability.
- 29. Certificate of Insurance shall show Bid Number and Bid Title.
- 30. OTHER INSURANCE REQUIRED: _____

INSURANCE AGENT'S STATEMENT:

I have reviewed the above requirements with the bidder named below and have advised the bidder of required coverages not provided through this agency.

AGENCY NAME: _____

AUTH. SIGNATURE: _____

BIDDER'S STATEMENT:

If awarded the Contract, I will comply with all Contract insurance requirements.

BIDDER NAME: _____

AUTH. SIGNATURE: _____

**ARLINGTON COUNTY, VIRGINIA
INVITATION TO BID NO. 19-200-ITB**

SUPPLEMENTARY SPECIFICATIONS

1. CONSTRUCTION STANDARDS

All work shall conform to the Arlington County Department of Environmental Services' Construction Standards & Specifications, Current Edition, available at:

<http://topics.arlingtonva.us/building/construction-standards-specifications/>

The Contractor shall maintain a copy of the current edition at the time of performing the work at the project site at all times.

2. PROJECT ASSIGNMENTS

Individual projects will be assigned to the Contractor by the Project Officer using a letter of transmittal with project plans attached (if available) or at a field meeting held at the project site. The Project Officer will issue a project assignment transmittal & Notice to Proceed for every project assignment that states the time for completion for each individual assignment. Liquidated damages will be assessed for any work not completed within the timeframe specified in the Notice to Proceed.

If there is any discrepancy between the plans, specifications and the Construction Standards, the requirements of the plans shall prevail over the other documents.

The Contractor shall start work on each assigned project within thirty (30) calendar days of receipt of the letter of transmittal or date of the field meeting, unless the Project Officer approves another date in writing.

Prior to the start of construction, the Contractor shall send to the Project Officer a written cost estimate for the assigned project, using the Contract Unit Prices no later than ten (10) days before start of construction. This estimate will be used to ensure the County allocates sufficient funds to pay for the anticipated quantities at the contract unit prices and the Contractor and the County have the same understanding of the work. The estimate shall not oblige the County to pay the estimate amount - all work shall be compensated for per actual quantities at the contract unit prices.

The Contractor's written estimate shall include the time of completion of the project. The project estimate must be approved by the County Project Officer prior to beginning of any work.

No later than ten (10) days prior to the start of any work, the Contractor shall submit for approval a full description and details of all materials required as specified in the current edition of the Arlington County Department of Environmental Services Construction Standards and Specifications. Subsequent project assignments shall not require submittals of previously approved material, unless new material(s) or a change in materials is proposed.

3. UNLISTED WORK

Unlisted work shall mean work that is not covered by the contract unit prices and is not Emergency Work.

This section shall not cover incidental unit price items not anticipated in the bid. Prices for incidental items shall be agreed to by the County and Contractor and may be made part of this contract by a written amendment signed by both parties.

All work under this section shall require the Contractor submit to the Project Officer a written estimate using the contract hourly rates identified in Section III of the Bid Form. Materials will be furnished by the County, when available. When the Contractor supplies materials, the County will reimburse the Contractor for actual cost of the materials.

4. JOB SIZE LIMITATION

The size of the assigned jobs will vary throughout the Contract Term. No single assignment under this contract may exceed \$275,000.

5. WORK HOURS/OVERTIME

Work hours depend on project sites. The Contractor will be notified about any work hour irregularities and restriction at the time of project assignment.

No overtime pay will be made for any work under this Contract.

6. INVOICING INSTRUCTIONS

The Contractor shall send all original invoices to the Project Officer, copies of the invoices shall be sent to the Maintenance and Engineering supervisors at the following address:

Arlington County
Department of Environmental Services
Water/Sewer/Streets Bureau
4200 28th Street South
Arlington, Virginia 22206

7. CONTRACTOR RESPONSIBILITIES

The Contractor shall provide all labor, equipment, material, barricades and maintenance of traffic for the work assigned, all other items and appurtenances necessary to perform the work and to meet all applicable safety laws and regulations. The Contractor shall be responsible for legal disposal of all excavated material.

8. PROGRESS OF WORK

The Contractor shall start construction within thirty (30) calendar days of the transmittal or field meeting date unless another date is approved by the Project Officer. Failure of the Contractor to meet response time requirements will be considered grounds for termination of the contract.

Allowable calendar days for completion of the work shall be determined on a project by project basis, but in no case shall be more than sixty (60) days per project.

The Contractor's sole relief for any claim for delay which is unreasonable, and caused by the acts and omissions of the County, and due to causes within the County's control shall be the Contractor's direct costs which result from the delay, but only to the extent the Contractor gave the County written notice of such delay and damages at the time they were incurred, and to the extent any damages for delay were actually caused by the County. The Contractor's sole relief on any claims for delay which is reasonable, or not caused by the acts or omissions of the County, or due to causes not within the County's control shall be an extension of the Contract Term. Any claim by the Contractor shall be subject to Virginia Code §11-56.2.C.

9. SCHEDULING OF WORK

Scheduling of work shall be the sole responsibility of the Contractor. No time extensions will be allowed for delay claims because of normal and seasonal weather conditions considered typical for a given month in accordance with the County general conditions as listed in Section IV.

During the performance of the work, the Contractor shall identify the causes for any delays attributable to conditions deemed to be beyond the Contractor's control. These causes shall be identified in terms of operations affected and significant dates that encompass the periods of delay. The Contractor shall submit such information to the County Project Officer within seven (7) calendar days of determining the need for delay, to make an evaluation of the claim for delay.

10. EMERGENCY WORK

Bidders shall enter rates for equipment and labor for emergency work in Section II of the Bid Form. Upon award of the contract, the Contractor shall submit a contact list with names and phone numbers of key personnel to be contacted if emergency work is required. Key personnel must be available 24 hours a day, 7 seven days a week. In an emergency, material used to repair storm sewer lines, streams or channels will be provided, when available, by the County from its Water/Sewer/Streets Warehouse, located at 4202 S. 28th St., Arlington, Virginia 22206. When the Contractor supplies materials, the County shall only reimburse the Contractor for actual cost, without any markup.

Emergency work typically consists of responding to storm sewer line, stream or channel collapses or backups.

The Contractor's key personnel shall respond on site to County's request for emergency work within four (4) hours of receipt of such request, unless otherwise specified in such request. County staff authorized to request emergency work from the Contractor will be identified by the Project Officer at the beginning of the contract term.

The Contractor will be compensated for Emergency Work requested by, and performed to the satisfaction of, the County Project Officer at the contract unit prices and contract rates identified in Section II on the Bid Form. Equipment or labor categories not identified under Section II of the bid form that are necessary for the performance of emergency work shall be compensated for at the Contractor's actual cost, without any markup. If an equipment is owned by the Contractor, the County will pay the

rates set by RS Means Construction Estimating Book/Database. Contractor shall attach the supporting documentation for the actual cost or material or equipment, and for the RS Means-derived rates.

11. OTHER CONTRACTS

The County reserves the right to include items listed in this contract in other bids of the County without any obligation for remuneration to the Contractor for similar or same items contained in this contract. Arlington County intends to solicit separate bids for work covered under this contract which is included as part of another project, for all projects over \$250,000, and for work which requires special bidding provisions (e.g., use of non-County funds).

12. CLEANUP

Before Project Officer's final acceptance of work performed by the Contractor under an assignment, the Contractor shall clean the worksite of all excess material, debris and rubbish and legally dispose of it off-site. The work site shall be left in a neat and orderly condition.

13. CONTRACT PERFORMANCE

The County Project Officer or designee will inspect all Contractor's operations under this contract, and will withhold payment for any work performed which is considered not in accordance with the plans and specifications. Payments withheld for this reason will be released upon receipt of satisfactory evidence (site inspection by County inspector) that the work has been corrected to the County's satisfaction. Inspections by the County Project Officer will occur within fourteen (14) calendar days of completion of work by the Contractor; and any necessary corrections to the work shall be completed by the Contractor within seven (7) calendar days of notice to Contractor at no additional cost to the County. Failure of the Contractor to correct any deficiency within the seven (7) day period shall result in a deduction from the amount of payment due for the work in an amount equal to that portion of the work found deficient. Repeated violations of this provision may result in contract termination.

14. MAINTENANCE OF TRAFFIC

The Contractor shall conduct its operation in a manner that will ensure that traffic will be uninterrupted except as approved by the County. At the close of each work day, the area of work shall be confined to the smallest area possible so that the maximum use of the street will be restored and the hazard to traffic reduced to the minimum. No excavation shall remain open within the roadway without the approval of the County except when the excavation can be safely bridged with the use of steel plates or other materials acceptable to the County. When areas of excavation outside of the roadway do remain open, the area shall be barricaded and warning signs shall be posted.

At all times the Contractor shall use the personnel and traffic control signs and devices necessary to comply with Part VI of the "National Manual on Uniform Traffic Control Devices." During the progress of the work when the street may be obstructed to any extent by construction equipment or construction operations, in addition to the signs and barricades, special workers equipped with orange flags shall be designated by the Contractor to direct traffic. These workers so designated shall not be assigned to any other duties while engaged in directing traffic. The Contractor has sole responsibility for ensuring that its operations are conducted in a safe manner and notwithstanding any other provision to the contrary, shall fully indemnify Arlington County, its officers, agents and employees for any damage or injury related to traffic operations which is caused by negligent or otherwise improper or deficient

performance under the Contract or nonperformance of the terms of the Contract. All personnel, signs, barricades and any other items necessary for the maintenance of traffic and safety shall be provided by the Contractor. The cost of maintenance of traffic is considered incidental to the work performed and no separate payment shall be made by the County for this work. All costs of this work shall be included by the Contractor as part of the Contract unit prices.

The Contractor shall obtain a Traffic Control permit from Arlington County's Department of Environmental Services, Transportation Division (703-228-3575) for each individual project prior to the start of work. All fees for the permit will be waived by Arlington County. The plan for the maintenance of traffic for each project shall be as specified in the approved Traffic Control permit.

15. RESPONSIBILITY

The County's review or acceptance of Subcontractors shall not relieve the Contractor of any of its responsibilities, duties and liabilities hereunder. The Contractor shall be solely responsible to the County for the acts, defaults, or omissions of its Subcontractors and of his Subcontractors' officers, authorized representatives and employees. Nothing contained in the contract documents shall be construed to create any contractual relationship between any Subcontractor and the County.

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT**

INVITATION TO BID NO. 19-200-ITB

ADDENDUM A

Arlington County Invitation to Bid No. **19-200-ITB** for **On-Call Sewer Maintenance and Repair** is amended as follows:

- Due to the large number of questions received in response to the solicitation, bid due date is postponed until **Tuesday, May 28, at 3:00pm**. Questions will be answered in a subsequent Addendum to this solicitation.

Igor Scherbakov
Procurement Officer
ischerbakov@arlingtonva.us

RETURN THIS PAGE, FULLY COMPLETED AND SIGNED, WITH YOUR BID:

RECEIPT OF ADDENDUM A IS ACKNOWLEDGED.

FIRM NAME: _____

AUTHORIZED SIGNATURE: _____ **DATE:** _____

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT**

INVITATION TO BID NO. 19-200-ITB

ADDENDUM B

Arlington County Invitation to Bid No. **19-200-ITB** for **On-Call Sewer Maintenance and Repair** is amended as follows:

- I. Standards and Specifications document has been uploaded to eVA
- II. Arlington County DES Standard Details document has been uploaded to eVA
- III. Revised ATTACHMENT A - PRICING SHEET and uploaded to eVA
- IV. Invitation to Bid, Section II Arlington Agreement Terms and Conditions, paragraph 2 "Scope of work" deleted and removed in its entirety and replaced with the following:

"The Contractor shall furnish all labor, materials, and equipment for the maintenance of storm sewer lines, streams, channels and appurtenances on an as-needed basis (the "Project") and all other work shown, described and required in the Contract Documents (hereinafter "the Work"). The Work shall be performed according to the standards established by the Contract Documents read together as a single specification. It shall be the obligation of the Contractor to obtain clarification from the Project Officer concerning any questions about or conflicts in the specifications, drawings and construction notes in a timely way so as not to delay the progress of the Work. The Contract Documents set forth the minimum Work estimated by the County and the Contractor to be necessary to complete the Work. It shall be the Contractor's responsibility, at solely the Contractor's cost, to provide sufficient services to fulfill the purposes of the Work. Nothing in the Contract Documents shall be construed to limit the Contractor's responsibility to manage the details and execution of its Work"

- V. The following questions have been received:
 1. The Bid Description describes the Work as Storm Sewer Lines, Streams ect. Should the contractor anticipate having to utilize bypass pumping to install any of this work? If so will the county add pay items or a change order to the Task Order for the pumping / bypass work?
 - **If bypass pumping is needed it will be paid under Unlisted Items by an hourly rate.**
 2. Items 1 through 27 (15" – 48" RCP) are they to be installed per Arlington Standards (#57 Stone Bedding with Compacted Backfill) or VDOT Standards (#25 Stone Bedding with Compacted Backfill)?
 - **Per Arlington Standards, unless work is being performed in a VDOT ROW.**
 3. Items 28 through 42 (15" – 36" HDPE) are they to be installed per Arlington Standards (#57 Stone Bedding under pipe and 2" up the side with Compacted Backfill) or VDOT Standards (Stone Bedding with Compacted Stone 1' above the pipe and then Compacted Backfill)
 - **Per Arlington Standards, unless work is being performed in a VDOT ROW.**

4. Items 43 through 69 (15" – 36" HP) are they to be installed per Arlington Standards (#57 Stone Bedding under pipe and 2" up the side with Compacted Backfill) or VDOT Standards (Stone Bedding with Compacted Stone 1' above the pipe and then Compacted Backfill)
 - Per Arlington Standards, unless work is being performed in a VDOT ROW.
5. Items 1 through 69 If field conditions do not allow for use of the compacted fill from the original trench to be utilized (ie bad materials or in VDOT ROW) will the contractor be compensated for the select fill utilizing Item 135?
 - Yes, or Item #128, or a combination of both, whichever is applicable on-site.
6. Is CCTV Inspection of installed Storm Drainage lines a requirement of this contract? If so how will the contractor be compensated for this work?
 - It is not a requirement for this contract.
7. If the Storm Pipes Fall within the Existing Roadway, will the county be paying for the saw cutting under item 145?
 - Correct.
8. How is Asphalt Demolition being paid for on this contract?
 - Incidental to the pipe or structure to be installed.
9. How is Regular Excavation / Grading being paid for on this contract?
 - Incidental to the pipe or structure to be installed.
10. How is the Depth to be determined by the County? (ie, is it being measure from invert to top of ground? From Top of Pipe to top of ground? Ect)
 - From invert to top of the ground.
11. Will the County Add a Mobilization Pay item to the contract like the previous On-Call contract issued before this one?
 - No mobilization pay item will be added.
12. Will the County Add a SWPPP Pay Item to the contract like the previous On-Call contracts issued before this one?
 - No SWPPP pay item to be included.
 - There is already a line item for Silt Fence if needed and inlet protection.
13. Please Provide a Trench Detail with the backfill requirements for Items 71-76 (PVC Drains / Underdrains).
 - Refer to Arlington County Construction Standard Detail S-4.0 for a general example of backfill over a PVC pipe.
14. Will the County specify the depth range for 71-76 as they have with other pipe line items?
 - No
15. Items 71 through 76 If field conditions do not allow for use of the compacted fill from the original trench to be utilized (ie bad materials or in VDOT ROW) will the contractor be compensated for the select fill utilizing Item 135?
 - Yes, or Item #128, or a combination of both, whichever is applicable on-site.
16. If the PVC Pipes Fall within the Existing Roadway, will the county be paying for the saw cutting under item 145?
 - Correct.
17. Please verify the intended with for Items 86-93. Should the contractor be anticipating any inlets beyond the standard width?
 - Most should be standard. In occasions, modifications could be necessary.
18. Please Provide a detail and specifications for item 99, Driveway Grate.
 - Refer to Arlington County Construction Standard Detail D-1.12.
19. Please clarify what the use of item 114 is for. Please provide a specification and measurement payment for this item.
 - Miscellaneous concrete in Cubic Yards.

20. Items 116 through 119 Are Rip Rap Items Paid for in SY. What are the depth requirements for the rip rap?
 - Refer to Arlington County Construction Standards & Specification, Section 02210.
21. Please confirm all asphalt patching work required for trench restoration (temporary and permanent) will be compensated under items 134-138 and is not incidental to any other line items.
 - Correct.
22. Item 146 please specify the depth requirements for the topsoil.
 - Refer to Arlington County Construction Standards & Specification, Section 02801.
23. Is Topsoil Required for Item 147? If so please specify the depth requirements for the topsoil.
 - Yes. Refer to Arlington County Construction Standards & Specification, Section 02801.
24. For Item 148, the County has Three Adjustment Details (A,B,C). Please specify which type of adjustments this pay item covers.
 - It could be for any of the three (3) types of adjustments. Provide a cost that will cover any of the adjustments needed.
25. Please Provide a Trench Detail with the backfill requirements for Items 151-152 (Laterals / Cleanouts).
 - Refer to Arlington County Construction Standard Detail S-4.0 for a general example of backfill over a PVC pipe.
26. Will the County specify the depth range for 151-152 as they have with other pipe line items?
 - Yes.
27. Items 151 & 152 If field conditions do not allow for use of the compacted fill from the original trench to be utilized (ie bad materials or in VDOT ROW) will the contractor be compensated for the select fill utilizing Item 135?
 - Yes, or Item #128, or a combination of both, whichever is applicable on-site.
28. If the Lateral Pipes Fall within the Existing Roadway, will the county be paying for the saw cutting under item 145?
 - Yes
29. Item 154 Appears Redundant as you have the Same Pay Items when Adding Item 161 and 162. Please Consider Removing the Redundant Item(s)
 - Item to remain.
30. Please Verify That Items 162 through 169 are not to include the Equipment Operator and is for the Equipment only and the Equipment Operator will be paid for under item 161.
 - Correct.
31. Item 165 (Track Excavator) Appears Redundant as you three Pay Items for Excavator with Operators (Items 182-184). Please Consider Removing the Redundant Item(s)
 - Item to remain.
32. Item 172 (Steel Plates) Appears Redundant as you two Pay Items for Steel Plates (Items 192-193). Please Consider Removing the Redundant Item(s)
 - Item 172 to be removed from Bid Table.
33. Item 173 (Excavation Trench Box) Appear Redundant as you have five pay items for Trench Boxes (Items 187 – 191). Please Consider removing the redundant item(s)
 - Item 173 to be removed from Bid Table.
34. Please Verify That Item 186 is not to include the Equipment Operator and is for the Equipment only and the Equipment Operator will be paid for under item 161.
 - Correct. Item 186 is for equipment only.
35. Item 206 (Track Excavator) Appears Redundant as you three Pay Items for Excavator with Operators (Items 223-225). Please Consider Removing the Redundant Item(s)
 - Item to remain.

36. Item 213 (Steel Plates) Appears Redundant as you two Pay Items for Steel Plates (Items 233-234). Please Consider Removing the Redundant Item(s)
- Item 213 to be removed from Bid Table.
37. Item 214 (Excavation Trench Box) Appear Redundant as you have five pay items for Trench Boxes (Items 228-232). Please Consider removing the redundant item(s)
- Item 214 to be removed from Bid Table.
38. Is the Traffic Control Item Provided (175 + 216) for all line items, or is this item specifically for the T&M Section of the work? If For only the T&M Section Will the County Add a Traffic Control item to the contract like the previous On-Call contract(s) issued before this one?
- Items 175 and Item 216 are only to be used under Emergency Work and unlisted Work.
 - For Section I-Storm Sewer Work, traffic control is to be provided by the Contractor as specified in the “Supplementary Specifications” under Maintenance of Traffic. An item for traffic control will not be added.
39. The County did not provide any specifications or measurement and payment specifications. Please provide for the items in the contract
- ArlCounty Construction Standard Details and ArlCounty Constructions Specifications will be attached.
40. Item 168 is for a Trench Compactor. What size or classification is Arlington Looking for here. Ex. Jumping Jack or Walk Behind Trench Roller? Please clarify as cost varies greatly.
- As necessary, to comply with Arlington County Construction Standards & Specification, Section 02200.
41. Item 174 and 185 are redundant items. Please consider removing one from the bid form.
- Item 185 to be removed from Bid Table.
42. Item 184 is for a Full Size excavator Ranging from 10 ton to 90 ton. The 90 Ton limit is an excessive request for this type of project and is for wide open job with a lot of room to maneuver which this contract does not appear to based on the descriptions. Please consider taking this high end range to 40 tons or less on the high end requirement.
- Item 184 to remain with the up to 90 tons requirements. This line item is not to be used regularly, but it needs to remain as it is, since we’ve had some occasions in which it was necessary to be used due to the location and the scope.
43. Item 209 is for a Trench Compactor. What size or classification is Arlington Looking for here. Ex. Jumping Jack or Walk Behind Trench Roller? Please clarify as cost varies greatly.
- As necessary, to comply with Arlington County Construction Standards & Specification, Section 02200.
44. Item 215 and 226 are redundant items. Please consider removing one from the bid form.
- Item 226 to be removed from Bid Table.
45. Item 225 is for a Full Size excavator Ranging from 10 ton to 90 ton. The 90 Ton limit is an excessive request for this type of project and is for wide open job with a lot of room to maneuver which this contract does not appear to based on the descriptions. Please consider taking this high end range to 40 tons or less on the high end requirement.
-
46. What is the depth to consider for bid Items 74 through 85, 110 through 113, 151, 152?
- Variable.
47. - Please provide standard details for grates and frames to be used in this project.
- Refer to Arlington County Standard Detail.
48. - What are the dimensions for Imbricated Riprap (bid item 120)?

- Variable, as needed.
49. - What is the depth for Rip Rap CL I, II, III (Items 116 through 123)?
- Variable, as needed.
50. - Please provide cross section, material and depth for saw cut (bid item 145).
- No cross section to provide. This line item is for saw cut on asphalt or concrete for excavation related to storm sewer maintenance.
51. - What is the project duration? Please clarify/confirm.
- This bid is not for a single project. It is to provide on-call service to the County's storm sewer system as requested. The Contract is for up to 5 years, with annual renewals.
52. - What is the cost range for this ITB?
- Work is provided as "Task Orders" and they could have a cost range between the hundreds up to a maximum of \$275,000.00.
53. - Is there an MBE/DBE requirement for this project?
- Not applicable.
54. - Are there any minimum wage rates to be used in this project? If affirmative, please provide them.
- Not applicable.
55. - How are you planning to pay for mobilizations?
- There is no separate payment for mobilization.
56. - Who is responsible for doing the stakeout in this project? Under which item is this going to get paid for? Are as-builts required for this project?
- If needed, it will be scheduled to be done by the County's Surveying Group and cut-sheets would be provided.
 - When a Task Order is completed, Contractor will need to submit an as-built (red-line drawing) with the invoice.
57. - Is the General Contractor required to perform a minimum amount of work with its own forces for this project?
- There is no minimum requirement.
58. - How many work orders do you expect to issue per month and per year?
- There is not a fixed or guaranteed amount.
 - For general knowledge, the last 5 year Contract had approximately 100 task orders assigned in a range of 12 to 30 per year.
59. - Is there a minimum dollar amount per work order?
- No minimum.
60. - Is there any clearing and grubbing? How are you planning to pay for it?
- Not usually part of a task order scope. If a tree or stump needs to be removed, we usually coordinate with another County Department or a specialized Contractor.

61. - Do you expect any work to be performed during nighttime? What percentage?

➤ No scheduled work to be performed at night, unless is an emergency.

62. - Are there any liquidated damages for this ITB?

➤ No

63. - Are there any working hour restrictions for this ITB?

➤ Variable per task order and/or location. Regular working hours in the County’s Right-of Way are from 7am to 5:30 pm. If working on VDOT ROW, VDOT working hour restrictions will apply.

64. - Who is responsible for traffic control? How do you plan to pay for it?

➤ If it is not under Emergency Work or Unlisted Work, it shall be covered by Contractor as specified in the “Supplementary Specifications” under Maintenance of Traffic.

65. - Are the contract documents listed on ITB page 13 correct?

➤ Yes

66. - Is the scope of the project listed on ITB page 13 correct?

➤ No, see correction in the Addendum B above.

Igor Scherbakov
Procurement Officer
ischerbakov@arlingtonva.us

RETURN THIS PAGE, FULLY COMPLETED AND SIGNED, WITH YOUR BID:

RECEIPT OF ADDENDUM B IS ACKNOWLEDGED.

FIRM NAME: _____

AUTHORIZED SIGNATURE: _____ **DATE:** _____

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT**

INVITATION TO BID NO. 19-200-ITB

ADDENDUM C

Arlington County Invitation to Bid No. **19-200-ITB** for **On-Call Sewer Maintenance and Repair** is amended as follows:

- Bid due date is postponed until **Friday, May 31, at 2:00pm.**
- Uploaded the revised Pricing sheet that contains built-in formulas for calculation for the Bid Grand Total price.
- The following questions have been received:
 1. There are numerous bid items that indicate '(DEPTH>10') or (OVER 6' DEPTH). There is no way to price them without knowing the limits or maximum depth. Please provide them and revise your bid schedule.

Response: An average depth when storm sewer is found above 10ft is approximately 12ft. In some occasions storm sewer has been found as deep as almost 20', but this is not usual. The bid table will not be revised.
 2. What is the maximum depth to consider for bid Items 75 through 85, 110 through 113, 151, 152?. Please provide a range or maximum depth to bid on them.

Response: For Items 75-85 and items 110-113 variables depths in a range to >10' can be assumed. The same note as above would apply: "An average depth when storm sewer is found above 10ft is approximately 12ft. In some occasions storm sewer has been found as deep as almost 20', but this is not usual". For 151 and 152 an average range would be 3 to 5 feet.
 3. Please provide standard details for grates and frames to be used in this project.

Response: Refer to Arlington County Construction Standard Details.
 4. What are the dimensions (minimum/maximum) for Imbricated Riprap (bid item 120)?

Response: Variable, as needed on-site
 5. What is the depth for Rip Rap CL I, II, III (Items 116 through 119)? Please provide a range or maximum depth to bid on them.

Response: Variable, as needed on-site.
 6. Please provide maximum depth to saw cut (bid item 145).

Response: The depth for saw cut is variable. Assume for asphalt an average thickness of 7 to 8 inches and for concrete an average thickness of 4 to 6 inches. Whatever is

necessary to avoid damaging the asphalt or concrete surface around the location of the trench/excavation.

7. Please provide geotechnical report/soil borings for the sites to bid in this project or what kind of soils can we assume in all work orders?

Response: We cannot provide soil reports, since this is not project based. Assume typical soil for the region.

8. Is there any rock excavation? How are you going to pay for it?

Response: Rock Excavation is unusual. If encountered, it shall be paid under line items in Section III- Unlisted Work.

The balance of the solicitation remains unchanged.

Igor Scherbakov
Procurement Officer
ischerbakov@arlingtonva.us

RETURN THIS PAGE, FULLY COMPLETED AND SIGNED, WITH YOUR BID:

RECEIPT OF ADDENDUM A IS ACKNOWLEDGED.

FIRM NAME: _____
AUTHORIZED
SIGNATURE: _____ **DATE:** _____

EXHIBIT B

ARLINGTON COUNTY
CONSTRUCTION STANDARDS & SPECIFICATIONS
TABLE OF CONTENTS

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01300	Submittals
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02200	Earthwork
02202	Rock Excavation
02210	Riprap
02211	Gabions
02300	Pile Foundations – Timbers
02350	Cofferdams
02400	Sheeting, Shoring and Bracing
02500	Gravity Sewers and Appurtenances
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02515	Televised Inspection of Sewers
02550	Water Mains and Appurtenances
02600	Bituminous Roadway Pavements
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02612	Interlocking Concrete and Brick Pavers
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03400	Precast Concrete

DIVISION 4 – MASONRY

04100	Mortar and Grout
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STANDARD DETAILS

M. MISCELLANEOUS STANDARDS

R. ROADWAY STANDARDS

D. STORM DRAIN STANDARDS

W. WATER MAIN STANDARDS

S. SANITARY SEWER STANDARDS

REVISIONS

Revision	Description	Date
1	Removed Details R-2.3, R-2.3B St 1of2, R-2.3B 2of3, R-2.3C 1of2, R-2.3C 2of2 and replaced with Details DW-1.0, DW-1.1, DW-2.0, DW-2.0 2of2, DW-2.1 1of2, DW-2.1 2of2, DW-2.2 1of2, DW-2.2 2of2, DW-2.3, DW-2.4, DW-2.5	5/13/2010
2	Removed the General Conditions, Sections 01100, 02110, 02201, 16550 & 16680. Removed Details R-5.1, R-5.1A, R-5.2, R-5.3, R-5.4, R-5.5A, R-5.5B, R-5.6A, R5.6B, R-5.3C, R-5.7, R-5.8, R-5.9, R-5.9A & R-5.9B Modified Sections 01000, 01300, 01400, 01500, 02100 & 02200. Updated the Table of Contents	02/17/2012
3	<p>Revised: 01400 (Testing), 02400 (Sheeting, Shoring, & Bracing), 02505 (Storm Sewers & Appurtenances), 02510 (Sanitary Sewers & Appurtenances), 02550 (Water Mains & Appurtenances);</p> <p>Created: 02500 (Gravity Sewers & Appurtenances), 02515 (Televised Inspection of Sewers);</p> <p>Revised Standards: M-3.0 (Pipe & Bedding Details), D-1.7 (Catch Basin w/ Grate Top), D-3.2, Storm Sewer Manhole w/ Grate Cover), W-8.1 and W-8.2 (Water Service Connections), W-9.3 through W-9.6 (Water Meter Installation), W-10.0 (Water Meter Fact Sheet)</p> <p>Created Standard: R-2.9 (Concrete Valley Gutter), R-8.1 (Bike Rack Layout)</p> <p>Eliminated Standards: R-7.0 through 7.9C and renamed R-7.9C (Continuous Soil Panel) to R-7.0, D-1.0 (Concrete Pipe Crushing Strength), D-5.0 through D-5.2,</p> <p>Renamed the DW- (Driveway) series of standards as R-2.3 and R-2.4(A-C);</p>	9/30/13

SECTION 01000 - GENERAL PROVISIONS AND REQUIREMENTS1. Purpose of Section

This section outlines the general provisions and requirements common to these standard specifications and details. This section includes definitions and abbreviations used throughout the specifications and details. All references in this section shall apply to the entirety of these Specifications unless, and except as, explicitly modified in specific sections.

2. Definitions

Wherever used in these Standards and Specifications, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

BUSINESS DAY – Any day that the County is open for general business.

CALENDAR DAY - Any day of twenty-four hours measured from midnight to the next midnight. Included are weekends and holidays. Where these Specifications do not clarify or distinguish between Calendar Day and Business Day, the reference shall be assumed to indicate a Calendar Day.

CONTRACT - The written agreement (including all attachments and amendments thereto) between OWNER and CONTRACTOR covering the work to be performed.

CONTRACT DOCUMENTS – The collection of documents which as a whole comprise the requirements of the Contract or Permit, including any amendments or addendums.

CONTRACT DRAWINGS – The drawings which show the locations, character, dimensions, and details of the Work to be performed under the Contract.

CONTRACTOR – The individual, partnership, firm, corporation, limited liability company, joint venture, or other person or entity contracting with the County for performance of prescribed work or holding a PERMIT for work to which these specifications apply.

COUNTY – See OWNER

ENGINEER – The Director, Department of Environmental Service, Arlington County, or designee.

OWNER – The County of Arlington, Virginia, for whom the work is to be performed.

PERMIT – Written authorization from the Engineer or other authorizing agency, where applicable, to perform the stipulated work.

PROJECT – The entire construction to be performed as provided in the Contract Documents, Permit, or other relevant construction plans or documents.

PROJECT OFFICER – See ENGINEER

PROVIDE – Indicates “provide complete and in place”, that is to “furnish and install”.

ROADWAY- The portion of the right of way used for vehicular, and/or pedestrian travel.

SHOP DRAWING – Fabrications, erection and setting drawings, manufacturer’s standard drawings, schedules, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, and all other descriptive data pertaining to the materials and equipment as required to demonstrate compliance with the contract or permit requirements.

SUBCONTRACTOR – Those who have a direct contract with the Contractor or other Subcontractor to perform Work or furnish material worked to a special design according to the Contract Documents. However, the term shall not include those who merely furnish material not so worked.

SUBMITTAL – Any data required by the Contract Documents to be submitted to the Engineer at any point prior to continuing Work. By way of illustration, Submittals would include, but not be limited to: construction schedules, shop drawings, equipment specifications, material samples, and subcontractor or supplier lists.

SUPPLIER - Any person or organization who supplies materials or equipments for the work (including that fabricated to a special design), but who does not perform labor at the site.

WORK – The labor, equipment, materials, and all appurtenant items and actions necessary to satisfy the requirements and intent of the contract or permit.

3. Abbreviations

The following is a list of abbreviations used within the technical specifications. The appropriate designation shall refer to the latest edition or update published by that organization:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standard Institute
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association

NFPA	National Fire Protection Association
NFPA	National Forest Products Association
OSHA	Occupational Safety and Health Administration
SSPC	Steel Structures Painting Council
VDOT	Virginia Department of Transportation
WRI	Wire Reinforcement Institute

4. Technical Terms

Materials or work described in words which, so applied, have a well-known technical or trade meaning shall be construed to refer to the technical or trade meaning.

5. Reference to Standards or Specifications

Any material specified by reference to the number, symbol, or title of a specific standard, such as a Commercial Standard, a Federal Specification, a Trade Association Standard, or other similar standard, shall comply with the requirements in the latest revision of the standards or specification and any amendment, or supplement, except as limited to type, class or grade, or as modified in such reference. The standard referred to, except as modified in the contract documents, shall have full force and effect as though printed in the Specifications.

Reference to any article, device, product, material, fixture, form or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable, as determined by the Engineer.

6. Applicable Specifications

The following specifications are incorporated into these standards and specifications by reference. Where the provisions of the referenced specifications conflict with this document, this document shall govern.

- Arlington County Traffic Signal & Streetlight Specifications
- “Manual on Uniform Traffic Control Devices for Streets and Highways” U.S. Department of Transportation, Federal Highway Administration.
- The Arlington County Code
- VDOT Road and Bridge Specifications

7. Applicable Ordinances for Environmental Services and Building Construction

The Contractor or permit holder is responsible for familiarizing himself with the Arlington County Code

prior to commencing with any construction. The following codes, in particular, relate to the Environmental Services and building industry:

Chapter 1	General Provisions
Chapter 3	Building Code
Chapter 7	Electrical Code
Chapter 8	Fire Prevention
Chapter 10	Garbage, Refuse and Weeds
Chapter 11	Licenses
Chapter 14	Motor Vehicles and Traffic
Chapter 15	Noise Control
Chapter 18	Plumbing and Gas Codes
Chapter 22	Street Development and Construction
Chapter 23	Subdivisions
Chapter 26	Utilities
Chapter 48	Flood Plain Management
Chapter 55	Underground Utilities Protection
Chapter 57	Erosion and Sediment Control
Chapter 60	Storm water Detention

8. Use of Virginia Department of Transportation Specifications

Virginia Department of Transportation, Road and Bridge Specifications, latest edition, technical specifications only, shall apply and become a part of these specifications whenever these specifications do not adequately cover the work to be done. In the event there is a conflict between these specifications and VDOT Specifications these specifications shall govern.

9. Infeasibility of Specifications

In the event that the Contractor determines that any aspects of the Specifications are infeasible, the Contractor is obligated to immediately notify the Engineer of such infeasibility. If the Engineer agrees

that any aspect of the Specifications are in fact rendered infeasible, such determination shall in no way invalidate or otherwise revoke the remainder of the Specifications.

10. Inspection of the Work

The Engineer and representatives of any public authority or public entity shall, at all times, have access to and from the work site during preparation or progress of the work. The Contractor shall provide suitable facilities for such access and for proper observation of the Work and shall conduct all special tests required by the Contract Documents, the Engineer's instructions, and any laws, ordinances, or regulations of any public entity applicable to the Work.

11. Removal and Disposal of Obstructions

Unless instructed otherwise, the Contractor shall remove existing structures, materials and obstructions, whether explicitly identified in the contract documents or not, which interfere with the new construction at no expense to the County. If such structure, material, or obstruction is unanticipated by the Contract Drawings, the Contractor shall notify the Project Officer prior to disturbance. Structures, materials, artifacts, relics, and other obstructions found on the work site shall be the property of the County. Structures and materials not desired by the County will become the property of the Contractor and shall be disposed of by the Contractor in accordance with all applicable State, Federal, and local regulations. Disposal of such items shall be at no additional expense to the County.

12. Work Site Conditions

The work site shall be kept and maintained by the Contractor in a neat, orderly, and workmanlike appearance at all times. The Contractor shall remove and legally dispose of, as frequently as necessary, all refuse, rubbish, scrap materials and debris generated at the site. At the completion of the work, but before final acceptance by the Engineer, the Contractor shall remove and legally dispose of all surplus materials, false work, temporary structures (including foundations thereof), and debris of every nature resulting from the contractors operations or any activity associated with the work, and restore the site to a neat, orderly condition. If the Contractor, at any time, fails to maintain the site in a neat, orderly, and workmanlike condition, the County shall have the right, upon 24 hours notification, to remove and dispose of such surplus materials, false work, temporary structures, and debris, and put the site in a neat and orderly condition at the Contractor's expense.

13. Public Convenience

At all times, work shall be conducted so as to ensure the least possible obstruction to traffic and inconvenience to the general public and the properties and residents in the vicinity of the work. No road or street shall be closed to the public except with the specific written permission of the Engineer and the proper governmental authorities. Fire hydrants on or adjacent to the work site shall be kept in operating condition and accessible to firefighting equipment at all times, unless explicitly permitted by the Engineer. Temporary provisions shall be made and provided by the Contractor to ensure the continued use of sidewalks, trails, and transit facilities compliant with all applicable ADA and other regulations.

14. Protection of Work and Property

- a. The Contractor shall continuously maintain protection of all its Work from damage and shall protect all public and private property from injury or loss arising in connection with this Work. The Contractor shall make good any such damage, injury, or loss, except such as may be caused by agents or employees of the County.
- b. The Contractor shall not place upon the Work, or any part thereof, any loads which are not consistent with the safety of that portion of the Work.
- c. The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, etc., except those to be removed or abandoned in place and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. Any damage which occurs by reason of the operations under this Work shall be completely repaired by the Contractor at the Contractor's expense.
- d. The Contractor shall shore, brace, underpin, secure, and protect, as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site that may be affected in any way by excavations or other operations connected with the work embraced in this Work. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owned or other party before commencement of any work. The Contractor shall indemnify and save the County harmless from any damages on account of settlements or loss of all damages for which the County may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- e. In an emergency affecting the safety of life or of the work, or of adjoining property, the Contractor, without special instruction or authorization from the Engineer or County, is hereby permitted to act, at the Contractor's discretion, to prevent such threatened loss or injury, and the Contractor shall so act without appeal, if so instructed or authorized.

15. Accident Prevention

The Contractor shall exercise proper precaution, at all times, for the protection of persons and property and shall be responsible for all damages to persons and property either on or off the site, which occur as a result of the Contractor's performance of the work. The Contractor shall observe the safety provisions of all applicable laws, including those of the Occupational Safety and Health Administration, and building and construction codes. The Contractor shall take or ensure that such additional safety and health measures are taken as the County may determine to be reasonably necessary. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention" published by the Associated General Contractors of America, Inc. to the extent that such provisions are not in conflict with applicable local laws. The Contractor shall follow the "Rules and Regulations Governing Construction, Demolition, and all Excavation" as adopted by the Safety Codes Commission of Virginia, 1966, or latest edition, covering requirements for shoring, bracing, and sheet piling of trench excavations.

16. Permission to Work on Highways and Across Utilities

When construction shall proceed to cross highways, railroads, or utilities under the jurisdiction of the State, County, or other public agency, public utility, or private entity, the Contractor shall secure written permission, where necessary, from the proper authority before executing such new construction. A copy of such written permission must be filed with the County before any work is started. The Contractor shall furnish to the Engineer a release from the proper authority before final acceptance of the work.

17. Adjacent Work

In case of a dispute arising between two or more contractors engaged on adjacent work as to the respective rights of each under these specifications, the Engineer shall determine the rights of the parties. The Engineer's decision shall be final and binding on the parties concerned.

18. Connecting Work

The Contractor shall do all cutting, fitting, patching, digging, and other necessary preparations that may be required to make several parts of the work fit properly and/or to receive or be received by the work of other Contractors as shown upon or reasonably implied by the Construction Documents and as directed by the Engineer. The Contractor shall not endanger the integrity of or adversely affect any work by such cutting, fitting, patching, or other preparations. The Contractor shall not alter the work of any other Contractor except with the written consent of the Engineer.

SECTION 01300 SUBMITTALS AND SUBSTITUTIONS1. Purpose of Section

This section outlines the requirements for submitting and processing the construction schedule, substitutions, shop drawings, samples, and other data which are required for the Engineer's review for conformance with the standards, specifications and contract documents.

2. Related Requirements Specified Elsewhere

Section 01000 - General Provisions and Requirements

Section 01400 - Testing

3. Submittals – General Requirements

- a. The Contractor or permit holder shall not begin work which requires the submission of other data, until said submittals are returned with the Engineer's initials or signature indicating review and acceptance.
- b. After any Submittal has been reviewed by the Engineer, no change will be considered unless satisfactory evidence is presented to prove that the approved Submittal cannot be obtained or that such change is in the County's best interest.
- c. All submittals shall be made so as to cause no delay in the project, allowing reasonable time for review and checking by the Engineer. Except as specified otherwise, all submittals shall be submitted at least ten (10) Business Days before the start of the affected work.
- d. Submittals shall be accompanied by all required certifications and other such supporting materials and in such sequence or in such groups that all related items may be checked together.
- e. When Submittals cannot be adequately reviewed because a submission is incomplete, does not include all necessary appurtenant submittals, has been submitted out of sequence, is illegible, or for any other reason, the Submittal will be returned by the Engineer without action, or will be held until such materials as are necessary are received. Incomplete or defective submissions as described above shall not be considered to have been submitted.
- f. Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for approval. If the submittals indicate variations from the Contract Documents because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal such that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility of executing the work in accordance with the Contract Documents, even if the Submittal was approved.
- g. The Engineer shall review the submittals with reasonable promptness. Review and/or approval of submittals will be general for conformance with the design concept of the project

and compliance with the information given in the Contract Documents. Approval shall not be construed as permitting any departure from Contract requirements, as authorization of any increase in price, as verification of quantities or field conditions, nor as relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise that may exist.

- h. The Contractor shall be responsible for the detailed accuracy of the submittals. Deviations in submittals from the requirements of the Contract Documents or the construction standards shall not be relieved unless the Engineer specifically accepts deviations named in writing by the Contractor.
- i. Unless otherwise specified, submit three copies of all submittals.
- j. Accompany submittals with a transmittal letter containing the following information:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's and supplier's name and address
 - 4. The number of each shop drawing, product data and sample submitted.
 - 5. Identification of product or material
 - 6. Relation to adjacent structure or material
 - 7. Field dimensions, clearly identified as such
 - 8. Applicable specification section number
 - 9. Applicable standards, such as ASTM number or VDOT specifications.
 - 10. Identification of deviations from Contract Documents
 - 11. Contractor's stamp, initiated or signed, certifying his review of the submittal, verification of field measurements and compliance with Contract Documents.

4. Construction Schedule

Prior to commencing Work, the Contractor shall submit a Construction Schedule with the following information:

- a. Work breakdown structure to a level of detail appropriate to the work such that the Engineer may reasonably monitor and determine at any point whether the Contractor is prosecuting the Work as expected.
- b. Task dependencies, durations, early and late starts and finishes.
- c. Identification of Critical Path tasks.

5. Subcontractors

- a. Prior to commencing Work, the Contractor shall submit for approval a list of all Subcontractors which are proposed to be used on the Project. The list shall include the following information for each Subcontractor:
 1. Name and address of Subcontractor
 2. Contact name, title, and phone number
 3. Description of the Subcontractor's qualifications to perform the anticipated Work.

6. Materials & Supplier of Products

Prior to commencing Work, the Contractor shall submit for approval a list of all Suppliers and Products which are proposed for installation. The list shall be tabulated by applicable Specification section or related trades or construction activities.

7. Substitutions

- a. The Engineer will consider formal requests for substitution of products in place of those specified up to fifteen Business Days before the start of work.
- b. All proposals for substitutions shall be submitted in writing by the General Contractor or permit holder and not by individual trades or material suppliers.
- c. Include in the following information in any Substitution request:
 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 2. Product identification, including manufacturer's name, address and literature outlining the product description, performance, test data and reference standards.
 3. Samples, if applicable.
 4. Name and address of similar projects on which product was used and date of installation.
 5. Itemized comparison of proposed substitution with product or method specified including any changes in construction schedule, relation to separate contracts, and accurate cost data on proposed substitution in comparison with product or method specified.
- d. If any proposed Substitution will affect any portion of the Project, adjacent construction, work of other Contractors or Subcontractors, or use or functionality of the finished Project, then the necessary changes to or affected functionality of the Project will be considered as an essential part of the proposed Substitution. All such changes or accommodations necessary to restore and/or provide the intended functionality of the Project shall be clearly documented by the Contractor as part of the Submittal.
- e. The County will bear no additional expense as a result of any Substitution.

- f. The Engineer will review proposed substitutions and make his recommendations in writing within ten working days. The Contractor shall abide by the Engineer's recommendations when proposed substitute materials or items of equipment are not accepted for installation and shall furnish the specified material or item of equipment in such case.

8. Shop Drawings

- a. Submit drawings, prepared by Contractor, subcontractor, supplier or distributor, which illustrates some portion of the work; showing fabrication, layout, setting or erection details.
- b. Identify details by reference to sheet and detail numbers shown on Contract Drawings or the Construction Standards.
- c. Use a minimum sheet size of 8 ½ inches x 11 inches.
- d. When submitting specific product data, catalog sheets, or the manufacturer's standard schematic drawings, modify the submissions to delete information which is not applicable to the project. When required, supplement the standard information to provide additional information applicable to project.
- e. Show dimensions and clearances required.
- f. Show performance characteristics and capacities, where applicable.
- g. Note clearly on the drawings any deviations from the material or equipment as specified.
- h. The Engineer will review the Shop Drawings with reasonable promptness.

9. Samples

- a. Where required, provide physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is to be judged in such quantities and locations as required by the specifications.
- b. Samples shall be submitted in single units, unless specified otherwise.
- c. Materials and equipment incorporated into the Work shall match the approved Samples.

10. Resubmissions Requirements

If Submittals are disapproved or require revision, revise the initial submittal and resubmit as specified for initial submittal. Indicate on re-submittal any changes which have been made other than those requested by the Engineer.

PART 1 - GENERAL1.1 Purpose of Section

This section outlines the requirements for testing and verification of work, materials, and any other miscellaneous items required by the Contract Documents.

1.2 Related Requirements Specified Elsewhere

Section 01300 – Submittals

PART II - MATERIALS**PART III - EXECUTION**3.1 General Requirements

- A. Materials, supplies, equipment, and work shall be fully tested in accordance with the Contract Documents. Unless otherwise noted within the specification section, perform the type and number of tests called for by the standards referenced.
- B. Testing shall be done by an independent testing laboratory approved by the Engineer.
- C. Certifications of testing and inspections by the testing laboratory, mills, shops, and factories shall be submitted per Section 01300.
- D. The Contractor shall provide the necessary labor and supervision required to support field testing and inspection by the Engineer at no additional cost to the County. Defects disclosed by tests shall be rectified at no additional cost to the County.
- E. Testing and inspection of the Work shall not relieve the Contractor of his responsibility for conforming to the requirements of the Contract Documents.

PART IV – MEASUREMENT AND PAYMENT4.1. Testing

- 1. Unless otherwise specified, testing of materials, supplies, equipment, and work to comply with these specifications shall be considered incidental to the work, and the Contractor will not be entitled to further payment. The County may direct additional testing in excess of the Contract requirements at the County's expense, unless such testing reveals non-compliant work, in which case the Contractor shall bear the cost of the testing.

SECTION 01500 TEMPORARY EROSION AND SEDIMENT CONTROL**PART 1 - GENERAL**1. Description of Work

This work shall consist of the application of temporary measures throughout the life of the project to control erosion and siltation. Such measures shall include, but are not limited to, the use of berms, dikes, dams, sediment basins, fiber mats, silt fences, straw bales, washed gravel or crushed stone, mulch, grasses, slope drains, temporary seeding, and other methods. Temporary erosion and siltation control measures as described herein, shall be applied to erodible material exposed by any activity associated with the construction, and consistent with state and local control standards.

2. Related Work Specified Elsewhere

Section 02100- Clearing and Grubbing

Section 02200- Earthwork

3. Applicable Specifications

Erosion and Sediment Control (Chapter 57 of the Arlington County Code)

4. Applicable References

Virginia Soil and Water Conservation Commission Erosion and Sediment Control Handbook.

5. Submittals

Prior to the start of the work the Contractor shall prepare and submit a plan for applying temporary and permanent erosion and siltation control measures. The plan shall include, but is not limited to, the operations of clearing and grubbing, stripping of topsoil, grading, stabilizing cleared areas, dewatering, and the construction of structures at watercourses. Construction work shall not commence until the schedule of work and the methods of operations have been reviewed and approved by the Engineer.

Temporary measures shall be coordinated with the construction of permanent drainage facilities and other contract work to the extent practicable to assure economical, effective, and continuous erosion and sediment control, and to prevent any damage, clogging, or other negative impacts upon the Work or other property.

6. Permits

Unless otherwise specified, the Contractor is responsible for obtaining and complying with any and all applicable State, Federal, and Local permits which are required for construction, including, but not limited to Virginia Water Protection Permits issued by the Virginia DEQ, General Nationwide Permits issued by the US Army Corps of Engineers, and Virginia Stormwater Management Program Permits issued by the Virginia DCR.

PART 2 - MATERIALS

Materials shall be at the Contractor's option with the approval of the Engineer in accordance with Arlington County Code, Erosion and Sediment Control Ordinance (Chapter 57).

PART 3 - EXECUTION**7. Installation and Maintenance of Erosion and Sediment Control**

- a. No grading operations will be allowed until temporary sediment and erosion control measures have been installed in accordance with the approved plan conforming to the requirements of Arlington County Erosion and Sediment Control Ordinance.
- b. Control measures shall be periodically cleaned of silt and maintained. Immediately after every rainstorm, all control measures shall be inspected and any deficiencies corrected by the Contractor.
- c. The County reserves the right to order the performance of other temporary measures not specifically described herein to correct an erosion or siltation condition.
- d. Temporary control measures may be removed when the area has been stabilized.

8. Extent of Grading Operations

- a. The Contractor shall limit the surface area of earth material exposed by grubbing, stripping of topsoil and excavation to that which is necessary to perform the next operation within a given area.
- b. Unless specifically authorized by the Engineer, the grubbing of root mat and stumps shall be confined to the area over which excavation is to be actively prosecuted within 30 days following the grubbing operations.
- c. The stripping of topsoil shall be confined to the area over which excavation is to be actively prosecuted within 15 days following the stripping operations; and excavation and embankment construction shall be confined to the minimum area necessary to accommodate the Contractor's equipment and work force engaged in the earth moving work.
- d. No disturbed area, including stockpiles, is to remain denuded longer than 30 days without temporary seeding or otherwise stabilizing the area.

9. Dewatering and Discharges

- a. All dewatering operations shall be conducted in a manner that prevents or minimizes the amount of sediment or other pollutants which discharge to the County storm sewer system, which includes curb and gutter, or any open watercourse. Any discharge from dewatering operations shall be properly filtered prior to being discharged. Dewatering activities shall not create any erosion nor flooding. A dewatering plan must be included as part of the Erosion and Sediment Control plan with sufficient detail to ensure that the proposed dewatering will meet all applicable requirements.

- b. All non-stormwater discharges to the County's storm sewer system, which includes curb and gutter, or any open watercourse must comply with the conditions of Section A.1.a.3 of the County's VSMP Municipal Separate Storm Sewer System (MS4) Permit. Contaminants, including but not limited to, volatile organic compounds, petroleum products, metals, PCBs/Pesticides, shall not be discharged to the County's storm sewer system without approval from Arlington County. A separate Virginia Pollutant Discharge Elimination System (VPDES) permit, issued by DEQ may be required.
- c. Contractors shall not dump or dispose of anything in a storm drain, street, stream, or riparian area that could cause adverse conditions. Contractors shall employ good housekeeping and pollution prevention measures at work sites at all times. Work areas, including staging or stockpile areas, shall be kept clean and free of trash and debris to the maximum extent possible. Construction materials shall be properly stored and secured. Stockpiled materials shall be kept covered and perimeter controls shall be employed to minimize exposure to wind, precipitation, and runoff. Equipment and vehicle washing shall not be permitted on-site without proper controls and facilities to collect all sediment and/or pollutants. Spill kits and appropriate tools for cleanup shall be kept on-site at all times. Spills shall be cleaned immediately using absorbent materials or other appropriate measures which will prevent any pollutants from entering a storm drain or open watercourse.

PART 4 - MEASUREMENT AND PAYMENT

10. Measurement and Payment

- a. Unless otherwise specified, no separate measurement of quantities will be made for this work. Temporary erosion and sediment control as detailed on the approved plan is considered to be a subsidiary obligation to the Contract and therefore, there will be no payment made for this work.
- b. No measurement will be made for temporary erosion control required to correct conditions created due to the Contractor's negligence, carelessness or failure to install permanent controls in accordance with the approved plan, or methods or sequence of such work.
- c. No measurement will be made for limiting the area of construction operations as directed by the Engineer. The cost of shaping the top of earthwork, constructing temporary earth berms, slope drains, straw bales, etc., considered being a subsidiary obligation to the Contract and therefore, there will be no payment made for this work.
- d. In the event the Contractor repeatedly fails to satisfactorily control erosion and siltation, the Owner reserves the right to employ outside assistance or to use its own forces to provide the corrective measures indicated; the cost of such work, plus engineering costs, will be deducted from monies due to the Contractor for other work.

SECTION 02100 CLEARING AND GRUBBING**PART 1 - GENERAL**1. Description of Work

Provide all labor, material and equipment to perform all clearing and grubbing as called for on the approved plans and as specified herein, or as necessary to prosecute the Work.

2. Related Work Specified Elsewhere

Section 01500 – Temporary Erosion and Sediment Control

Section 02200- Earthwork

3. Applicable Specifications

Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

Garbage, Refuse and Weeds Code (Chapter 10 of the Arlington County Code)

American Association of Nurserymen (A.A.N.)

International Society of Arboriculture (I.S.A.) National Arborist Association (N.A.N.)

4. Protection of Vegetation

- a. Protect existing trees, shrubs and bushes outside the limits of clearing and grubbing by fencing or barricading as required by the Urban Forester (DPRCR). Protect existing trees designated to be saved inside the limits of clearing and grubbing by methods approved by the Urban Forester (DPRCR), which may include tree protection fencing, root pruning, and/or protective matting.
- b. Trees damaged by construction operations shall be evaluated by the Urban Forester (DPRCR) and replaced, pruned, and/or treated. Pruning or treatment must be performed by an International Society of Arboriculture (I.S.A) Certified Arborist.
- c. Replace trees damaged beyond repair by the construction process with nursery grown stock meeting American Association of Nurserymen (A.A.N.) Standards. Trees shall be replaced per the County's tree replacement guidelines.

5. Protection of Property

- a. Protect property pipes, stones and monuments from damage. The Contractor will be responsible for replacing disturbed markers by a registered surveyor at no expense to the County.

- b. Protect street, roads, historical objects, adjacent property, vegetation and other works to remain throughout the contract.

PART 2 - MATERIALS

PART 3 - EXECUTION

6. Clearing

The area of clearing shall be maintained within the limits shown on the plans. Individual trees, groups of trees and other vegetations, which are to remain within the areas to be cleared, are to be undisturbed, standing and not injured. Tree protection boundaries will be established and secured as directed by the Urban Forester (DPRCR) to protect the root systems as well as above ground trees. The tree protection area shall not be violated.

7. Grubbing

The area of grubbing shall be maintained within the clearing limits shown on the plans. Remove stumps and matted roots to a depth of 24 inches below existing ground surface. Refill excavations made by removal of stumps or roots as specified for backfill in Section 02200.

8. Trimming of Trees

- a. Trees may be trimmed to remove branches or roots which interfere with construction when so approved by the Engineer and Urban Forester (DPRCR). All trimming and pruning shall conform to specifications and standards of practice of the National Arborist Association.
- b. Do not unnecessarily cut tree roots extending into grading limits. When roots are exposed by the work, cut them back cleanly with hand pruning shears, lopping shears or hand saws, and backfill with approved topsoil immediately. Backfill around tree roots immediately after completion of construction in vicinity of the trees. Backfill around trees and roots shall be compacted to no more than 80% unless otherwise directed by the Engineer.

9. Salvage

- a. Unless otherwise indicated on the plans, remove only those trees which directly interfere with the construction of the project. Trees designated by the Engineer to be salvaged shall be either mechanically dug with a tree spade or hand dug, balled and burlapped with root ball sizes as specified by the American Association of Nurserymen.
- b. Material which is to be salvaged, as a result of clearing operations, shall include live plants suitable for replanting. Shrubbery is to be transplanted as trees using A.A.N. Standards. If required, temporarily replant the shrub and at the completion of construction replace according to A.A.N. Standards.
- c. Place any desirable topsoil in well-drained stockpiles, not to exceed 7 feet in height, and protect per Section 01500

10. Disposal

- a. Dispose of trees and shrubs in accordance with the Garbage, Refuse and Weeds Ordinance of the Arlington County Code. When approved by the Engineer, material may be dumped within the Contract area where directed.
- b. Do not burn materials on the site. The County Fire Marshal may consider granting a waiver from open burning restrictions in cases where the State Air Pollution Control Board has granted a waiver to the Contractor or permit holder. The responsibility for obtaining all waivers shall be the Contractor's or permit holders.
- c. Remove material from the site as it accumulates. Do not allow waste material to accumulate for more than 48 hours.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement of quantities will be made for this work. Clearing and grubbing is considered to be a subsidiary obligation of the contract and, therefore, there will be no payment made for this work.

SECTION 02200 EARTHWORK**PART 1 - GENERAL**1. Description of Work

Provide all labor, material and equipment to perform all excavation, transportation, handling, disposal, placement, shaping, compaction, and other tasks pertaining to earthwork for the structures, pipelines, roadways, and other work as called for on the approved plans and as specified herein.

2. Related Work Specified Elsewhere

Section 01500 – Temporary Erosion & Sediment Control

Section 02100 - Clearing and Grubbing

Section 02202 - Rock Excavation

Section 02400 - Sheeting, Shoring and Bracing

Section 02650 - Restoration of Roadway

3. Applicable Specifications

- a. American Association of State Highway and Transportation Officials (AASHTO)
- b. American Society for Testing and Materials (ASTM)
- c. Occupational Safety and Health Act, State & Federal (OSHA)
- d. Underground Utility Protection Ordinance (Chapter 55 of the Arlington County Code)
- e. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- f. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

4. Underground Utilities

The location of existing utilities has been indicated on the drawings based on the best information available. The completeness or accuracy of the information is not guaranteed. Contractor shall notify “Miss Utility” in accordance with the provisions stipulated in the Underground Utility Protection Ordinance (Chapter 55), of the Arlington County Code.

5. Overhead Utilities

The Contractor shall identify and protect all existing overhead utility poles and facilities in the vicinity of the Work. The Contractor will be solely responsible for all necessary notification and coordination

with the utility owner(s). There will be no payment made for necessary bracing, sheeting, shoring, or other work required to protect and maintain existing utility poles or overhead utilities.

6. Existing Foundations

When foundations are located such that excavation may endanger or interfere with an existing structure or utility, the Contractor shall take all measures necessary to protect the existing utilities or structures. There will be no payment made for these measures.

7. Stability of Excavations

The Contractor shall be solely responsible for the stability of excavations and for meeting all State and Federal OSHA requirements. Provide all sheathing, lagging, bracing, and other support required to retain the stability of excavations.

8. Care and Restoration of Pavement and Property

When excavations are to be made in paved surfaces, the Contractor shall sawcut or use of a similar tool so as to provide a clean, uniform edge with a minimum of disturbance to remaining pavement. Pavement and other property outside of the defined Limits of Disturbance shall be preserved in the condition existent prior to construction. Damage or other impacts upon pavement or property outside the Limits of Disturbance shall be restored immediately at the Contractor's expense.

9. Construction Tolerance

Compact, shape, slope, and dress to yield the grades and slopes illustrated on the approved plans. In backfilled or other non-paved areas, grades shall be within 0.10 foot of the design grade. Slopes shall not be steeper than 2(H):1(V) and shall not deviate from a theoretical plane surface by more than 0.5 feet.

PART 2 - MATERIALS

10. Backfill

Backfill shall be free of vegetation, masses of roots, and stones over 3-inches in any dimension, frozen material, cinders, ashes, refuse, or porous matter. Organic matter shall not exceed minor quantities and shall be well distributed. In addition, Backfill shall be of such a nature and in such condition that it can be compacted to a dense and stable fill.

11. Topsoil

- a. Topsoil furnished by the Contractor shall consist of a natural friable surface soil without admixtures of subsoil, refuse, or foreign materials. It shall be reasonably free from roots, hard clay, coarse gravel, stones larger than 2 inches in any dimension, noxious weeds (including quackgrass rhizomes and the nut-like tubers of nutsedge), tall grass, brush, sticks, stubble, or other materials which would be detrimental to the proper development of vegetative growth.

- b. Topsoil shall contain not less than 3% nor more than 10% organic matter by weight.
- c. The Contractor shall Submit per Section 01300 to the Project Officer a soil analysis describing the soil composition including pH factor and percentage of organic content prior to placing any Topsoil.

12. Select Borrow

Select Borrow shall conform to VDOT Section 207 – Select Material, Type I.

13. Inspection of Materials

The Project Officer shall determine the feasibility or suitability of soils based upon testing provided by the Contractor and any other relevant information. The Project Officer's decision shall be final.

PART 3 - EXECUTION

14. Location & Protection of Existing Structures & Utilities

- a. Locate all utility pipes, conduits and facilities well ahead of the excavation process. Plainly mark all such locations and comply with the Underground Utility Protection Ordinance (Chapter 55), of the Arlington County Code.
- b. Where the Contractor has identified or anticipates existing utilities, structures, or artifacts, excavate using hand tools or other labor intensive activity as necessary to protect the facilities. No extra compensation or time will be allowed for this activity
- c. In case of damage caused by the Work, notify the owner or appropriate agency or party and affect repair in a manner resulting in a condition at least equal to the condition prior to construction. No extra compensation or time will be allowed for repair of damages.

15. Trench Excavation

- a. Carry out the excavation, dewatering, sheeting, and bracing in such manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utility, facility, or any work previously completed.
- b. Excavate pipe trenches to the necessary depth as shown on the drawings, holding the width below top of pipe as shown in the Standard Details.
- c. The Contractor shall comply with all OSHA and/or other applicable regulations for excavation.
- d. Excavate trenches to provide a uniform and continuous bearing and support for the pipe and appurtenant structures on solid and undisturbed ground and at the specified grade at every point.
- e. Correct any part of the trench bottom excavated below the specified grade with approved materials and thoroughly compact. Shape the bottom of all pipeline trenches to fit the lower

part of the pipe exterior for a width of a least 60% of the pipe breadth. Shape the excavation and/or bedding for pipe bells, joints, and fittings. Care shall be taken that stones and lumps shall not become nested.

- f. Should an unacceptable bedding for the proposed pipe or structure be encountered, notify the Engineer. The Engineer may direct additional excavation below the bottom of the proposed pipe or structure and direct the contractor to provide an alternate bedding or foundation. Additional excavation due to the fault or negligence of the Contractor or without prior approval from the Engineer shall be remedied at the expense of the Contractor.

16. Sheeting, Shoring, and Bracing

Provide sheeting, shoring and bracing in accordance with Section 02400.

17. Storage, Handling, and Disposal of Excavated Materials

- a. Carefully remove loam and topsoil to be incorporated in the finished work and store separate from the other excavated material. Failure to isolate loam and topsoil from the other excavations shall require that said soils not be used as topsoil.
- b. Excavation shall include the disposal of material deemed unsuitable by the Project Officer for reuse in the Work. The Contractor shall stockpile, treat, and/or otherwise manipulate suitable materials which may be incorporated into the project at a later date or different location. The Contractor is responsible for protecting any stockpiled material from contamination by unsuitable material and from degradation by any other means. Failure by the Contractor to adequately handle and protect excavated material will result in the Contractor being directed to use Select Borrow or other approved material at no expense to the County. Unless otherwise specified, the Contractor will be solely responsible for securing the necessary area for stockpiling, treating, protecting, and related activities.
- c. Do not mix pavement with other excavated material. Dispose of excavated pavement away from the work site immediately. All costs associated with removing, handling, transporting, disposing, etc. of existing pavement, curb and gutter, sidewalks, driveway aprons, etc. is considered to be incidental to Excavation and no additional compensation will be considered for such activities.
- d. All materials deemed unsuitable for use in the Work by the Project Officer shall be disposed of by the Contractor at his own expense. Storing, transporting, loading, handling, treating, and other associated costs are considered to be incidental to the Work and no additional compensation will be considered for such activities.
- e. The County shall take preference over others in claiming excavated material. The Contractor shall consult the Engineer before disposing of such materials.
- f. If space is available at the County's Trades Center, the Contractor may be directed to dispose of clean excavated asphalt and/or unreinforced concrete pavement there, at no cost to the Contractor or the County. If space is not available at the Trades Center, the Contractor will be responsible for alternate disposal arrangements. No additional compensation will be made

if the Trades Center does not have adequate space to accommodate materials from the project.

18. Dewatering

At all times during construction – provide, place and maintain ample means and devices with which to remove promptly all water entering trenches and other excavations. Keep excavations dry until the structures, pipes, and appurtenances to be built therein have been completed and backfilled. Dispose of all water pumped or drained from the work without impact to the Work, traffic, or injury to public or private property, and in compliance with all Local, State, and Federal regulations.

19. Backfilling – General

- a. If the Project Officer determines that sufficient approved material from excavation on the job-site is not available for backfill, the Contractor shall secure material from areas outside the job-site to complete the backfill.
- b. All backfill materials shall contain sufficient moisture for proper compaction.
- c. Except in proposed landscape areas, or where otherwise specified, each layer of material shall be compacted to a dry density not less than 95 percent of the maximum determined by the Modified Proctor Compaction Test. Upon completion of backfilling in any area under the contract, the Owner may make tests to determine the degree of compaction of the backfill material. If the results of test indicate densities less than specified, the Contractor shall, at his own expense, remedy the condition as directed, in such portions of the trenches as may be required.
- d. Backfill all excavations as rapidly as practicable after the completion of each section of the work. All unauthorized excavations made by the Contractor shall be immediately backfilled at the Contractor's expense. Complete all backfilling to the dimensions and levels shown on the drawings.
- e. The placement of material around structures shall be carried out symmetrically around the structure in horizontal lifts not to exceed six inches of loose material. The Contractor shall protect, and be responsible for any damages to adjacent structures or utilities.
- f. Start backfilling around concrete structures only after the concrete has reached sufficient strength to withstand the pressure exerted by the material and compacting equipment and after carrying out and satisfactorily completing the tests specified in Section 03100, Concrete Formwork, Reinforcement and Materials.
- g. At points which cannot be reached by mobile mechanical equipment, use suitable power-driven tampers to achieve the same degree of compaction.
- h. No material shall be placed or compacted when it is wet or frozen or when the sub grade or previously placed material is wet or frozen.

20. Backfill for Pipelines

- a. The sub grade shall be properly shaped before any material is placed and compacted. Care shall be taken that stones and lumps shall not become nested.
- b. Place backfill material in six-inch layers to a point at least two feet above the pipe crown. Thoroughly compact each layer for the full trench width and under, around, and over the pipe, using hand-operated mechanical tampers exerting a pressure of not less than 250 foot pounds per square foot of tamping force. The contractor will be responsible for pipe damage as a result of excessive tamping force.
- c. Remainder of trench, more than two feet above pipe crown, may be backfilled by machinery in one-foot layers, thoroughly compacted.

21. Final Grading & Topsoil

- a. Prior to placement of topsoil, the subgrade shall be disced or rototilled to a minimum depth of 2 inches.
- b. Topsoil shall be uniformly distributed in a 4-8 inch layer and lightly compacted to a thickness of 4 inches (or as indicated on the plans) using a cultipacker, roller, or other approved equipment weighing 100-160 pounds per linear foot of roller.
- c. Topsoil shall not be placed when either the topsoil or the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading.
- d. Final grading shall not permit ponding of water.

22. Tests and Testing

- a. The optimum moisture content and the maximum density of each type of material used for structural fill and backfill shall be determined by “Standard Test Methods for Moisture Density Relations of Soils and Oil- Aggregate Mixtures Using 5.5-lb. Rammer and 12-inch Drop (ASTM D698) or (AASHTO T-99)”.
- b. The field moisture content of materials being compacted shall be determined by “Laboratory Determination of Moisture Content of Soil,” (ASTM D2216). The field density of compacted material shall be determined by either “Standard Test Method for Density of Soil in Place by Sand Cone Method,” (ASTM D1556) or- “Standard Test Method for Density of Soil in Place by the Rubber Balloon Method,” (ASTM D2167).
- c. Perform sufficient field density and field moisture content tests on each lift of material to ensure the Engineer that the requirements of this Section of the Specifications are compiled with.
- d. State when and where the tests are to be made so that the Engineer may observe the testing. Submit certified reports verifying test results. The Engineer may order more testing should he feel the above procedures to give inadequate information, or if he feels the results of such testing to be questionable.

23. Maintenance of Backfilled Excavations

- a. The Contractor shall maintain the backfilled area in proper condition for a period of one year after final acceptance of the project. All defects shall be promptly corrected. If the Contractor fails to do so within a reasonable time after the receipt of written notice from the Engineer, the County may correct any dangerous condition at the Contractor's expense.
- b. The Contractor shall be responsible for any injury or damage that may result from improper maintenance of trenches at any time previous to the end of the aforementioned guarantee period.

24. Fill or Embankments

- a. Fill or embankment above existing grade shall consist of the placing, shaping, and compaction of approved Backfill material as illustrated on the approved plans.
- b. Concrete foundations, slabs, rocks, boulders, and similar material removed during excavation may be utilized in embankments when said material will be located five feet or more below the proposed subgrade surface. When such materials are used, they shall be fractured into pieces such that no dimension exceeds 18 inches in any dimension or plane. The Contractor shall take care to ensure that no voids develop, and will be held responsible for any surface settlement resulting there from.
- c. The embankment material shall be uniformly compacted throughout in lifts of no more than 12 inches, except in the case of rock, where lifts of up to 2 feet may be used. Except as otherwise allowed in the paragraph above, the embankment material shall conform to the requirements of Backfill. Each layer shall be compacted at optimum moisture content and the embankment shall have the required maximum density of ninety five percent (95%) as compared to the density of the same material when tested in accordance with AASHTO T-99.
- d. Do not place embankment upon frozen ground or areas covered with snow or ice or saturated soils.
- e. The area upon which embankments are to be placed shall be denuded of vegetation per Section 02100.
- f. Compact the ground upon which the embankment will be constructed to a depth of 8 inches prior to placing any fill material.
- g. Embankments to be constructed over swampy areas may be deposited by end dumping the original course. This course may exceed 8", but shall be the minimum depth required to support the equipment and shall be determined by the Engineer. The use of compaction equipment will not be required on the original course.

PART 4 - MEASUREMENT AND PAYMENT**25. Excavation**

When explicitly included as a pay item, Excavation will be measured by the cubic yard as illustrated on the approved plans, or as approved by the Project Officer. Excavation in excess of that shown on the approved plans will not be compensated, unless specifically approved in advance by the Project Officer. Payment will include all labor, materials, and equipment and will include excavation, handling, storage and disposal of materials, backfilling, compaction, testing, and all other activities necessary to comply with these Specifications.

26. Fill

When explicitly included as a pay item, Fill will be measured by the cubic yard in place as illustrated on the approved plans, or as approved by the project Officer, and will include all materials, equipment, and labor to construct the fills or embankments as illustrated on the construction drawings. Unless otherwise specified, Backfilling of excavations will not be compensated as Fill. Payment will include all clearing and grubbing, preparation, acquisition, transporting, storing, and handling of material, placement, shaping, compaction, and other activities necessary to comply with these Specifications.

27. Over excavation

When included as a pay item or Stipulated Price Item, and authorized by the Project Officer, Over Excavation conducted as a result of obstructions or unsuitable bedding for pipes or structures shall be measured in cubic yards excavated in excess of the contract documents. Payment shall be made for cubic yards and will include excavation, handling, storage and disposal of materials, backfilling, compaction, testing, and all other activities necessary to comply with these Specifications. When not included as a pay item or Stipulated Price Item, Over Excavation will be paid as Excavation. No payment shall be made for any Over Excavation unless ordered in writing by the Engineer prior to commencement of the operations.

28. Select Borrow

When included as a pay item or Stipulated Price Item, and authorized by the Project Officer, Select Borrow shall be measured in cubic yards in place. Payment will include acquisition of materials, transport, preparation, handling, storage, placement, compaction, testing, and other activities necessary to comply with these Specifications

29. Protection of Existing Utilities, Structures, and Property

Protection of existing utilities (above and below ground), structures, and other property is considered a subsidiary obligation of the Work. There will be no compensation or other consideration for the protection, repair, replacement, or restoration of any such facilities. In the event of unknown and unidentified underground utilities or other underground structures that must be protected to complete the Work, the Contractor shall immediately notify the Engineer. The Contractor shall identify appropriate methods to protect the unidentified facilities, and any compensation deemed due, and shall obtain approval from the Engineer prior to undertaking any action.

30. Testing

Testing will be considered subsidiary to the Work and no compensation will be approved. If the Project Officer directs testing in excess of that required by the Contract Documents, the Contractor shall be entitled to compensation unless such testing reveals noncompliant work

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials, tools and equipment as required to excavate and dispose of rock as specified herein.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork for Structures and
Pipelines Section 02201 - Earthwork for Roadways

1.3 Applicable Specifications

Underground Utility Protection Ordinance (Chapter 55 of the Arlington County Code)

1.4 Submittals

Submit the blasting plan to the Engineer for review and acceptance. Keep and submit to the Engineer an accurate record of each blast. The record shall show the general location of the blast, the depth and number of drill holes, the kind and quantity of explosive used, and other data required for a complete record.

1.5 Definition:

Rock shall be defined as:

1. Boulders or concrete material, excluding curb and gutter and sidewalk, exceeding 1/2 cubic yard in volume.
2. Solid ledge rock conglomerate deposits and non-stratified masses so firmly cemented as to require drilling and blasting; wedging; and/or barring for its removal.

1.6 Permits and Regulations

- A. Obtain all permits required for the transportation, handling, storage and use of explosives and drilling equipment. Blasting permits shall be obtained from the Arlington County Fire Marshal.
- B. Observe the Underground Utility Protection Ordinance of Arlington County as well as state and federal laws and ordinances relating to explosives. Blasters shall have licenses available for examination at all times on the work site.

PART 2 - MATERIALS

Explosives shall be commercial grade. Explosives, equipment and appurtenant items are the Contractor's option.

PART 3 - EXECUTION3.1 General

Excavate rock to the lines and grades indicated on the construction standards. Excavate to 6 inches below pipe or precast structure bottom and to the bottom of poured-in-place concrete structures.

3.2 Explosives

When the use of explosives is necessary, exercise the utmost care not to endanger life or property. Be responsible for damage resulting from the use of explosives. The Engineer shall not be responsible for the blasting plan.

3.3 Blasting

- A. Notify the Engineer at least 48 hours in advance of blasting operations.
- B. Conduct all operations involving explosives using experienced personnel only.
- C. Blast only with such quantities and strengths of explosives and in such manner as will break the rock approximately to the intended lines and grades.
- D. Avoid excessive cracking of the rock upon or against which any structure will be built. Prevent damage to existing pipes or other structures and property above or below ground.
- E. Cover areas to be blasted with mats, logs or other material to stop flying matter during explosions. Give sufficient warning to all persons in the vicinity of the work before a charge is exploded. Employ flagmen to stop or direct traffic as required.

3.4 Excess Rock Excavation

If rock is excavated beyond the limits of excavation indicated on the standard and is not authorized in writing by the Engineer, the excess excavation, whether resulting from over breakage or other causes, shall be defined as excess rock excavation and backfilled, by and at the expense of the Contractor, as specified below:

- 1. In pipe trenches, excess excavation below the elevation of the bottom of the pipe bedding, cradle or encasement shall be filled with material of the same

type, placed and compacted in the same manner, as specified for the bedding, cradle, or encasement.

2. In excavations for structures, excess rock excavation beneath foundations shall be filled with Class A3 concrete. Other excess rock excavations shall be filled with structural fill as specified in Section 02200 with the approval of the Engineer.
3. In excavations for roadways, excess rock excavation shall be filled with material as specified for the sub grade.

3.5 Shattered Rock

If rock below normal depth is shattered due to drilling or blasting operations and such shattered rock is unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as described above in excess rock excavation. All such removal and backfilling shall be classified as excess rock excavation and shall be at no additional expense to the County.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 The measurement for rock excavation for structures and pipelines shall be the vertical depth up to 6 inches below pipe and precast structures and to the bottom of cast-in-place structures. The pay width for rock shall be as shown in the pipe trench standards for pipe and shall be the outside dimension plus 12 inches for structures. The pay width and depth shall be fixed regardless of the actual dimensions of rock excavation. Payment shall be made for the cubic yards excavated and shall include the pipe or precast structure bedding due to over excavation. Any additional testing required, including seismograph, other than that shown on approved plans shall be done at no cost to the County.
- 4.2 The measurement for rock excavation for roadways shall be to the bottom of the sub grade and to the lines and grades as shown on the approved plans. Payment shall be made for the cubic yards excavated.

PART 1 - GENERAL

1.1 Description of Work

Provide all labor, material, equipment and incidentals to furnish and place the riprap as called for on the approved plans and as specified herein.

1.2 Related Work Specified Elsewhere

Section 03100 - Concrete Formwork, Reinforcement and Materials Section 04100 - Mortar and Grout

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS

2.1 General

- A. Stone for riprap and bedding shall be as specified in VDOT Section 205 and shall be sound, durable and free from seams, cracks and other structural defects or imperfections tending to destroy its resistance to weathering.
- B. Riprap bedding shall be reasonably well graded crush stone within the following limits:

<u>Sieve Size</u>	<u>Total Percent Passing</u>
3-inch	100
1-1/2-inch	75-95
3/4-inch	50-85
No. 4	25-55
No. 16	10-25
No. 50	2-10

- C. Grade A, B, or C sand may be used in mortared or grouted riprap.

2.2 Dry Riprap

- A. Dry riprap, Class I, shall meet VDOT Section 414.03(a).
- B. Dry riprap, Class II, shall meet VDOT Section 414.03(a).
- C. Dry riprap, Class III, shall meet VDOT Section 414.03(a).

2.3 Mortared Riprap

Stone for this purpose shall as far as practicable, be selected as to size and shape in order to secure fairly large, flat-surfaced stone which will produce a nearly true and even surface with a minimum of voids. Place the stone upon a slope not steeper than the natural angle of repose of the fill material. Fifty percent of the mass shall be broad flat stones, 2 cubic feet or more in volume, laid with the flat surface uppermost and parallel to the slope. Mortar mix shall conform to the requirements of Section 04100.

2.4 Grouted Riprap

Grout for grouted riprap shall consist of one part of Portland cement and three parts of sand, thoroughly mixed with water to produce grout having a thick, creamy consistency. The stones shall be of the same sizes and placed in the same manner as specified for dry riprap, Class 1.

2.5 Stone Riprap

Stone riprap for pier and abutment protection shall range in size up to derrick stone and shall be graded from coarse to fine in such a manner as to provide a minimum of voids.

2.6 Concrete Slab Riprap

The concrete slabs for riprap shall consist of Class A concrete, cast-in-place 6 inches thick, unless otherwise noted on the approved plans. The slabs shall be of two types: plain or reinforced concrete. If reinforcement is required, it shall be furnished as shown on the approved plans.

2.7 Dumped Riprap

- A. Type (1) Core Riprap: Core riprap shall conform to the general requirements of this section and shall be reasonably well graded. It shall be composed of compact, angular pieces of derrick stone weighing no less than 500 pounds and no more than 4,000 pounds each, averaging 2,000 pounds, except that approximately ten percent by weight may consist of pieces weighing from 10 to 250 pounds each. Neither the width nor thickness of any piece of riprap shall be less than one-third of its length.
- B. Type (2), Heavy Riprap: Heavy riprap shall conform to the general requirements of this section and shall be reasonably well graded. It shall be composed of compact, angular pieces of derrick stone weighing no less than three tons and no more than ten tons each, averaging four tons. Neither the width nor thickness on any piece of riprap shall be less than one-third of its length.

PART 3 - EXECUTION**3.1 Riprap Bedding**

Riprap bedding of the thickness indicated on the plans shall be placed on the embankment to form a backing for the riprap. Where approved by the Engineer a construction fabric or matting may be substituted for backing, as shown on the approved plans. Spread riprap bedding uniformly on the prepared base, in a satisfactory manner, to the lines indicated on the approved plans or as directed. Placing of material by methods which will tend to segregate particle sizes within the bedding base during placing of bedding shall be repaired before proceeding with the work. Compaction of the bedding material will not be required, but it shall be finished to present a reasonably even surface free from mounds or depressions.

3.2 Dry Riprap

- a. Place the stones upon a slope not steeper than the natural angle of repose of the fill material. Lay with joints as close as practicable and lay the courses from the bottom of the bank upward, the larger stones being placed in the lower courses. Fill the open joints with spall.
- b. For Class 2 and Class 3 riprap, use stones having one broad flat surface when possible, and lay the flat surface on a horizontal earth bed prepared for it and so placed as to overlap the underlying course, the intent being to secure a lapped or – “shingled” surface which will shed a maximum amount of water. Fifty percent of the mass shall be of stones having a volume of two cubic feet or more. These stones shall be placed first and roughly arranged in close contact. Then fill the spaces between the larger stones with stone of suitable size so placed as to leave the surface evenly stepped, conforming to the contour required, and capable of shedding water to the maximum degree practically attainable.

3.3 Mortared Riprap

Place these stones first and roughly arranged in close contact, the largest stones being placed near the base of the slope. Fill the spaces between larger stones with stones of suitable size, leaving the surface reasonably smooth and tight and conforming to the contour required. In general, lay the stone with a degree of care that will ensure for plane surfaces a maximum variation from a true plane of not more than 1-¹/₂ inches in four feet. Warped and curved surfaces shall have the same general degree of accuracy as specified for plane surfaces.

As each of the larger stones is placed, surround it by fresh mortar and shove adjacent stones into contact. After the larger stones are in place, fill all the spaces or openings between them with mortar, and place the smaller stones by shoving them into position, forcing excess mortar to the surface, ensuring that each stone is carefully and firmly bedded laterally.

After the work has been completed as described, all excess mortar forced up shall be spread uniformly to completely fill the surface voids. Point all surface joints roughly with flush joints or with shallow, smooth-raked joints.

3.4 Grouted Riprap

Care is to be taken during placing to keep earth or sand from filling the spaces between the stones. After the stones are in place, completely fill the spaces between them with grout from bottom to top and sweep the surface with a stiff broom. Do not grout riprap in freezing weather.

In hot, dry weather, protect the work from the sun and keep moist for at least three days after grouting by the use of saturated burlap.

3.5 Stone Riprap for Foundations

Deposit in an approved manner at locations shown on the approved plans or where designated by the Engineer.

3.6 Concrete Slab Riprap

Except as modified herein, construction of the slabs shall conform to specification for Concrete Formwork, Reinforcement and Materials - Section 03100.

The concrete shall be of such consistency that it can be placed without the use of top forms. Dig a trench of the dimensions shown on the approved plans at the toe of the slope and dress the slope to the lines and grades specified.

Place the riprap in blocks of dimensions as shown on the plans, alternate blocks being poured and the remaining panels filled in later. Unless otherwise shown, the blocks shall be laid in horizontal courses and successive courses shall break joints with preceding ones. The joint details shall be as shown on the approved plans, but if not shown, the horizontal joints shall be normal to the slope and all joints shall be close joints without filler.

3.7 Dumped Riprap

- A. The slopes above mean high water shall be finished to a reasonably smooth and compact surface within an allowable tolerance of two inches from the surface lines, cross-sections and elevations indicated on the plans. Tolerances for underwater portions shall be six inches. The degree of finish for graded slopes of the embankment shall be that obtainable from either blade grader or scraper operations, as the Contractor may elect. Immediately prior to placing riprap bedding in any area, the prepared base shall be inspected by the Engineer and no material shall be placed thereon until that area has been approved.
- B. Place dumped riprap on the embankment as soon as practicable after the riprap bedding has been finished. Place stone for dumped riprap on the bedding material in such a manner as to produce a reasonably well graded mass of rock with a practicable percentage of voids and construct to the lines and grades shown on the approved plans, or as directed. Riprap shall be to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Do not place dumped riprap in layers. The larger stones

shall be reasonably well distributed. The finished riprap shall be free from pockets of small stones and clusters of larger stones. Hand-placing to a limited extent may be required, but only to an extent necessary to secure the results specified and as required to form reasonably uniform slopes. A tolerance of plus-six inches or minus-four inches from the lines and grades shown on the plans will be allowed in the finished surface, but the extremes of such tolerance shall not be continuous over an area greater than 200 square feet.

- C. The desired distribution of the various sizes of stones throughout the mass may be obtained, at the option of the Contractor, either by selective loading at the quarry or other source, by controlled dumping of successive loads during final placing or by a combination of these methods. Do not place riprap by dumping into chutes or other similar methods likely to cause segregation of the various sizes. The Contractor shall maintain the riprap protection until accepted and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the plans.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Riprap Bedding

Riprap bedding shall be considered a subsidiary requirement for the placement of dry riprap and dumped riprap. Payment for riprap bedding shall be included in the unit price bid for dry riprap or dumped riprap.

4.2 Dry Riprap

Dry riprap shall be measured in square yards actually placed, by class, and payment shall include the riprap bedding in-place, and shall be at the unit price stated in the bid proposal.

4.3 Mortared Riprap

Mortared riprap shall be measured in square yards actually placed. Payment shall be at the unit price stated in the bid proposal.

4.4 Grouted Riprap

Grouted riprap shall be measured in square yards actually placed. Payment shall be at the unit price stated in the bid proposal.

4.5 Stone Riprap

Stone riprap shall be measured in units of volume or weight. Payment shall be at the unit price stated in the bid proposal.

4.6 Concrete Slab Riprap

Concrete slab riprap shall be measured in units of square yards actually placed. Payment shall be at the unit price stated in the bid proposal.

4.7 Dumped Riprap

Dumped riprap shall be measured in tons as evidenced by railroad bills of lading or truck delivery tickets. Payment shall be at the unit price stated in the bid proposal.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, material and equipment to perform all work pertaining to the fabrication, construction, and installation of gabions in accordance with these specifications and the lines, grades and dimensions shown on the approved plans.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork for Structures and Pipelines

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS2.1 Gabion Units

Wire mesh used to form gabion baskets shall conform to Section 228 of the VDOT Specifications. Mesh edge wire and selvedge reinforcing wire shall be not less than 0.150 inch (9 gauge) and lacing/tie wire for binding gabion units together, not less than 0.087 inch for galvanized gabion units. When PVC coated gabions are specified on the plans, minimum edge wire and selvedge wire shall be 0.132 inch and lace wire 0.087 inch.

2.2 Stone

Stone shall conform to Section 204.02 of the VDOT Specifications.

2.3 Filter Material

Filter material shall be Miraf 140, Typar 3401 or equal.

PART 3 - EXECUTION

3.1 Excavation for gabions shall be performed in accordance with Section 02200. Gabions shall be placed on a smooth foundation. Final line and grade shall be approved by the Engineer.

- 3.2 The assembly, placement and filling of the gabion units shall be as specified in Section 610.02 of VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

Gabion structures shall be measured in cubic yards based on the nominal dimensions of the baskets (units) placed. Payment shall be at the unit price stated in the Bid Proposal and shall include slope preparation, excavation, erosion and sediment control, filter material, backfill where required and all other work necessary for a complete installation in place.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, material and equipment to furnish and construct pile foundations as called for on the approved plans and specified herein.

The work includes pile foundations and all other incidental construction.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02110 - Demolition

Section 06100 - Structural Timber and Lumber

Section 09800 - Wood Preservatives

1.3 Applicable Specifications

A. American Association of State Highways and Transportation Officials (AASHTO)

B. American Wood Preserver's Association (AWPA)

1.4 Applicable References

A. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

B. National Forest Products Association (NFPA)

C. Virginia Department of Transportation, Road and Bridge Specification (VDOT)

1.5 Product Handling

Piling shall be delivered, stored and handled carefully to prevent physical damage such as excessive kinks, camber or twist that would prevent proper installation.

PART 2 - MATERIALS2.1 General

Timber piles shall conform to the applicable requirements of AASHTO M168. When the piles are to be treated, the treatment shall be as specified in Section 09800 of these specifications title: Wood Preservatives.

Timber piles which will be below water level at all times may be of any species of wood which will satisfactorily withstand driving.

In untreated piling for use in exposed work, the diameter of the heartwood shall be not less than 80 percent of the required diameter of the pile.

All wood piling shall be cut from sound and solid trees, preferably during the winter season. They shall contain no unsound knots. Sound knots will be permitted, provided the diameter of the knot does not exceed four (4) inches or one-third (1/3) of the diameter of the stick at the point where it occurs. Any defect or combination of defects, which will impair the strength of the pile more than the maximum allowable knot, shall not be permitted. The butts shall be sawed square and the tips shall be sawed square or tapered to a point not less than four (4) inches in diameter as directed by the Engineer.

Shoes for timber piles shall be of steel or cast iron and of a shape which will allow a secure connection to the pile and will withstand driving.

2.2 Timber Piles

Piles shall be cut above the ground swell and shall taper from butt to tip. A line drawn from the center of the tip to the center of the butt shall not fall outside of the center of the pile at any point more than one (1) percent of the length of the pile. In short bends, the distance from the center of the pile to a line stretched from the center of the pile above the bend to the center of the pile below the bend shall not exceed four (4) percent of the length of the bend or two and one-half (2-1/2) inches. All knots shall be trimmed close to the body of the pile.

Round piles shall have a minimum diameter at the tip, measured under the bark, as follows:

<u>Length of Pile</u>	<u>Tip Diameter</u>
Less than 40 feet	8 inches
40 to 60 feet	7 inches
Over 60 feet	6 inches

The minimum diameter of piles at a section four (4) feet from the butt, measured under the bark, shall be as follows:

<u>Length of Pile</u>	<u>Diameter</u>	
	So. Yellow Pine, Douglas Fir, or Species of So.	<u>All Other</u>
20 feet & under	<u>Cypress</u> 11 inches	11 inches
20 to 30 feet	12 inches	12 inches
30 to 40 feet	12 inches	13 inches
Over 40 feet	13 inches	14 inches

The diameter of the piles at the butt shall not exceed twenty (20) inches. Square piles shall have the dimensions shown on the plans.

PART 3 - EXECUTION**3.1 Inspection**

Timber piles shall be branded, prior to shipment, with the supplier's brand, year of treatment, species of timber and preservative treatment, retentions and class and length. The brand symbols shall conform to the American Wood Preserver's Association Standard M6.

3.2 Installation

Unless otherwise specified, all piles shall be peeled by removing all of the rough bark and at least eighty (80) percent of the inner bark. No strip of inner bark remaining on the stick shall be over three-fourths (3/4) inch wide or over eight (8) inches long, and there shall be at least one (1) inch of clean wood surface between any two (2) such strips. Not less than eighty (80) percent of the surface on any circumference shall be clean wood.

The timber pile foundations shall be installed properly in the sizes and to the alignment, batter and bearing as shown on the approved plans.

Driving heads, mandrels or other devices shall be provided so that the piling will be driven without injury.

The piling heads shall be square and a driving cap provided to hold the axis of the pile in line with the axis of the hammer.

PART 4 - MEASUREMENT AND PAYMENT

Timber bearing piles will be measured by the number of linear feet from points of tips to heads of the piles remaining in place on the completed project. Payment shall be at the unit price stated in the Bid Proposal and shall include splicing, pointing tips; the furnishing, fitting and attaching of metal shoes or points painting, and for furnishing all other labor, tools, equipment and incidentals necessary to complete the work.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, material, equipment and incidentals to furnish and place the cofferdams as called for on the approved plans and specified herein.

The work includes using cofferdams to allow the construction of substructures in open excavation.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02200 - Earthwork for Structures and Pipelines

Section 02300 - Pile Foundations - Timbers

Section 02400 - Sheeting, Shoring and Bracing

Section 03100 - Concrete Formwork, Reinforcement and Materials

1.3 Permits and Regulations

The Contractor shall obtain all permits required by the State Water Control Board, and the United States Army Corps of Engineers.

1.4 Applicable References

- A. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.5 Submittals

The Contractor shall submit, upon request, drawings showing his proposed method of cofferdam construction and other details left to his option or not fully shown on the plans.

PART 2 - MATERIALS

Materials shall be at the Contractor's option with the approval of the Engineer.

PART 3 - EXECUTION

Cofferdams for foundation construction shall be as watertight as practicable and carried to a depth which will allow them to function properly without displacement. In general, the interior dimensions of cofferdams and cribs shall be such as to give sufficient clearance for the

construction of forms, the inspection of their exteriors, and to permit pumping from outside of the forms. Cofferdams which are tilted or moved laterally during the process of sinking shall be corrected so as to provide the necessary clearance.

When conditions are encountered which render it impracticable to dewater the foundation, the Contractor may be required to construct a concrete foundation seal of such dimensions as may be necessary and the balance of the masonry shall be placed in the dry. When a foundation seal is placed under water, the cofferdam, if it is to remain in place, shall be vented or ported at low water level.

Cofferdams shall be constructed so as to protect fresh concrete against damage from a sudden rising of the stream and to prevent damage to the foundation by erosion. Timber or bracing shall not be left in cofferdams in such a way as to extend into the substructure masonry, unless specifically authorized by the Engineer.

Excavation shall not be made outside of cofferdams, except as necessary to permit the constructing of same. The natural stream bed adjacent to the structure shall not be disturbed without permission of the Engineer. If any excavation or dredging is made before the cofferdams are sunk or in place, the contractor shall, without extra compensation after the foundation base is in place, backfill all such excavation to the original ground surface or stream bed with approved material. Material deposited within the stream area from foundation or other excavation or from the filling of cofferdams shall be removed and the stream area freed from all obstructions caused by the Contractor's operations. The Contractor shall exercise every reasonable precaution throughout the duration of the project to prevent erosion of the soil and the pollution and siltation of rivers, streams and impoundments.

The Contractor shall prepare and submit a plan indicating the precautions to be followed to prevent the aforementioned conditions. Such plan shall be approved prior to beginning work. The plan shall include, but is not limited to, the specific location of all temporary structures or other obstructions which will constrict the stream flow; a description of construction activities which will contribute to the construction of the existing stream flow; the dimensions and number of all temporary structures and constructions that are to be placed in the stream at any one time; and a dimensional elevation view of the stream and proposed temporary structures and constrictions.

The Contractor shall prevent stream constriction which would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

Unless otherwise provided, cofferdams or cribs with all sheeting and bracing shall be removed after the completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry.

PART 4 - MEASUREMENT AND PAYMENT

Cofferdams shall be measured in vertical linear feet. Payment shall be at the contract unit price stated on the Bid Proposal and shall include all materials, labor and equipment for clearing and grubbing, excavation, placement, removal and backfill.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, material, equipment, and incidentals to furnish and place the sheeting, shoring or bracing for the protection of the work, and public or private property, and for the safety of personnel as called for on the approved plans, as specified herein, or as required by field conditions and/or regulations.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02200 - Earthwork

Section 02300 - Pile Foundations - Timber

Section 02350 - Cofferdams

Section 03100 - Concrete Formwork, Reinforcement and Materials

1.3 Applicable Specifications

- A. American Association of State Highways and Transportation Officials (AASHTO)
- B. American Society for Testing and Materials (ASTM)
- C. Occupational Safety and Health Act (OSHA)

1.4 Applicable References

- A. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS

Materials shall be of metal, wood or other material acceptable to the Engineer. Sheet steel piling shall conform to ASTM A-328. Structural timber and timber piles shall conform to AASHTO M-168.

PART 3 - EXECUTION3.1 General

- A. Be fully responsible for the design and supervision of installation and removal of all sheeting, shoring and bracing required to support the excavation. Submit the design and proposed installation procedure to the Engineer for approval prior to any excavation. Approval by the Engineer will not relieve the Contractor of the responsibility for the adequacy of the shoring, and if at any time during the progress of the work it is determined by the Engineer that such design and installation is inadequate, the Contractor shall at his expense, furnish, install or make such changes in the plan or installation as may be necessary to perform the work in a manner satisfactory to the Engineer and in conformance with all applicable Local, State, and Federal regulations.

- B. The sheeting, shoring or bracing installation shall provide for the depth and width of the excavation and the characteristics and water content of the soil. Also, weather conditions, the proximity of other structures, the vibration from construction equipment and/or vehicular traffic and spoil placement or other surcharge loads shall all be taken into account.

3.2 Installation

- A. Furnish, put in place, and maintain such sheeting, bracing and shoring required to support the sides of the excavation and to prevent any movement of earth which could in any way injure persons, endanger adjacent structures and utilities, or delay the work.
- B. Whenever possible, drive sheeting ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Prevent voids outside of the sheeting. If voids are formed, fill immediately with appropriate material and compact.
- C. In areas not shown on the approved plans, where it is required to leave sheeting, shoring and bracing in place to prevent injury to proximate structures, utilities and property, or the installation, the approval of the Engineer, in writing, shall be required for payment. Cut off sheeting and bracing at the elevations specified by the Engineer.

3.3 Removal

Remove sheeting, shoring and bracing during the backfill operations. Provide additional backfill compaction around the area of the pipe or structure to fill voids left behind the sheeting and shoring as it is removed. Avoid the production of loads which will increase the safe backfill load on the pipe or structure.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Sheeting, Shoring and Bracing

- A. Timber sheet piling, shoring and bracing, left in place as shown on the approved plans, or approved by the Engineer, in writing, shall be measured in 1,000-foot-board measure (MFBM) for the materials actually left in place. Payment shall be at the unit price stated in the Bid Proposal and shall include all materials, labor, tools, equipment and incidental work necessary for the installation.
- B. Steel sheet piling, left in place as shown on the approved plans or approved by the Engineer, in writing, shall be measured in square feet (SF) for the materials actually left in place. Payment shall be at the unit price stated in the Bid Proposal and shall include all materials, labor, tools, equipment and incidental work necessary for the installation.
- C. Sheeting, shoring and bracing removed from the installation shall be considered a subsidiary obligation of the work to which it pertains. Payment for such sheeting, shoring and bracing shall be included in the unit and lump sum prices of the work to which it pertains.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials, and equipment to furnish and install gravity sewer pipe, structures, and appurtenances as specified herein and in related specifications.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork
Section 02505 – Storm Sewers
Section 02510 - Sanitary Sewers
Section 02515 – Televised Inspection of Sewers
Section 02950 - Tunneling
Section 02951 - Boring and Jacking
Section 03400 - Precast Concrete
Section 04200 - Masonry Units
Section 05500 – Structural Steel

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. American National Standards Institute (ANSI)
- C. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable Reference

- 1. Arlington County Plumbing Code (Chapter 18 of the Arlington County Code)
- 2. Arlington County Utilities Code (Chapter 26 of the Arlington County Code)
- 3. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- 4. Virginia Department of Conservation and Recreation Erosion and Sediment Control Handbook
- 5. Virginia Department of Health (VDH) and State Water Control Board Sewerage Regulations (VR 355-17-000) [Section 62.1-44.19(8) of the Virginia Code].

1.5 Submittals

Submit full descriptions and details of all pipe, valves, hydrants, and other appurtenances proposed for the project Per Section 01300 Submittals.

1.6 Quality Assurance

- 1. The Contractor shall be responsible for providing evidence that all materials used in the work meet all applicable standards and certifications. Such evidence shall comply with the requirements of Section 01300.
- 2. The Contractor shall provide ample space and other accommodations to enable the Engineer to inspect all pipe, structures, and other materials upon delivery to the site and prior to utilizing the

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GRAVITY SEWERS AND APPURTENANCES

pipe, structures and materials in the Work. The Contractor shall ensure that materials are stockpiled or otherwise stored such that the Engineer has access to all aspects and components.

3. The Contractor shall conduct a television inspection of all installed sewer installations in accordance with Section 02515 (CCTV Sewer Inspections) prior to final acceptance.

1.7 Easements

1. Sewers shall be installed within the ROW whenever possible.
2. Where the following clearances cannot be maintained within the ROW, permanent easements shall be secured to allow for maintenance and operations.
 - a. 10 feet each side of the centerline (20 feet total) for sewers 15 inches and smaller and less than 10 feet in depth.
 - b. 10 feet from the outside edge of the pipe for sewers greater than 15 inches or deeper than 10 feet in depth.

PART 2 - MATERIALS

Reinforced Concrete Pipe (RCP)

1. RCP shall conform to ASTM C-76, Class III or greater. Asbestos containing pipe or appurtenances will not be accepted.
2. RCP pipe shall be in lengths of at least 8 feet and shall be manufactured with bell and spigot ends with rubber gasket joints conforming to ASTM C443.

Polyvinyl Chloride Pipe

1. PVC pipe and fittings 15" and less shall comply with ASTM D3034.
2. PVC pipe and fittings larger than 15" shall comply with ASTM F679, T-1.
3. PVC pipe shall be in lengths of at least 12 feet, and be manufactured with integrated bell gasket joints. Joints shall comply with ASTM D3212 and gaskets shall comply with ASTM F477.
4. PVC pipe shall be less than 6 months old at the time of installation.

Precast Concrete Manholes

1. Precast manhole bases, risers, and cones shall conform to the requirements of ASTM C-478. Cones shall be eccentric. Manholes shall have a minimum internal diameter of 48 inches.
2. All sections shall be of male and female end type with a preformed groove provided in the male end for a round rubber gasket ring complying with ASTM C361 or C443. The gasket assembly alone shall provide adequate sealing to meet internal and/or external pressure requirements.
3. Precast manhole sections shall be clearly marked with the following information as applicable: ASTM designation, standard detail or drawing number, station location and designation, date of manufacture and name of manufacturer.
4. Precast manholes shall be manufactured by Americast, or approved equal.

Concrete

SECTION 02500

GRAVITY SEWERS AND APPURTENANCES

Concrete used in manhole or structure construction shall be type A3 and conform to the requirements of Section 03100 – Concrete Formwork, Reinforcement, and Materials.

Brick

Brick used in manhole bench and collar construction shall conform to the requirements of Section 04200 - Masonry Units.

Mortar

Mortar used in manhole construction shall be one part of Portland cement conforming to ASTM C150, Type II, and two parts of sand conforming to ASTM C144, with enough water added to produce mortar of the proper consistency for the type of joint.

Manhole Frames and Covers

1. Manhole frames and covers shall be constructed of gray or ductile iron conforming to ASTM A48 and A536.
2. Frames and covers shall have machined bearing surfaces to prevent rocking and rattling under traffic.
3. Manhole covers shall be as shown on the Construction Standards and as indicated on the Contract Drawings. Frames and covers shall be manufactured by Dewey Brothers Inc., or equal.

Manhole Steps

1. Manhole steps shall be a composite of a No. 3 grade 60 deformed steel bar encased in a copolymer polypropylene plastic of the “press-fit” design or rubber.
2. Steps shall be PSI-PF as manufactured by M.A. Industries or Wedge-Lok as manufactured by Delta Pipe Products, or approved equal.

Manhole Neck Adjustments

1. Adjustments to manhole necks shall be limited to 2 inches of concrete.
2. Concrete adjustment rings shall be used for adjustments in excess of 2 inches, but not to exceed 12 inches. Non-shrink grout shall be used between adjustment rings.

Quick-Setting Grout

Quick-setting non-shrink grout shall conform to the requirements of VDOT. Use Octocrete, Speedcrete, or approved equal.

Miscellaneous Metals

Structural steel, grating and miscellaneous metal shall conform to the requirements of Section 05500 - Structural Steel and Miscellaneous Metal.

PART 3 - EXECUTION

1. General

SECTION 02500**GRAVITY SEWERS AND APPURTENANCES**

1. No sewer facilities shall be constructed without approved plans, shop drawings, and construction cut sheets.
2. Sewer size, material, direction, and grade shall remain constant between manholes or structures.
3. Bring any conflicts during the installation of piping to the attention of the Engineer.
4. If any active sewers must be removed from service for any period of time, the Contractor shall submit for approval per Section 01300 a plan for diverting flow or otherwise maintaining service and capacity of the existing pipe(s) while out of service.

2. Laying Pipe

- A. PVC sewer shall not be installed with less than 3 feet of cover from the top of pipe to finished grade.
- B. PVC pipe installed with less than 14' feet of cover shall be SDR 35 (pipe stiffness of 46 psi) or stronger. PVC installed with 14 or more feet of cover shall be SDR 26 (pipe stiffness of 115 psi) or stronger. PVC shall not be installed at depths greater than 20' without special design analysis.
- C. RCP sewer shall not be installed with less than 18 inches of cover from the top of the pipe to finished grade. Refer to the table below for minimum Class requirements based upon height of cover from the top of the pipe to finished grade and pipe diameter:

	12"	15"	18"	24"	30"	36"	42"	48"	60"	72"	84"
2'	IV	III	III	III	III	III	III	III	III	III	III
3'	III	III	III	III	III	III	III	III	III	III	III
4'	III	III	III	III	III	III	III	III	III	III	III
5'	III	III	III	III	III	III	III	III	III	III	III
6'	III	III	III	III	III	III	III	III	III	III	III
7'	III	III	III	III	III	III	III	III	III	III	III
8'	IV	III	III	III	III	III	III	III	III	III	III
9'	IV	IV	III	III	III	III	III	III	III	III	III
10'	IV	IV	IV	III	III	III	III	III	III	III	III
11'	IV	IV	IV	III	III	III	III	III	III	III	III
12'	IV	IV	IV	IV	III	III	III	III	III	III	III
13'	IV	IV	IV	IV	IV	III	III	III	III	III	III
14'	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
15'	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
16'	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
17'	V	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
18'	V	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
19'	V	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
20'	V	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV

3. Laying Pipe

- A. Install PVC pipe in accordance with ASTM D2321. Install RCP pipe in accordance with ASTM C1479.
- B. Use the proper tools for the safe handling and laying of pipe. Unload pipe by hand, skidways or hoists in such a manner so that material is not dropped or damaged. Distribute pipe at site of installation near area where it is to be laid. Protect machined ends of pipe from damage and keep pipe free from dirt and debris.

- C. Lay pipe to a true uniform line and grade from elevations indicated on the drawings with continuous bearing of barrel and bells on cradle or bedding material. Excavate bedding material at bells to ensure continuous and direct bearing of all portions of the pipe and bell on bedding materials.
- D. Utilize adequate bedding material to provide a continuous and firm bearing profile for the pipe. Pay particular attention to sufficient compaction of the bedding and haunches area below the pipe springline.
- E. Lay pipe upgrade whenever possible and with the bell end pointing in the direction of work progress.
- F. Use full manufactured lengths of pipe whenever possible. Do not use short lengths of pipe with couplings unless approved by the Engineer.
- G. Plug or grout lift holes left in the pipe prior to backfilling operations.
- H. As the work progresses, clear the interior of the pipe of all dirt and superfluous materials of every description.
- I. Keep trenches and excavations free of water during construction and until final inspection. Do not lay pipe in water or in a frozen bedding condition. Prevent flotation and re-lay pipe that has floated.

4. Manholes, Catch Basins, and Other Structures

- A. All structures shall be constructed to be watertight under the anticipated loads and site conditions.
- B. Structures shall be centered along the axis of the pipes intersecting the structure, unless otherwise specified. Structures shall not be placed overtop of any other utilities.
- C. Cast-in-place concrete for structures shall be placed monolithically, or as shown on the plans. Concrete may be allowed to drop freely up to five feet in height; where greater drops are required, a tremie or other device approved by the engineer shall be used.
- D. Construct flow channels in the bottom of structures. Cast in place channels shall be a minimum of 4 inches thick 3000 psi concrete. Provide a positive means of bonding the channel to the manhole base of the structure. Flow channels shall provide a smooth transition from inlet pipe(s) to outlet pipe(s) to minimize turbulence. Benches shall be sloped towards the channel to prevent the accumulation of debris.
- E. Steps shall be provided in any structure greater than 4' in depth. Steps shall be installed in accordance with Standard Drawing M-2.0.
- F. The crown of inlet pipes shall not be lower than the crown of outlet pipes.
- G. Cut all pipes flush with the inside walls of the structures. Sanitary structures shall use a flexible rubber gasket designed specifically for the materials and the anticipated service conditions to ensure a watertight and flexible joint.
- H. Adjust frame and cover to match finished grade using concrete adjusting ring(s).

5. Abandonment of Sewers

- A. Sewers to be abandoned may be excavated and removed or abandoned in place as detailed below.
- B. Structures to be abandoned in place shall be excavated and removed to a minimum depth of 2' below finished grade. The remainder of the structure shall be filled with flowable fill, 21A

aggregate, or sand. #57 aggregate may be used if all openings of the structure are completely covered with filter fabric to prevent migration of adjacent fines.

- C. Sewers to be abandoned in place shall be capped at all open ends and completely filled with flowable fill.

6. As Built Plans

- A. Prior to Final Release & Payment, the Contractor shall submit one set of As-Built drawings per Section 01300 and meeting industry standards for clarity, detail, and precision. As-Built drawings shall include a certification from the Contractor that the plans as drawn indicate actual construction.
- B. The As-Built drawings shall include, at a minimum:
 - a. Invert Elevations
 - b. Manhole top elevations
 - c. Percent of grade between manholes
 - d. Horizontal distance between manholes
 - e. Any material changes
 - f. Location of connection to existing system measured from nearest structure
 - g. Location of pipe connections, including service lines, measured from nearest manhole
 - h. Actual location, depth or elevation, and type and size of all utility crossing.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Sewer

Sewer pipe for the various materials, classes, and sizes shown on the plans shall be measured in linear feet along the center line of the pipe and shall be measured from inside wall of structure to inside wall of structures. Payment shall include the furnishing of all pipe and fittings, all necessary tests, excavation, removal and disposal of existing pipes, removal and disposal of unsuitable or surplus material, placement of bedding and backfill as shown in Standard M-3.0, restoration, and all work incidental to providing a complete sewer installation.

4.2 Manholes

Manholes for the various internal diameters shall be measured by the vertical foot from the invert of the outlet pipe to the top of the manhole cover. Payment shall include excavation, backfill, bedding, foundation, base and components, channels, sleeves, frame and cover, intermediate landings, steps, restoration and all other work necessary for a complete installation.

4.3 Adjust Existing Manholes to New Grade

Adjusting existing manhole tops to meet new grades, for the various types of adjustments listed in the Standard details, shall be measured as each. Payment shall include all materials, labor, and incidentals necessary for complete adjustment.

4.4 Excavation Below Grade and Additional Bedding

Over excavation, additional bedding and associated work shall be measured and paid in accordance with Section 02200.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, supervision, materials and equipment to furnish and lay all storm sewer pipe and appurtenances to the lines and depths called for on the approved plans and as specified in Section 02500 Gravity Sewers and Appurtenances.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork
Section 02500 – Gravity Sewers and Appurtenances
Section 02510 - Sanitary Sewers
Section 02515 – Televised Inspection of Sewers
Section 02950 - Tunneling
Section 02951 - Boring and Jacking
Section 03400 - Precast Concrete
Section 04200 - Masonry Units
Section 05500 – Structural Steel

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. American National Standards Institute (ANSI)
- C. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable Reference

- 1. Arlington County Plumbing Code (Chapter 18 of the Arlington County Code)
- 2. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- 3. Virginia Department of Conservation and Recreation Erosion and Sediment Control Handbook

PART 2 - MATERIALS2.1 Precast Concrete Blocks

Precast concrete blocks shall conform to ASTM C-139.

PART 3 - EXECUTION3.1 General

- A. Storm sewers shall be RCP as specified in Section 02500 Gravity Sewers. Other materials may be approved on a case by case basis.

- B. Maintain a minimum 5-foot horizontal distance between storm sewer and all other utilities.
- C. The minimum vertical clearance between storm sewer and other utilities shall be 1.0 foot, unless provisions to prevent damage to the underlying utility are detailed for approval by DPW.

3.2 Catch Basins and Structures

- A. Joints for masonry structures shall be completely filled and shall be smooth and free of surplus mortar on the inside of the structure.
- B. Structures shall be parged on the inside using portland cement mortar 1/2" thick.
- C. Concrete blocks shall be 12" in length. For structures less than 6' in depth, 6" thick concrete blocks may be used. For depths from 6' to 12', 8" thick blocks shall be used. For depths greater than 12', 12" thick blocks shall be used.
- D. When possible on storm drainage inlets, manhole covers shall be positioned over the outgoing pipe.
- E. Whenever grate inlets are used, they shall be bicycle friendly and placed such that the inlet openings run perpendicular to any anticipated traffic flow.
- F. Shape inverts per drawing D-2.1.
- G. Angle iron and frame and cover shall be painted with black asphaltic paint.
- H. A construction joint shall be provided in the gutter at the outside edges of each catch basin. The gutter between the outside edges of a catch basin shall be considered part of the catch basin and this work shall be included in the payment for catch basins.

3.3 Design Requirements

Storm sewers shall be designed as described in the VDOT Drainage manual, with the exceptions defined below:

- A. The 10-year storm shall be the basis of design except for conditions in which severe threat to property or life would result from system failure, in which case the 100-year storm should be the design basis.
- B. Storm sewer inlets on residential streets shall be located to prevent stormwater from overtopping the curb during the design storm. The design shall account for a 1" freeboard between the top of curb and gutter flow depth. Gutter flow spread shall not be permitted to overtop the crown of the roadway. On streets other than residential, storm sewer inlets shall be placed in accordance with the requirements of the VDOT Drainage Manual.

3.4 Valley Gutters

- A. Concrete valley gutters may be utilized where placement of drainage inlets would not be feasible due to lack of drainage infrastructure and/or conflicts with other infrastructure.
- B. Valley gutters should be used only on residential streets. For streets with greater than 1500 vehicles per day, valley gutters shall only cross stop controlled legs of an intersection.
- C. Valley gutters shall be constructed of Class A3 concrete, 9" thick, placed on a 6" base of crushed aggregate, with welded wire fabric as shown in VDOT Road and Bridge Standard PR-2, and per detail R-2.9.
- D. Valley gutters shall be capable of carrying the design storm runoff entirely within the concrete conveyance area.

3.5 Private Connections

- A. Storm Sewer Connections are privately owned and maintained from the storm sewer main up to and including the property served. Pipe and fitting for storm sewer service connections shall conform to the requirements of the Arlington County Plumbing Code and Plumbing Code adopted by the State of Virginia.
- B. Connections directly to pipes shall not be allowed without specific approval by the DES Engineering Bureau and issuance of appropriate permits. Where specifically permitted by DES, connections to existing pipes shall be made using saddles or fittings designed specifically for use on the pipe material which it is proposed to be used upon. Concrete saddles shall not be permitted.
- C. For connections to pipes 24" and smaller, the saddle shall be a strap-style saddle, with straps extending around the entire circumference of the pipe. Connections to pipes larger than 24" shall use saddles or fittings specifically designed and manufactured for such connection, with appropriate anchors. When anchors are set into concrete pipes, expansion anchors shall not be permitted. Such fittings or saddles shall eliminate any encroachment of the pump discharge pipe into the flow line of the existing pipe when flowing full. Saddles shall provide flexural relief for the pump discharge line without transmitting any stress onto the storm sewer pipe.
- D. No mechanical discharge of groundwater, stormwater, or other collected water onto the public right of way shall be permitted. Gravity drainage from roofs or area drains through the curb will be permitted.
- E. Connections to existing storm sewer mains shall be at manholes or inlets. The connection shall be made by core-drilling the structure and using a manhole adaptor appropriate for the pipe and structure materials. Connections at brick or masonry structures shall be made by carefully chiseling or removing single bricks or blocks such that the clearance between the connection pipe and any portion of the manhole is minimized.

PART 4 - MEASUREMENT AND PAYMENT

Payment shall be as described in Section 02500 Gravity Sewers, except the items listed below.

4.1 Catch Basins and Yard Inlets

Catch basins, and yard inlets, shall be measured as each. Payment shall include excavation, bedding, backfill, concrete base and invert, walls, top, frame and cover, gutter or apron, steps, restoration, and all other work necessary for a complete installation.

4.2 Catch Basins or Other Structures Converted to Manholes

Catch basins, or other structures converted to manholes shall be measured as each. Payment shall include demolition, excavation, backfill, modification work necessary to convert the structure, steps if required by Standards, restoration, and all other work necessary for a complete installation.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, supervision, materials and equipment to furnish and lay all sanitary sewer pipe and appurtenances to the lines and depths called for on the approved plans and as specified in Section 02500 Gravity Sewers and Appurtenances.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork
Section 02500 – Gravity Sewers and Appurtenances
Section 02505 - StormSewers
Section 02515 – Televised Inspection of Sewers
Section 02950 - Tunneling
Section 02951 - Boring and Jacking
Section 03400 - Precast Concrete
Section 04200 - Masonry Units
Section 05500 – Structural Steel

1.3 Applicable Specifications

- A. American National Standards Institute (ANSI)
- B. American Society for Testing and Materials (ASTM)
- C. American Water Works Association (AWWA)

1.4 Applicable Reference

- A. Arlington County Plumbing Code (Chapter 18 of the Arlington County Code)
- B. Arlington County Utilities Code (Chapter 26 of the Arlington County Code)
- C. Plumbing Code adopted by the State of Virginia
- D. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- E. Virginia Department of Conservation and Recreation Erosion & Sediment Control Handbook
- F. Virginia Department of Health (VDH) and State Water Control Board Sewerage Regulations (VR 355-17-000) [Section 62.1-44.19(8) of the Virginia Code].

1.5 Submittals

Submit full descriptions and details of all materials, and appurtenances proposed for the project Per Section 01300 Submittals

1.6 Quality Assurance

A. Sanitary Sewer Field Tests

Conduct field tests as specified in paragraph 3.6.

B. Force Main Field Tests

Hydrostatic testing of force mains shall conform to the hydrostatic testing specifications of Section 02550, except that the entire force main may be pressure tested at one time.

1.7 Definitions

- A. Terminal Sewer – Any sewer which has no other common sewers discharging into it.

PART 2 - MATERIALS

2.1 Polyvinyl Chloride pipe (PVC)

PVC pipe shall be as specified in Section 02500 Gravity Sewers and Appurtenances.

2.2 Concrete Pipe

Concrete pipe smaller than 12-inch shall not be used as sanitary sewer pipe. Concrete pipe shall be as specified in Section 02500 Gravity Sewers and Appurtenances.

2.3 Ductile Iron Pipe (DIP)

Ductile iron pipe shall conform to AWWA C-151 (ANSI A21.51), minimum class 52. Pipe lining shall be corrosion resistant to sewer gas, sewercoat, protecto 401 or approved equal and shall have mechanical or push-on joints utilizing rubber gasket rings conforming to AWWA C-111 (ANSI A21.11). Fittings shall be ductile-iron, mechanical joint conforming to AWWA C-110 (ANSI A21.10) with double cement lining. Force mains shall be minimum class 52 ductile iron pipe.

2.4 Vitrified Clay Pipe

Vitrified clay pipe shall not be used as sanitary sewer pipe.

2.5 Asbestos-Cement Pipe

Asbestos-cement pipe shall not be used as sanitary sewer pipe.

2.6 Manhole Covers

Manhole covers shall be watertight, and as specified in Section 02500 Gravity Sewers and Appurtenances

PART 3 - EXECUTION

3.1 Design Basis

A. Per Capita Flow

New sanitary sewer systems shall be designed on the basis of an average daily per capita flow as follows:

<u>Establishment</u>	<u>Average Daily Usage</u>
Single Family	225 gallons per day (gpd)/unit
Multi-Family	205 gpd/unit
Apartment	160 gpd/unit
Hotel	80 gpd/room
Manufacturing	0.03 gpd/sq. ft. GFA
Transportation	0.03 gpd/sq. ft. GFA
Trade	0.11 gpd/sq. ft. GFA
Office	0.05 gpd/sq. ft. GFA
Restaurant	0.40 gpd/sq. ft. GFA
Service	0.09gpd/sq. ft. GFA
Intensive Service	0.50 gpd/sq. ft. GFA
Other	0.07 gpd/sq. ft. GFA
School	0.03 gpd/sq. ft. GFA
Church	1000 gpd/church

Note: GFA = Gross Floor Area

B. Peak Flow

- 1 Sanitary Sewers shall be designed to accommodate Peak Flow as determined by multiplying a Peak Flow Factor by the calculated Average Daily Usage.
- 2 For Terminal Sewers, or any sewers which collect only Terminal Sewers, the Peak Flow Factor shall be 4.0
- 3 For all other sewers, the Peak Flow Factor shall be 3.0
- 4 Force Mains shall be designed to accommodate a Peak Flow Factor of ____

3.2 Sanitary Sewer Design Criteria

Sanitary sewers shall be designed and installed in accordance with Arlington County Standard Details and Specifications, the Virginia Department of Health and State Water

Control Board Sewerage Regulations, Water Pollution Federation Standards, the Uniform Statewide Building Code of Virginia, and the following design criteria:

- A. All data regarding size of building, type of occupancy, number of occupants and estimated peak water demands as applicable for all buildings within the proposed development shall be furnished to DES to substantiate sanitary sewer main sizes. The final size of all sanitary sewer mains and appurtenances shall be determined by DES.
- B. Sanitary sewer mains shall be a minimum 8-inches in diameter and shall be installed in straight alignment and grade between manholes. Minimum sewer slopes should be 0.5%. Minimum slopes for terminal sewer segments and sewers serving less than 10 households or their equivalent should be 1.0%. Slopes less than those mentioned above shall only be considered for approval by DES in extreme cases with justification provided by the Engineer. Absolute minimum allowable slopes for various sized pipes shall conform to Virginia Department of Health Sewerage Regulation VR 355-17-106.05(c) for non-settled sewage. Maximum sewer slopes shall be 15%. Slopes shall be determined between centers of manholes.
- C. Sanitary sewers shall be installed at depths sufficient to serve existing and proposed basements. Minimum cover over sewers shall be 6 feet in streets and areas subject to vehicular traffic and shall be 4 feet in other areas.
- D. Stream and estuary crossings shall have a 3 foot minimum cover if possible and sewer pipe shall be ductile iron encased in concrete from manhole to manhole. The pipe and joints shall be tested in place and shall exhibit zero infiltration. Sewers located adjacent to streams shall be located outside of the stream bed whenever possible and should be sufficiently removed there from to provide for possible future channel widening.
- E. Gravity sewer size shall remain constant between manholes. Where a smaller sewer enters a larger one, the relative elevations of the inverts of the sewers shall be arranged to maintain approximately the same energy gradient.
- F. When pipe velocities greater than 15 feet per second are expected, special provisions shall be made to protect pipes and structures against internal erosion due to high velocity and corrosive gases. The pipe shall conform to applicable ASTM, AWWA, ANSI, or other appropriate standards or specifications which provide protection against internal erosion.
- G. Sanitary sewers shall be installed within street right of way and shall follow the street centerline wherever possible. The sewer shall extend a minimum of 10 feet along the property frontage of the last house being served. Sewers shall not be located longitudinally under walks. Sewers may be installed within recorded

- easements as specified in Section 02500 Gravity Sewers and Appurtenances when locations in public right of way are not possible.
- H. The minimum clear horizontal separation between sanitary sewer mains or sewer manholes and water mains shall be 10 feet. When local conditions prevent a minimum separation of 10 feet, a closer separation may be allowed provided that:
1. The top (crown) of the sanitary sewer main shall be a minimum of 18 inches below the bottom (invert) of the water main. The sewer main and water main shall be kept in separate trenches. Where minimum vertical separation cannot be obtained, the sanitary sewer shall be constructed of ductile iron pipe and pressure tested in place without leakage prior to backfilling.
- I. Sewer mains crossing under water mains shall be laid to provide a minimum vertical separation of 18 inches between the top of the sewer and bottom of the water main. If local conditions prevent this, the water main shall be relocated to provide the separation directed by the Engineer, or the sewer shall be constructed of ductile iron pipe, pressure tested in place without leakage before backfill, and with no joint of the sewer closer than 8 feet of the water main.
- J. Sanitary sewer mains crossing over water mains shall maintain a minimum vertical separation of 18 inches between the top of the water main and the bottom of the sewer. The sanitary sewer shall be constructed of ductile iron pipe, pressure tested in place without leakage before backfill. Provide adequate structural support for the sewer to prevent joint deflection or settlement on or breakage of the water main (refer to Standard Drawing M-7.0).
- K. The minimum clear horizontal separation between sanitary sewer and utilities other than water main shall be 5 feet.
- L. The minimum vertical clearance between sanitary sewer and utilities other than water main shall be 1.0 foot, unless provisions to prevent damage to the underlying utility are detailed for approval by DES.
- M. Individual building or house sewer services 5 inches and smaller shall be connected to the sanitary sewer main in accordance with the Arlington County Plumbing Code. Sanitary sewer services 6 inches and larger and sewer services serving more than one building, townhouse or similar structure shall be connected to a manhole on the sanitary sewer main as directed by DES. Existing manholes receiving new sewer services must be approved by DES and shall be reconstructed or replaced as directed by DES to meet current Standards. No sanitary sewer service taps shall be made in trunk sewers 15 inches and larger without special approval from DES.

- N. Ventilation of gravity sewer systems shall be provided where continuous watertight sections (including manholes with watertight covers) greater than 1,000 feet in length are incurred [conforms to Virginia Department of Health Sewerage Regulation VR 355-17106.07(G)].
- O. Sanitary sewer lines constructed in fill areas shall be continuous ductile iron (CL-50) run from manhole to manhole. Fill material beneath the pipe shall be select material compacted to 95 percent density at optimum moisture (ASTM Proctor Test). Refer to 3.4C for manholes in fill areas.

3.5 Sewer Service Connections

Sewer service connections to the sanitary sewer main shall be made only by a licensed plumber and in accordance with the Plumbing Code adopted by the State of Virginia and the Arlington County Plumbing Code. No sewer service connections shall be made within 2 feet of any joint in the sanitary main or within 5 feet along the pipe leading from a terminal manhole. The minimum allowable distance between sewer service connections at the sewer main shall be 3 feet. No house service lateral shall be connected to an existing manhole without the special approval of DES.

3.6 Sanitary Sewer Acceptance Tests

- A. General: Acceptance tests shall not be made until all sanitary sewer pipes, manholes and required building spurs have been installed, and the pipe trenches are backfilled to the finished grade and compacted. Prior to backfilling sanitary sewer sections, the Contractor may perform preliminary tests at his own discretion without the presence of the Engineer. The Contractor shall schedule the final acceptance tests with the Engineer at least 48 hours in advance. Final acceptance tests shall be performed in the presence of the Engineer or his duly authorized representative. All material, equipment and labor required shall be provided by the Contractor. Sewer pipes shall be tested from manhole to manhole or from manhole to terminus. Sections passing the acceptance tests shall continue to be maintained by the Contractor until a satisfactory final inspection of the entire sewer system is completed.
- B. Low Pressure Air Tests: Sanitary sewer sections of one diameter only and above the ground water table shall be tested using low air pressures after completion of backfill and before hookup of house connections. Temporarily cap and securely brace all laterals for the test. Inspect sewers and manholes prior to testing and remove all soil and debris by thoroughly flushing the lines. Dispose of soil and debris without using the existing sewer system. Provide and securely brace test plugs at each manhole. After all personnel are removed from manholes, add air slowly to the portion of the pipe being tested until internal air pressure is held at a test pressure of 4.0 pounds per square inch (psi) for a minimum of two minutes. Pressure gauges used in the air test procedure shall be calibrated in divisions of 0.10 psi.

- If, in the Engineer's opinion, there is any indication of leakage at the test plug, relieve the internal pressure before taking steps to eliminate the leak. After the two-minute holding period at 4.0 psi, disconnect hose and compressor from the pipe section being tested. If pressure decreases to 3.5 psi, observe and record the time required for the pressure to drop 1.0 psi from 3.5 to 2.5 psi. Pipes failing to maintain minimum acceptable holding times in accordance with the most current version of ASTM-C828 will not be accepted.
- C. Mandrel Testing: All PVC sewer lines shall require Mandrel testing in addition to air test acceptance to determine if they are within the allowable deflection tolerance. The Contractor shall perform the deflection test by utilizing an approved go/no go multi-arm mandrel which meets ASTM D-3034 dimensions for 7.5 percent deflection limit.
- D. Manhole Testing: Manholes shall be tested using one of the methods listed below. Manholes may be tested for leakage at the same time that gravity sewer lines are being tested for leakage. Manhole inverts shall be completed before testing is performed.
- a. Vacuum testing shall include vacuum pump, certified vacuum gauge with a range of 0 to 30 inch mercury (Hg.), sealing element with manhole support brace and air pressure to monitor the inflatable sealing ring. Evacuate the manhole to 10 inches Hg. for the specified test period using the chart provided. If the vacuum drops less than one inch mercury within the test time the manhole is considered acceptable.
 - b. When exfiltration testing is used, the allowable leakage shall not exceed one-half gallon per hour. This equates to 0.25 or ¼-inch per four hour test period. The inflatable plugs or stoppers shall be positioned in the lines far enough from the manhole to ensure testing of those portions of the lines not air tested. The manhole shall then be filled with water to the top of the manhole rim. A 24-hour soak shall be allowed prior to testing. After test completion the water shall be pumped from the manholes and disposed of properly.
 - c. Under no circumstances shall water be allowed to enter the existing sanitary sewer system. If water drop in manhole exceeds the allowable leakage during the test period the Contractor shall make repairs or replacement at no cost to the County and retest as specified above.
- E. In addition to passing air test requirements, sanitary sewer sections below the ground water table shall be tested using the following infiltration test procedure. The Contractor shall provide all material, labor and equipment for the infiltration tests.

- a. Plug upper section of pipe system after flushing and cleaning section in conformance with paragraph B above. Place a weir in the downstream invert of pipe in a plumb and level position. Read the infiltration after an elapsed time of 30 minutes with the line of sight level to the weir line. Flow rates shall not exceed 100 gal./day/inch of diameter/mile. Readings that exceed 100 gal./day but are below 1,500 gal./day shall be remeasured using a weir with spout such as the –"Pomon-o-Weir" or equivalent.
- F. Sewer sections containing a large amount of lateral volume or sewer sections partially submerged, shall be air-tested using the appropriate criteria stipulated in ASTM Designation C-828 to ensure accuracy of the test procedure.

VACUUM TEST TABLE

Specified test period for vacuum to
Drop less than one-inch mercury

Manhole Depth In Feet	4-Foot Inside Diameter (seconds)	5-Foot Inside Diameter (seconds)	6-Foot Inside Diameter (seconds)
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	65
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

AIR TEST TABLE

Based on Equations from ASTM C828

SPECIFICATION TIME (min:sec) REQUIRED FOR PRESSURE DROP
FROM 3-1/2 to 2-1/2 PSIG WHEN TESTING ONE PIPE DIAMETER ONLY

PIPE DIAMETER, INCHES

PIPE LENGTH (FEET)	4	6	8	10	12	15	18	21	24
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SECTION 02510**SANITARY SEWERS AND APPURTENANCES**

25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	1:20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30		
175	0:31	1:09	2:03	3:13	4:37	7:05			
200	0:35	1:19	2:21	3:40	5:17				
225	0:40	1:29	2:38	4:08	5:40				
250	0:44	1:39	2:56	4:35					
275	0:48	1:49	3:14	4:43					
300	0:53	1:59	3:31						
350	1:02	2:19	3:47						
400	1:10	2:38							
450	1:19	2:50							
500	1:28	2:50	3:47	4:42	5:40	7:05	8:30	9:55	11:20

PART 4 - MEASUREMENT AND PAYMENT**4.2 Sewer Service Connections**

Sewer service connections shall be measured in linear feet along the center line of the main sewer, from the center line of main sewer to the end of the cap of where tied into the existing line. Payment for house connections shall include the plumbing permit, sewage excavation, backfill, tapping main sewer, pipe, fittings, and all cap work incidental to a complete and operable house connection.

4.3 Sanitary Sewer Force Mains

Measurement and payment shall be as per Section 02500, and shall also include thrust blocks, anchorage, and any other restraint required.

4.6 Drop Connections

Drop connections for the various sizes and depths shown on the bid proposal shall be measured as each. Payment shall be at the unit price stated in the bid proposal and shall include all materials, labor and incidentals necessary for a complete and operable installation.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials, equipment to inspect sewer pipes using closed circuit television technology as specified herein.

1.2 Related Work Specified Elsewhere

Section 02500 – Gravity Sewers and Appurtenances
Section 02505 – Storm Sewers
Section 02510 - Sanitary Sewers & Appurtenances

1.3 Applicable Specifications

- A. National Association of Sewer Service Companies (NASSCO)

1.4 Submittals

Provide copies of the inspection and electronic reports complying to NASSCO Pipeline Assessment and Certification Program (PACP) standards for all segments of sewer and manholes inspected.

1.5 Quality Assurance

- A. The vendor performing the Television Inspections shall hold a valid NASSCO PACP certification.

PART 2 - MATERIALS2.1 Equipment

The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Project Officer. The Equipment shall provide a means of accurately measuring distance from manhole or other structure to an accuracy of no less than 6 inches.

PART 3 - EXECUTION3.1 General

- A. After cleaning, all sewer sections shall be visually inspected by means of closed-circuit television. The inspection will be done one segment at a time from manhole to manhole and the flow in the section being inspected will be suitably controlled. All CCTV inspections and documentation shall be performed in accordance with NASSCO PACP standards including the specific date and time of inspection.
- B. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition and any connections. In no case will the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire sewer segment between manholes, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If, again, the camera fails to pass through

the entire sewer segment, the inspection shall be considered complete and noted as "Survey Abandoned" with the specific reason.

- C. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to insure good communications between members of the crew.
- D. The Contractor shall stop the camera and visually inspect all entering pipe connections and other features of interest.

3.2 Documentation

- A. All documentation shall clearly reference the adjacent structure numbers for each segment of pipe inspected.
- B. Electronic media location records shall be kept by the Contractor and will clearly show the location, by distance in 1/10 of a foot or nearest mm, from the manhole wall, in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots, storm sewer connections, cracks, fractures, broken pipe, presence of scale and corrosion, and other discernible features, as defined in the PACP defect codes, will be recorded on electronic media and a copy of such records will be supplied to the Owner.
- C. Digital photographs of the pipe condition and all defects shall be taken by the Contractor. Photographs shall be located by distance, in increments of 1/10 of a foot, from the adjacent manhole or structure wall.
- D. Electronic media recordings shall be in a format and media which is acceptable to the Project Officer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Television Inspection

Where specifically included as a payment item, payment shall include the labor, materials, equipment, operations, maintenance of traffic, operational modifications to the existing system, and any other work incidental to Television Inspections. If not included as a specific pay item, Television Inspection should be considered a subsidiary obligation to installation of any new sewer.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, supervision, materials and equipment to install all water pipe and appurtenances to the lines and depths as called for on the approved plans and as described herein for a complete and operable water distribution system.

1.2 Related Work Specified Elsewhere

Section 02200 - Earthwork for Structures and Pipelines

Section 02950 - Tunneling

Section 02951 - Boring and Jacking

1.3 Applicable Codes, Standards, and Specifications

- A. American National Standards Institute (ANSI)
- B. American Society for Testing and Materials (ASTM).
- C. American Water Works Association (AWWA).
- D. National Fire Protection Association (NFPA)
- E. Arlington County Fire Protection Code (Chapter 8 of the Arlington County Code)
- F. Arlington County Plumbing Code (Chapter 18 of the Arlington County Code).
- G. Arlington County Utilities Code (Chapter 26 of the Arlington County Code).
- G. Plumbing Code adopted by the State of Virginia

1.4 Applicable References

- A. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code).
- B. Virginia Department of Health (VDH) Waterworks Regulations (12 VAC 5-590)

1.5 Submittals

Submit full descriptions and details of all pipe, valves, hydrants, and other appurtenances proposed for the project Per Section 01300 Submittals.

1.6 Quality Assurance

- A. The manufacturer shall provide facilities or a certified laboratory for conducting load bearing and other tests required by the referenced specifications such as the ASTM.
- B. The Engineer will inspect pipe, fittings and joint material upon delivery to the site. The Contractor shall provide ample space between rows of stockpiled pipe to facilitate adequate inspections.

PART 2 - MATERIALS**2.1 General**

- A. All materials shall be suitable for 150 pounds per square inch (psi) working pressure unless otherwise indicated.
- B. Pipe of the same size and material shall be furnished by the same manufacturer. Each pipe length and fitting shall be clearly marked with the manufacturer's name, trademark and class of pipe.
- C. Materials shall be recently manufactured and unused. Only previously approved manufacturers items may be furnished.

2.2 Iron Pipe

- A. Iron pipe shall be ductile iron conforming to AWWA C151 (ANSI A21.51), class 53 minimum for 6-inch pipe and class 52 minimum for 8-inch and larger pipe. Pipe shall be single cement lined conforming to AWWA C104 (ANSI A21.4) and shall have mechanical or push-on joints utilizing rubber gasket rings, conforming to AWWA C111 (ANSI A21.11). Coatings shall be bituminous 1.0 mil. thick.
- B. Fittings shall be mechanical joint ductile iron conforming to AWWA C110 (ANSI A21.10), with a minimum pressure rating of 250 psi, or ductile iron compact grade conforming to AWWA C-153 (ANSI 21.53) with a minimum pressure rating of 350 psi. Fittings shall be cement lined conforming to ANSI A21.4.
- C. Polyethylene encasement with a minimum thickness of 8-mils shall be applied to all underground ductile pipe installations and shall comply with the installation and material requirements of AWWA C-105 and ANSI A21.5. All pipes, fittings, valves, hydrants and branch connections shall be

encased as shown on approved plans. All holes and openings of any size shall be repaired in accordance with the manufacturer's recommendations.

2.3 Tie Rods and Accessories for Anchorage and Mechanical Joint Restraints

- A. Tie rods, tie bolts and accessories shall be manufactured of Cor-Ten corrosion resistant steel, ASTM-A242, Super Star series of Star National Products or approved equal.
- B. Mechanical joint restraints shall be used with all water main appurtenances as directed or as approved by the engineer. Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Restraining devices shall be manufactured of ductile iron. Torque limiting twist off nuts shall be used to insure proper installation of the restraining device. The minimum working pressure shall be at least 250 psi and shall be manufactured by EBAA iron, inc., MEGALUG or approved equal.

2.4 Gate Valves

- A. Gate valves, 4-inch through 12-inch, for buried installation shall be ductile or grey cast iron, resilient wedge type, O-ring sealed, non-rising stem, fitted with a 2-inch operating nut opening left, with mechanical joint and/or flanged ends, as indicated on the drawings. Valves shall conform to AWWA C-509 (grey iron) or C-515 (ductile iron) requirements. Provide buried valves with valve boxes. Provide extension stems extended within two feet of finished grade if required for valve depth. Valves shall be American Flow Control Series 2500-1, Mueller A-22360, U.S. Pipe USPO valve, Kennedy KS, or approved equal.
- B. Gate valves 14" and larger shall be iron body with fusion epoxy coating conforming to AWWA C 550 bronze mounted, double disc, resilient wedge, O-ring sealed, non-rising stem, fitted with a 2" operating nut opening left, with mechanical joint and/or flanged ends as indicated on the drawings. 14" gate valves may be installed in vaults or buried with valve boxes and extension stems placed within two feet of finished grade if required for valve depth. Gate valves 16" and larger shall be installed in vaults with or without NRS bypass valve as indicated on the drawings. Valves shall conform to AWWA C-500 requirements and shall be Mueller Co. 2360 series or approved equal.

- C. Gate valves 3" to 8" for water meter and/or fire line vault or interior installation shall be iron body, bronze mounted, resilient wedge , bolted bonnet, 250 psig maximum working pressure class 125 psi, outside screw and yoke, rising stem with hand wheel, opening left, with flanged ends. Valves shall be Mueller Co. 2360 series or approved equal.
- D. Gate valves 2" and smaller shall be bronze body, solid disc, union bonnet, class 150 psi minimum, non-rising stem with hand wheel, opening left, with inside threaded ends. Valves shall be Stockham Model B-128 , Crane Model No. 426, or approved equal.

2.5 Butterfly Valves, Check Valves and Cone Valves

Butterfly, check, and cone valves shall be as directed by the Engineer on a special project basis.

2.7 Fire Hydrants

- A. Fire hydrants shall be dry top, dry barrel compression type, with a valve opening of 5-1/4inches, double O-ring seals and safety flange, and shall conform to AWWA C502 requirements.
- B. Hydrants shall be provided with two 2-1/2 inch hose outlets and one 4-inch pumper outlet with threading conforming to NFPA No. Standard 1963, *Standard for Fire Hose Connections*, requirements for American National Fire Hose Connection Screw Threads (NH), 6-inch mechanical joint inlet connection, National Standard 1-1/2 inch pentagon operating nut and outlet cap nuts, chains on outlet caps, and harnessed lugs. Hydrants shall open left and counterclockwise. Fire hydrants shall be painted with an exterior type industrial coating enamel. The upper barrel including bonnet and hose nozzle caps shall be painted "National Standard Yellow" using Duron Duraclad 12-10611 or approved equal. Hydrants shall be Mueller Super Centurion 250, American AVK or approved equal.

2.8 Valve Boxes

Valve boxes shall be of the two-piece, sliding type 5-1/4-inch shaft, cast iron kind. Valve box shall read "Water" Valve boxes shall be as manufactured by Bingham and Taylor Company, Capitol Foundry, or Tyler Company and conform to their standard dimensions.

2.9 Copper Pipe

Copper pipe shall be seamless water tube, AWWA type K conforming to ASTM designation B88 requirements. Fittings shall be underground copper service flared type.

2.10 Water Meters and Services by Arlington County

Water meters, including taps, pipe fittings, meter box and accessories from the water main through the meter, will normally be furnished and installed by the Arlington County Department of Environmental Services (DES) after payment of the appropriate fee. The connection from the back side of the meter installation to the building shall be installed by the owner's plumber.

2.11 Water Meters and Services by Contractor

- A. The Department of Environmental Services shall approve all water meter locations. Water meters shall be located in the utility strip or just behind the curb within public right-of-way or recorded easements and a minimum of 5 feet horizontally clear from other utilities, structures, or trees.
- B. The Contractor shall assume complete responsibility for the installation, adjustments and any damage that may occur until final acceptance of the project.
- C. New water mains shall pass all acceptance testing procedures before the installation of water service connections.
- D. All services shall be installed by wet tap only. Service taps shall be located at the 10:00 and 2:00 position on the water main. Maintain a minimum of 12 inches between taps. Direct taps are allowed for ¾ inch and 1 inch connections. Use approved saddles for 1 ½ inch and 2 inch connections.
- E. Water service lines shall have a minimum of three feet of cover and shall be approved by the engineer, from the main to the meter prior to backfilling. Meter settings for 1-inch to 2 inch services shall be a minimum of 18-inches and a maximum of 24-inches below the meter box cover. Meter box covers shall be painted black with an exterior type of rust resistant enamel.
- F. Meter boxes, meter box covers, corporation stops, angle valves, yoke ells, yoke bars and all other appurtenances (except the water meter) necessary for a complete installation shall be provided in accordance with the approved plans, specifications and requirements of DES. Meter box covers shall be furnished by Bingham and Taylor, Capitol Foundry, or approved equal.

2.12 Air Release Valves

Air release valves shall be constructed of cast iron body and cover conforming to ASTM A126.GR.B requirements. The float shall be stainless steel conforming to ASTM A240 requirements. Air release valves shall be manufactured by Apco, Crispin or approved equal.

2.13 Tapping Sleeves and Valves

Tapping sleeves and valves shall conform to the applicable requirements specified herein for installation on the existing type of pipe described below.

- A. Iron Pipe: The tapping sleeve shall have an iron body, mechanical joint, with gaskets, suitable for installation on the existing iron pipe. The tapping sleeve shall be as manufactured by Mueller Company No. H-615 or approved equal. Tapping valves shall conform to the applicable requirements specified herein for gate valves. All stainless steel tapping sleeves shall be type 304 stainless steel with stainless steel flange and full circumferential seal as manufactured by JCM style 432 and Ford style FAST or approved equal.
- B. Concrete Pipe: The tapping sleeve shall be in accordance with AWWA Manual M-9. The sleeves shall have a separate gland which permits installation of the sleeve prior to the cutting of the prestress wires. The gland shall have a fusion epoxy coated (per AWWA C-213-79) waterway, and a broad gasket set in a retaining groove of a draw flange to eliminate flexing. The gland shall be equipped with load bearing set screws to protect the cylinder. Sleeves shall be furnished with grouting seals and grout horns to facilitate filling the space between the sleeve and the pipe. Tapping sleeves shall be JCM 415 or approved equal.

2.14 Inserting Valves

Inserting valves shall be EZ Valve as manufactured by Advanced Valve Technologies, LLC, InsertValve™ or approved equal

2.15 Service Clamps

Service clamps shall have cadmium zinc plated be double steel straps and ductile iron body with corporation stop thread of appropriate size, neoprene gasket cemented in place, cadmium zinc plated nuts and straps and shall be the diameter required. Clamps shall be as manufactured by Ford, Mueller, Romac Industries, Smith Blair, JCM Industries or approved equal.

2.16 Manhole Frames and Covers

Manhole frames and covers shall conform to the requirements of Section 02500 Gravity Sewers, or as specified on the plans.

2.17 Manhole Steps

Manhole steps shall conform to the requirements of Section 02500 Gravity Sewers

PART 3 - EXECUTION

3.1 Water Main Design Criteria

Water mains shall be designed and installed to conform to Arlington County Standards and Specifications, the Virginia Department of Health Waterworks Regulations, American Water Works Association Standards and the following design criteria:

- A. If required by DES, detailed design calculations shall be submitted to substantiate line sizes and to demonstrate that the minimum pressure of 20 psi, as stated in Section 12.10 of the Virginia Department of Health Waterworks Regulations, will be met for average daily demands, peak hourly demands, and maximum daily demand plus fire flow. The final size of all water mains and appurtenances shall be determined by DES.
- B. The hydraulic conditions at the points of proposed connection of the existing Arlington County water system shall be defined. DES will provide the hydraulic conditions at the node closest to the point of connection (i.e., fire flow test results). The designer of the proposed water system shall model the water system network starting from the node of the water system for which Arlington County has supplied the starting hydraulic conditions. Requests for computer modeling or fire flow test information shall be addressed to DES. The request for computer modeling shall include a sketch plan indicating the location of proposed development, size of building, type of occupancy, number of occupants, estimated average daily demand, maximum daily demand, peak hourly demand and fire flow demand based on the Arlington County Fire Prevention Code requirements for all buildings within the proposed development. Required fire flow calculations shall be provided on the cover sheet of the approved plans.
- C. Water mains shall be 8-inch diameter minimum (unless otherwise approved by DES) and shall be looped wherever possible. Dead end mains shall not exceed 600 feet without approval from DES and shall have blow-offs or fire hydrants for flushing. No flushing device shall be directly connected to any sewer.
- D. Water mains shall be located in street right of way and 7 feet off of face of curb wherever possible. The water main shall extend the full frontage of the property being served unless directed otherwise by DES. Water mains shall not be located longitudinally under walks. Water mains, water meters, fire hydrants and blow offs

- shall be publicly maintained and as such shall be installed within recorded easements on private property when locations in public right of way are not possible. Such easements, measuring 20 feet in width, shall be recorded prior to final approval and issuance of building permits.
- E. Water mains shall have a minimum cover of 4 feet measured from the top of pipe to the proposed finished grade directly above the waterline; however, 3 feet minimum cover may be used for short distances to avoid utility conflicts and excessive depth of water main. Mains shall be laid on continuous grades to avoid sags or crests in the line.
- F. The minimum clear horizontal separation between water mains and sewer mains or sewer manholes shall be 10 feet (conforms to VDH Waterworks Regulation 12 VAC 5-590-1150). When local conditions prevent a minimum horizontal separation of 10 feet between water mains and sewer mains or sewer manholes, a closer separation may be allowed provided that:
1. Sewer manholes shall be of watertight construction and tested in place.
 2. The bottom (invert) of the water main shall be a minimum of 18 inches above the top (crown) of the sewer. The water main and sewer pipes shall be kept in separate trenches. Where minimum vertical separation cannot be obtained, the sewer shall be constructed of ductile iron pipe and pressure tested in place without leakage prior to backfilling.
- G. No water mains shall pass through or come in contact with any part of a sewer manhole.
- H. Water mains crossing over sewers shall be laid to provide a minimum vertical separation of 18 inches between the top of the sewer and the bottom of the water main. If local conditions prevent this, the water main shall be relocated to provide the separation directed by the Engineer, or the sewer shall be constructed of ductile iron pipe pressure tested in place without leakage before backfilling and with no joint of the sewer closer than 8 feet of the water main.
- I. Water mains crossing under sanitary sewers shall be protected by the following provisions:
1. A minimum vertical separation of 18 inches between the top of the water main and the bottom of the sewer.
 2. Sewer shall be constructed of ductile iron pipe, pressure tested in place without leakage before backfilling.

3. Adequate structural support for the sewer to prevent excessive joint deflection and the settling on and breakage of the water main. Refer to Standard Drawing M-7.0.
 4. One length of the water pipe shall be centered at the point of crossing so that the joints are equidistant and as far as possible from the sewer.
- J. Water mains crossing over surface waters shall be adequately supported, protected from freeze damage, accessible for repair or replacement, and above the 100-year flood elevation.
- K. Water mains crossing under surface waters shall be protected by the following provisions:
1. The pipe shall be of special construction, having flexible watertight joints.
 2. Valves shall be provided at both ends of the water crossing so that the section can be isolated for tests or repair; the valves shall be easily accessible and not subject to flooding.
 3. Sample taps shall be available at each end of the crossing at a reasonable distance from each side of the crossing and not subject to flooding.
 4. Permanent taps shall be made for testing and locating leaks.
- L. The minimum clear horizontal separation between water main and utilities other than sanitary sewer shall be 5 feet (see 3.1.F for separation between water main and sanitary sewer).
- M. The minimum vertical clearance between water main and utilities other than sanitary sewer shall be 1.0 foot, unless provisions to prevent damage to the underlying utility are detailed for approval by DES.
- N. The minimum horizontal separation between water main and buildings or other structures shall be provided as follows:
1. Ten feet for water mains less than 16 inches and 10 feet or less in depth.
 2. Fifteen feet for water mains 16 inches and larger or all mains in excess of 10 feet in depth.
- O. Valves shall be provided on all mains at major intersections and on branch mains at minor intersections. Four valves are required at crosses and three at tees unless otherwise approved by DES. Line valve spacing shall be 500 feet maximum for water mains 12 inches and smaller and as determined by DES for mains larger

- than 12 inches. Valve boxes shall be set and adjusted flush with the roadway surface. Where valves boxes are located in off street areas they shall be set flush in a 2' x 2' x 6" concrete pad.
- P. Automatic air release valves shall be installed on water mains according to the following provisions (conforming to VDH Waterworks Regulation 12 VAC 5-590-1160):
1. Air release valves shall be located at "strategic" high points as directed or approved by DES.
 2. Refer to the standard drawings for air release valve settings.
 3. Air release valve and piping shall be two inches unless directed or approved otherwise by DES.
 4. Air release valves shall not be located in areas subject to flooding or high water table. In cases where such locations cannot be avoided, sump pumps and special vent piping shall be required as directed by DES.
 5. Tapping saddles shall be used.
 6. Chambers containing air release valves shall not be connected directly to any storm drain or sanitary sewer, nor shall air release valves be connected directly to any sewer. Chambers shall be drained to the surface of the ground where they are not subject to flooding by surface water or to absorption pits located above the seasonal groundwater table elevation. Sump pumps may be used where other means are not practical.
- Q. Water meters shall be located in the utility strip or just behind the curb and a minimum of 5 feet clear of driveways and other vehicular traffic areas. A clear space 5 feet by 5 feet shall be permanently provided for 2 inch and smaller water meters. A clear space 20 feet by 15 feet and 10 feet deep shall be permanently provided behind the curb for 3- and 4-inch water meter vault installations. A clear space 25 feet by 20 feet and 10 feet deep shall be provided for 6-and 8-inch meter vault installations. Water meters sizes greater than 8-inches shall be approved by DES.
- R. No water service taps shall be made without special approval from DES in transmission mains 16 inches and larger.
- S. Backflow prevention devices shall be installed at each service connection to a consumer's water system when specified by the Arlington County Department of Community Planning, Housing & Development (DCPHD) - Inspection Services

Division that a potential health, pollution or system hazard to the waterworks exists. Refer to the Arlington County Cross Connection and Backflow Prevention Control Ordinance for more information.

- T. All plans and specifications for construction of proposed water distribution facilities must be approved by DES. No water distribution facility shall be constructed without approved plans, shop drawings and construction cut sheets.
- U. All existing segments of water main to be cut and capped shall be strapped or thrust blocked as directed by DES.
- V. Blow offs for water mains shall be provided at all “strategic” low points and all terminal points. Fire hydrants may be used in lieu of blow offs as directed by DES. Blow offs shall be installed in meter boxes and located behind the curb line and clear of driveways and other vehicular traffic areas (refer to Standard Drawing W-4.0).

3.2 Fire Protection Requirements

Waterworks systems shall be designed to deliver a minimum residual pressure of 20 psi with fire flow requirements and maximum daily demands applied to the system. Applicable fire flow shall be selected based on the requirements of Appendix B of the Arlington County Fire Prevention Code. The required fire flow may be reduced by up to 75% for buildings protected throughout with automatic sprinkler systems complying with the requirements of the Virginia Uniform Statewide Building Code, but in no case shall the flow be less than:

- (1) One and Two family dwellings - minimum exposure distances of:

less than 10'	1,500 – 2,000 gallons per minute (gpm)
10' - 30'	1,000 – 1,500 gpm
greater than 30'	1,000 gpm
- (2) Other than One and Two-family dwellings: 1,500 gpm

B. Fire Hydrants

- 1. Fire hydrants shall be located behind the curb line in accessible areas. Maximum spacing shall be 500 feet in residential areas and 300 feet in commercial and high density areas.
- 2. Building siamese fire line connections shall be located within 75 feet of fire hydrants or as approved by the Arlington County DCPHD - Inspection Services Division.

3. Actual fire hydrant locations are subject to approval by the Arlington County Fire Marshal and DES.
4. Fire hydrants shall not be installed on lines less than 8 inches in diameter or on lines not adequately sized to carry fire flows. Installation of fire hydrants on 6 inch water mains may be approved in special case determined by DES.
5. Connect hydrants to the water main with a minimum 6-inch ductile iron branch controlled by an independent gate valve. Hydrants shall stand vertically plumb with the center of the 4-inch pumper nozzle a minimum of 18 inches above the top of curb on streets with curb and gutter or a minimum of 18 inches above the elevation of the edge of the shoulder on streets without curb and gutter. Provide vertical offsets or bends as required to set hydrants at proper grade. The maximum bury depth shall be 6 feet.
6. No plantings or erection of other obstructions shall be made within 5 feet of any fire hydrant.
7. All hydrants, fire line valves and fittings shall be strapped or thrust blocked as approved by DES (refer to Standard Drawing W-7.0).
8. Drainage fill shall be provided to prevent the ponding of water around hydrants.
9. Fire hydrants shall be installed five feet from the point of curvature of curb returns or at the property line between properties in subdivisions or other areas where fire hydrants are installed between intersections.
10. Fire hydrants shall be drained to dry wells provided exclusively for this purpose.
11. Fire hydrants shall not be located in areas subject to high groundwater, flooding, contaminant or pollutant spills, or in areas where surface water ponds. If there exist no alternative location, weepholes on the hydrant shall be plugged and the hydrant shall be marked for seasonal dewatering or the weephole drainage shall be piped to daylight with the pipe end screened.
12. Fire hydrants shall be placed so that the top operating nut is a minimum of 18 inches and a maximum of 2 feet back from the face of curb unless otherwise directed by the Arlington County Fire Marshal or DES.

13. Fire hydrants shall be installed within recorded easements on private property when locations in public right of way are not possible.

3.3 Minimum Requirement for As-Built Plan

Prior to acceptance of water mains and appurtenances, the Contractor shall submit to Arlington County DES, a set of mylar tracings and CD indicating the as-built conditions. Such submittals shall be made prior to Request for Final Payment. The As-Built record drawings shall include the following:

- i) Changes in valve and fire hydrant locations.
- ii) Horizontal line changes and/or location of water main appurtenances changes.
- iii) Any changes in water main profiles greater than 6-inches.
- iv) Actual materials, limits of mechanical joint restraints and location of reaction blocking used on the project.
- v) Water main to meter distances and locations of all water service meters and water service lines.
- vi) Show actual location, depth or elevation, type and size of all utility crossings.
- vii) Provide a minimum of two (2) swing ties to all valve boxes and permanent blowoffs from fixed permanent objects visible above snow cover such as fire hydrants, utility poles or building corners. Swing ties shall cross as near to ninety degrees as practical for each valve box and blowoff located.
- viii) Statement from the Contractor that the As-Built construction record drawings are in substantial conformance with the associated design drawings unless otherwise noted on the as-built plans.

3.4 Construction Standards

A. Laying Pipe

1. Use proper and suitable tools for the safe handling and laying of pipes and fittings. Prevent fitting linings and coatings from being

damaged; damaged pipe shall be replaced or repaired to the satisfaction of the Engineer.

2. Unless indicated otherwise, the depth of trench shall be sufficient to provide a minimum cover over the top of the pipe of 4.0 feet from the existing or proposed ground surface and to avoid interference of the pipeline with other utilities. Install pipe on continuous grades, as indicated on plans, to avoid sags or crests in the line.
3. The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe, so as to leave a smooth end at right angles to the axis of the pipe. Outside edge of cut pipe shall be beveled and smoothed to avoid damage to the gasket. Avoid damage to the lining. Do not flame cut cast iron pipe with oxyacetylene torch.
4. Thoroughly clean pipes and fittings before they are laid.
5. Carefully lower pipe fittings into trench. Butt ends of pipe against each other in such a manner that there shall be no shoulder or unevenness on the inside of the pipe.
6. Ensure that pipe is well bedded on a solid foundation as shown in the standard details. Correct any defects due to settlement. Excavate bell holes sufficiently large to ensure making proper joints. Exercise precautions to include the furnishing and placing of aggregate to prevent any pipe from resting directly on rock. Rock found in trench shall be removed to provide a clearance of at least six inches below and on each side of all pipe, valves and fittings and shall be replaced with select fill.
7. Iron pipe shall be jointed in full accordance with AWWA Standard C600, the manufacturer's recommendations and the following requirements:
 - a. Push-on joints shall be thoroughly cleaned. Brush-coat gasket retaining groove with approved gasket lubricant and insert the rubber gasket in the bell socket. Apply a thin film of approved gasket lubricant to the exposed gasket surface. Clean and center the spigot end of the pipe into the socket complete the joint by forcing the spigot end to the bottom of the socket.

- b. Mechanical joints shall be thoroughly cleaned. Lubricate the gasket and spigot. Place the gland on the spigot end, followed by the gasket, and the pipe end seated and centered in the socket. The gasket shall then be seated in the sockets, gland moved into position and bolts and nuts loosely assembled by hand. Tighten with a wrench.
 8. At the close of work each day, close end of the pipeline with an expansion stopper so that no dirt or other foreign substance may enter the line. Keep this stopper in place until pipe laying is resumed.
 9. Remove and replace all defective materials at no additional cost to the County.
- B. Connections to Existing Mains
1. Notify the Engineer two (2) working days prior to scheduling work on existing water mains (notify Engineer on Thursday before proposed Monday work). No connections shall be scheduled for the day before weekends and holidays. Connect new water mains to the existing mains as shown on the drawings. Verify the location, type of pipe and size of the existing main well in advance of any work on the connection. The Contractor shall give DES at least five (5) days notice of the need to shut down existing water mains so that DES may give advanced notice to the affected customers. Shutdowns in service, where permitted, and operation of any valves on the existing system shall be done only by DES. To minimize shutdown time, connections to water lines shall be made by the Contractor only after complete preparations for such work have been done to the satisfaction of the Engineer.
 2. Reaction backing at connections to existing mains shall be made with high early strength concrete. In the event that line pressure must be restored less than 48 hours after the placement of reaction backing at these connections, provide temporary deadman and/or similar devices as required to maintain stability of the water mains.
- C. Installing Valves and Fittings
1. Install valves, fittings, and caps to pipe in the manner herein before specified for laying pipe. Provide valve boxes for each buried gate valve. Boxes shall not transmit shock or stress to the valve. Center and plumb boxes over the operating nut of the valve, with the box cover flush. Valves shall be strapped to adjacent fittings unless directed otherwise.

2. Inserting valves and tapping sleeves and valves shall be installed in accordance with the valve manufacturer's recommendations. Test pits shall be dug by the Contractor to determine type and size of existing pipe and suitability of tapping location on the pipe.

D. Thrust Restraint

Provide caps, tees, bends and inserting valves in water mains with reaction backing and other joint restraints such as "MEGALUG", manufactured by EBAA Iron, Inc., or approved equal, except where tie rods are specified or indicated. Reaction backing shall consist of concrete thrust blocks as shown on the Standard Details. Valves for connections to future lines, fire hydrants and related valves, and other fittings or valves so indicated shall be anchored by steel rods protected by two coats of acid-resisting asphalt paint.

The use of reaction backing may be waived in the sole discretion of DES if the designer provides calculations to indicate an adequate number of joints are restrained in proximity to caps, tees, bends and inserting valves. The limits of restraints shall be indicated clearly on the approved plans.

E. Water Service Connections

1. Water meters, including taps, pipe fittings, meter box, and accessories from the water main through the meter, will normally be furnished by, and installed by, Arlington County after payment of the appropriate fee. Connections from the meter installation to the building shall be installed by the Contractor.
2. The Department of Environmental Services shall approve all water meter locations. Water meters shall be located in the utility strip or just behind the curb within public right-of-way or recorded easements and a minimum of 5 feet horizontally clear from other utilities, structures, or trees.
3. The Contractor shall assume complete responsibility for the installation, adjustments and any damage that may occur until final acceptance of the project.
4. New water mains shall pass all acceptance testing procedures before the installation of water service connections.
5. All services shall be installed by wet tap only. Service taps shall be located at the 10:00 and 2:00 position on the water main. Maintain

a minimum of 12 inches between taps. Direct taps are allowed for ¾ inch and 1 inch connections. Use approved saddles for 1 ½ inch and 2 inch connections.

6. Water service lines shall have a minimum of three feet of cover and shall be approved by the engineer, from the main to the meter prior to backfilling. Meter settings for 1-inch to 2 inch services shall be a minimum of 18-inches and a maximum of 24-inches below the meter box cover. Meter box covers shall be painted black with an exterior type of rust resistant enamel.
 7. Where specified that Contractor shall install the water service, meter boxes, meter box covers, corporation stops, angle valves, yoke ells, yoke bars and all other appurtenances (except the water meter) necessary for a complete installation shall be provided in accordance with the approved plans, specifications and requirements of DES. Meter box covers shall be furnished by Bingham and Taylor, Capitol Foundry, or approved equal.
- F. Abandoning Existing Water Mains
1. Drain and abandon existing water mains not required in the completed system. Abandoned mains and appurtenances that conflict with proposed construction shall be removed as required. Abandoned mains not removed shall be capped or bulk headed at all open ends.
 2. Valves to be abandoned shall be removed along with the valve box, or if abandoned in place, the valve box shall be removed and the resulting void shall be stabilized via use of flowable fill or other approved means to avoid any future settlement.
 3. Cut and cap the existing water mains to remain in service at the locations indicated on the drawings, and provide with thrust block. Keep the length of pipe removed to the minimum necessary for installing the cap and concrete blocking. A cap shall be placed over the end of the pipe to be abandoned. The concrete thrust block shall be placed to bear against undisturbed ground. After this work has been completed, the capped line shall not be recharged unless so directed by the Engineer.
 4. Existing fire hydrants not required in the completed system shall be carefully removed, cleaned and transported to the County storage yard. Cap and anchor hydrant lead as close as possible to its control

valve with concrete thrust block and tie rods if main is to remain in service.

4. Existing water services shall be discontinued by DES unless a written request is provided to DES for the temporary use of the service during construction. Water meter boxes and vaults shall be removed by the Contractor. Water meters will be removed by DES as required. No credit or allowance will be given for discontinued water services.

G. Disinfection of Water Mains

1. When each pipe length has been placed and shut off, disinfect each section of the water main. Provide all labor, materials and equipment to perform the disinfection operations in compliance with all state and local regulations. Disinfection shall conform to AWWA C601 requirements.
2. Water for disinfection, flushing and testing will be furnished to the Contractor from the existing water system at no charge to the Contractor. Schedule water usage with the Engineer to result in a minimum interference to water service throughout the existing water system. Temporary connections to the existing water system shall be provided and removed by the Contractor and shall include approved means to prevent backflow and possible contamination of the existing water system. Temporary taps for removing air and flushing the main shall be provided by the Contractor as necessary.
3. Disinfection of the water main shall be accomplished in the following manner:
 - a. Preliminary Flushing of Mains: All mains shall be flushed prior to disinfection except when the tablet method of disinfection is used. The mains shall be flushed at a minimum velocity of 2.5 feet per second and all points in the main shall receive a minimum of five (5) consecutive minutes of flushing at this velocity, until the water runs clear.
 - b. Form of Chlorine to be Used: Liquid chlorine, calcium hypochlorite or sodium hypochlorite may be used for disinfection. Liquid chlorine shall be used only when approved by the Engineer. Calcium hypochlorite and sodium hypochlorite shall be added to water to form a chlorine water solution before being used.

- c. Methods of Application: The chlorine shall be applied by continuous feed method or by the tablet method only (slug method shall not be used). The application shall be performed as follows:
- a) Continuous Feed Method: Potable water shall be introduced into the pipe line at a constant flow rate. Chlorine shall be added at a constant rate to this flow so that the chlorine concentration in the water in the pipe is at least 50 mg/L. The chlorinated water shall remain in the pipe at least 24 hours, after which, the chlorine concentration in the water shall be at least 10 mg/L.
 - b) Tablet Method: Tablet method shall not be used if trench water or foreign material has entered the main or if the water is below 5°C (41°F). Tablets are placed in each section of pipe and also in hydrant branches and other appurtenances. A sufficient number of tablets shall be used to ensure that a chlorine concentration in the water in the pipe is at least 25 mg/L. The tablets shall be attached by an adhesive to the top of the pipe sections and crushed or rubbed in all appurtenances. The adhesive shall be acceptable to the Virginia Department of Health (VDH). When installation has been completed, the main shall be filled with water at a velocity of less than one foot per second. The water shall then remain in contact with the pipe for at least 24 hours.
- d. Contact Period: The chlorinated water shall be retained in the main for at least 24 hours during which time all valves and hydrants, in the section treated, shall be operated in order to disinfect the appurtenances. The tests for chlorine residual shall be made by the Contractor in the presence of the Engineer. The Contractor shall install corporation cocks and copper tubing for the tests at the locations indicated by the Engineer.
- e. Flushing and Discharge: The Contractor shall be solely responsible for the disposal of all chlorinated water in accordance with these Specifications and with all applicable Local, State, and Federal regulations and permits.

H. Hydrostatic Testing

1. Pressure tests shall conform with Section 4 of AWWA Standard C600.
 2. The water mains shall be tested for leakage by the Contractor at his own expense in the presence of the Engineer. All tests will be conducted in a manner to minimize any interference with the Contractor's work or progress. A maximum of 2,000 linear feet of water main may be tested at one time.
 3. The Contractor shall notify the Engineer when the work is ready for hydrostatic testing and tests shall be taken soon thereafter as practicable under the direction of the Engineer. Personnel for reading meters, gauges or other measuring devices will be furnished by the Engineer, but all other labor, equipment, water and materials, excluding meters and gauges, shall be furnished by the Contractor.
 4. The water mains, including all appurtenances, shall be tested as a whole or in sections, valved or bulkhead at the ends. Test piping under a hydrostatic pressure of 200 psig unless shown otherwise on the approved plans. Testing shall not be conducted against existing valves. Apply pressure to the piping after it has been purged of air. Maintain water pressure for a minimum of two hours. The test pressure shall not vary by more than 5 psi during the test. Testing procedures shall be in accordance with AWWA Standard C600 with the exception that in no case shall the measured leakage exceed 10 gallons/ inch of diameter/mile/day.
- I. Final Flushing
- All water mains shall be flushed after the acceptance of the hydrostatic test and before bacteriologic testing. The water mains shall be flushed at the highest flow possible through hydrants and/or blow-offs. The operation of any valves on the existing water system shall be done only by DES. Water discharged to the environment, storm, or sanitary sewer system shall be done in accordance with these specifications and all applicable regulations.
- J. Bacteriologic Test
1. After chlorination, hydrostatic testing and final flushing, and before the water main is placed in service, samples shall be collected from the main and tested for enteric bacterial contamination and shall show the absence of coliform organisms. At least two (2) sets of consecutive satisfactory bacteriological samples 24 hours apart shall be obtained from the distribution system before the system can be placed into service. Samples shall be collected at all accessible locations not exceeding 2,000 feet apart in the line downstream

from where the pipe was filled with water. Samples shall be taken through the use of sample tap consisting of a corporation cock and copper tube or through other accessible appurtenances on the main. Samples shall be collected by a representative of the testing laboratory.

2. All bacteriological sampling and testing shall be conducted by a state certified laboratory. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. After each group of samples is taken, the Contractor shall submit in writing to the Engineer a copy of the report stating the results of the tests.
- K. Repairs: Cleaning, disinfecting, flushing, testing, or similar operational actions shall be in accordance with the most current standards issued by AWWA (AWWA C-601).
- L. Discharge of chlorinated water
1. The contractor shall be responsible to handle, discharge, and dispose chlorinated water in compliance with all regulations, including the County's Municipal Separate Storm and Sanitary Sewer (MS4) Permit.
 2. No potable water shall be discharged to the environment or the storm sewer system until complete dechlorination has been achieved.
 3. Contractor shall be responsible to identify, implement, and monitor appropriate dechlorination methods which comply with all applicable regulations.
 4. Contractor shall conduct testing on-site to confirm that chlorine has been removed from any water discharged to the environment or storm sewer.
 5. Contractor shall take care to ensure that any discharge of dechlorinated water to the storm sewer or environment does not create any adverse impacts to the environment or infrastructure, such as erosion, or water volumes, temperatures, or velocities which adversely affect existing aquatic or terrestrial life in the receiving bodies.
 6. Superchlorinated water which has been used to disinfect the system, or any water which exceeds the generally prevailing chlorine concentration in the system (measured as less than 4 mg/L), shall be discharged to the sanitary sewer system after submittal and approval of a discharge plan. The discharge plan shall be submitted in accordance with Section 01300, and shall document at a minimum:

- a. the receiving sanitary sewer manhole,
 - b. the anticipated rate and duration of discharge,
 - c. plans to prevent any hydraulic connection between wastewater and the water distribution system (backflow prevention or an adequate air-gap),
 - d. listing of methods and equipment to be used,
 - e. accommodations to maintain vehicular and pedestrian traffic during the operation.
7. Discharge of water to the sanitary sewer shall not exceed 200 gallons per minute.
 8. Discharge of water to the sanitary sewer shall not occur without the Engineer present, and shall be conducted only after careful disinfection of all components connected to the water system.
 9. At all times during discharge of water to the sanitary sewer system, the Contractor shall have personnel monitoring the discharge into the sewer to ensure there is no cross-connection and that there are no adverse impacts upon the water or sanitary sewer system.
 10. If an adequate sanitary sewer facility is not available, the discharge plan may require use of a tanker truck to collect and dispose of the water in a sanitary sewer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Water Mains

Water mains for the various type, classes and sizes shown on the bid proposal shall be measured in linear feet along the pipe center line, regardless of depth, and shall include the length of fittings and valves. Payment shall include excavation, standard bedding, backfill, pipe, thrust restraint, fittings, laying of pipe, disinfection, flushing, erosion and sediment control, support of existing utilities, certification, testing, dewatering, restoration, trench maintenance, abandoning and/or removing existing mains and appurtenances as required and all other work incidental to providing a complete water main installation.

4.2 Valves

Valves shall be measured as each, by size and type. Payment shall include excavation, bedding, backfill, disinfection, certification, extension stems, thrust restraint, valve box and paved collar as required.

4.3 Fire Hydrants

Fire hydrants shall be measured as each. Payment shall include the hydrant and elbow, excavation, bedding, drainage gravel, thrust protection, backfill, disinfection, and certification.

4.4 Existing Fire Hydrants – Removed

Existing fire hydrants removed shall be measured as each. Payment shall include excavation, sheeting, shoring, backfilling, dewatering, removing, cleaning, capping hydrant branch, concrete thrust block and tie rods, joint restraint and testing of the cap.

4.5 Blow offs

Blow offs shall be measured as each by size. Payment shall include excavation, bedding, pipe, fittings, gate valve, adaptor, cap, meter box, frame and cover, service clamp, corporation stop, backfill, and other incidental work to complete the installation.

4.6 Connections to Existing Water Mains

Connections of new water mains to existing water mains (except connections made with tapping sleeves and valves) shall be measured as each. Payment shall include test pits, excavation, backfill, sleeves, dewatering, cutting, thrust restraint, and other work required to make the connection.

4.7 Tapping Sleeves and Valves

Tapping sleeves and valves shall be measured as each, by size. Payment shall include test pits, excavation, bedding, tapping, sleeve, valve, valve box, thrust restraint and backfill.

4.8 Inserting Valves

Inserting valves shall be measured as each, by size. Payment shall include test pits, excavation, bedding, thrust restraint, installation, valve, valve box and backfill.

4.9 Air Release Valves

Air release valves shall be measured as each. Payment shall include the entire setting, excavation, tapping, bedding, nipples, piping, fittings, corporation cock, gate valves, air release valve, manhole, manhole steps, frame and cover, and backfill.

4.10 Cutting and Capping Water Main to Remain in Service

Cutting and capping the water main to remain in service shall be measured as each, by size. Payment shall include excavation, cutting, capping, disinfection, restraints, and backfill.

4.11 Water Service Connections

Water Service Connections shall be measured as each, by size. Payment shall include excavation, provision of all materials and backfill. The County shall provide the water meter at no cost for service relocations.

4.12 Restoration in Paved Areas

Payment for restoration in paved area shall normally be made separately unless indicated otherwise on the approved plans or special provisions.

PART 1 - GENERAL1.1 Description of Work

- A. Provide all plant, labor, material and equipment to furnish and construct bituminous concrete pavements in reasonably close conformity with the lines, grades, thicknesses and typical cross sections shown on the construction standards and as called for on the approved plans and specified herein.
- B. The specifications referenced for each material shall fully apply and no deviations from said specification limits or quality will be permitted unless specifically stated otherwise in this Section. The failure of any component of a product to comply with the referenced specifications shall constitute failure of the whole product.

1.2 Related Work Specified Elsewhere

Section 02201 - Earthwork for Roadways
Section 02601 - Bituminous Hiking, Biking and Jogging Trails
Section 02650 - Restoration of Roadway
Section 09900 - Protected Coatings (traffic marking material)

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Release

The Contractor shall obtain a release from the Engineer prior to commencing paving operations.

1.5 Applicable References

- A. American Association of State Highway and Transportation Officials (AASHTO)
- B. American Society for Testing and Materials (ASTM)

PART 2 – MATERIALS2.1 Subbase

The subbase materials shall be in conformance with VDOT Section 208, gradation 21A, except as specified on approved construction plans.

2.2 Base Course

The base course shall be bituminous concrete consisting of course and fine aggregate combined with asphalt cement, resulting in a mixture of Type BM-2 in conformance with Section 211 of the VDOT Specifications.

2.3 Surface Course

The surface course shall be bituminous concrete consisting of crushed stone, crushed slag, or crushed gravel and the fine aggregate, slag or stone screenings, or combination thereof, combined with asphalt, cement, resulting in a mixture of Type SM-2A in conformance with Section 211 of VDOT Specifications.

The use of fine or coarse aggregate which tend to polish under traffic will not be permitted in the top layer of surface courses except in driveways, entrances, scratch courses and other areas permitted elsewhere in these specifications.

2.4 Tack Coats

Tack coat shall be asphalt cement of viscosity grade CMS-2 or CRS-2 in conformance with Section 310 of VDOT Specifications.

2.5 Traffic Marking

Traffic marking will be provided by the County.

PART 3 - EXECUTION

- 3.1 Furnish for test and analysis by an independent testing Agency, representative samples of the materials to be used in the work. Samples and testing shall be in accordance with VDOT Specification 211.06.
- 3.2 Grades shall be established by the Contractor. Thoroughly prepare and compact the sub grade as specified in Section 02201 - Earthwork for Roadways. Do not prime the sub grade.
- 3.3 Lay the subbase to the compacted thickness as shown on the Construction Standards and defined on the Contract Drawings in conformance with Section 308 of VDOT Specifications.
- 3.4 Lay the asphalt pavement to the compacted thickness as shown on the Construction Standards and defined on the Contract Drawings in conformance with Section 315 of VDOT Specifications.
- 3.5 Place the tack coat in conformance with Section 310 of VDOT Specifications.
- 3.6 The surface tolerance of the completed work shall be as specified in Section 315.07(a) of VDOT Specifications.

- 3.7 Maintain pavement placed under this Contract in a safe and satisfactory condition, and repair depressions and holes with material equal to that specified.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Bituminous pavement shall be measured to the street width shown on the approved plans regardless of the actual dimension constructed times its actual length and shall be based on 120 pounds per sq. yd. per inch depth. Payment shall be in tons of bituminous concrete per category of street pavement installed and shall include the necessary preparation of the sub grade surface, tack coats and bituminous concrete materials.
- 4.2 Subbase shall be measured to the width and depths shown on the approved plans regardless of the actual dimensions constructed. Payment shall be in cubic yards of material installed.

PART 1 - GENERAL

1.1 Description of Work

- A. Provide all plant, labor, material and equipment to furnish and construct the bituminous hiking, biking and jogging trails in reasonably close conformity with the lines, grades, thicknesses and typical cross sections shown on the construction standards and as called for on the approved plans and specified herein.
- B. The specifications referenced for each material shall fully apply and no deviations from said specification limits or quality will be permitted unless specifically stated otherwise in this Section. The failure of any component of a product to comply with the referenced specifications shall constitute failure of the whole product.

1.2 Related Work Specified Elsewhere

Section 02600 - Bituminous Roadway Pavements

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable References

- A. American Association of State Highway and Transportation Officials - (AASHTO)
- B. American Society for Testing and Materials (ASTM)

PART 2 - MATERIALS

2.1 Aggregate Base

The aggregate base shall be 6 inches of crusher run aggregate of size 25 or 26 and in conformance with Section 205 of the VDOT Specifications, or 6 inches of course aggregate of size 57 or 68 in conformance with Section 203 of the VDOT Specifications.

2.2 Surface Course

The surface course shall be 4-inch in thickness and type SM-2A as specified for the surface course in Section 02600.

PART 3 - EXECUTION

- 3.1 Place and compact bituminous concrete walks in conformance with Section 315.04 of the VDOT Specifications.

PART 4 - MEASUREMENT AND PAVEMENT

- 4.1 Bituminous concrete pavement shall be based on 120 pounds per sq. yd. per inch of depth and shall be measured to the width shown on the approved plans regardless of the actual dimension constructed. Payment shall be in tons of bituminous concrete installed.

- 4.2 Aggregate base shall be measured to the width shown on the approved plans regardless of the actual dimensions constructed. Payment shall be in cubic yards of material installed.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, plant, materials and equipment to lay all concrete walks and driveway entrance as detailed in the Construction Standards and as called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 03100 - Concrete Formwork, Reinforcement and Materials

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. Virginia Department of Transportation, Road and Bridge Specifications
(VDOT)

PART 2 - MATERIALS2.1 Aggregate Base

The aggregate base shall be aggregate conforming to VDOT Section 205 gradation 25 or 26 or course aggregate of size 68 in conformance with Section 203 of the VDOT Specifications.

2.2 Concrete

Concrete shall be Portland Cement air-entrained Class A3 in conformance with Section 03100.

2.3 Joint Filler

Joint filler shall be 1/2-inch preformed asphalt expansion joint material conforming to ASTM D994 or ASTM D1751.

PART 3 - EXECUTION

3.1 Concrete testing shall be conducted in conformance with Section 03100.

3.2 Grades shall be established by the Contractor. Thoroughly prepare and compact the sub grade as specified in Section 02201.

3.3 Place the aggregate base in conformance with Section 309 of the VDOT Specifications.

- 3.4 Joints shall be constructed at intervals of 40 feet, except for closures, but a slab shall not be less than 6 feet in length. Separate slabs by transverse premolded expansion joint filler for the full width of the slab, extending from the bottom of the slab to within one-quarter (1/4) inch of its top surface. Divide the slab between expansion joints into blocks 5-feet in length by scoring transversely. Where slabs are more than 7-feet in width, they shall be scored longitudinally to secure uniform blocks approximately square. Extend transverse and longitudinal scoring to at least 1/3 of the depth of the concrete slab. Scoring of transverse and longitudinal joints may be done with trowels, finishing and edging tools or by other means approved by the Engineer.
- 3.5 Where sidewalks are constructed adjacent to permanent structures or other rigid construction on one side and curb on the other, extend an expansion joint of premolded material only along back at curb and place for the full depth of the slab. Place a premolded expansion joint between the sidewalk and adjacent curb at all crosswalks both public and private. Fasten premolded expansion joint filler to prevent displacement.
- 3.6 Where sidewalk is constructed in conjunction with adjacent curb, the expansion joints in the curb and sidewalk shall coincide. Where such construction is adjacent to existing curb, the expansion joints shall, if practicable, coincide. Prior to placing concrete around any permanent structure, place premolded expansion joint material around such structure for the full depth of the sidewalk.
- 3.7 Where existing structures, such as light standards, poles, fire hydrants, etc., are within the limits of the sidewalk area, place premolded expansion joint around the structure for the full depth of the concrete.
- 3.8 Place sidewalk stress columns 6 inches in diameter and a minimum depth of 12 inches below the bottom of the sidewalk at locations shown in Construction Standards unless otherwise specified by the Engineer. The holes for the columns may be dug with a post hole digger or other approved means. The concrete must be the same type used in the sidewalk and placed at the same time. No separate payment will be made for excavation or concrete used in these columns, but shall be included in the price bid for the sidewalk.
- 3.9 Provide concrete forms, and pour the concrete in conformance with Section 504 of the VDOT Specifications.
- 3.10 Finish concrete walks and driveways as specified in Section 404.19 of the VDOT Specifications.
- 3.11 The surface tolerance of the completed work shall be as specified in Section 316 of the VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Concrete sidewalks shall be measured to the width shown on the plans, regardless of the actual dimension constructed, unless otherwise approved by the Engineer, times its

SECTION 02611

**CONCRETE WALKS AND
CONCRETE DRIVEWAY ENTRANCE**

actual length. Payment shall be in square yards for each type of concrete walk, and shall include the cost of stress columns.

- 4.2 Concrete driveway entrances shall be measured by the square yard of driveway entrance placed to the limits shown on approved drawings and indicated by the Engineer. Payment shall be in square yards for each type of driveway entrance.
- 4.3 Aggregate base shall be measured to the width and depth shown on the approved plans regardless of the actual dimensions constructed, unless otherwise approved by the Engineer. Payment shall be in cubic yards of material constructed.
- 4.4 Excavation shall be measured in cubic yards in its original condition based on the cut sheets and typical section. Payment shall be in cubic yards as described in Section 02201.

PART 1 - GENERAL**1.1 Description of Work**

Provide all labor, plant, material and equipment to lay interlocking concrete or brick pavers to line and grade as detailed in the Construction Standards and as called for on the approved plans.

1.2 Relate Work Specified Elsewhere

Section 02611 - Concrete Walks and Concrete Driveway Entrances

Section 02613 - Paver Crosswalk

Section 03100 - Concrete Formwork, Reinforcement and Materials

Section 04100 - Mortar and Grout

1.3 Applicable Specifications

- A. American Association of State Highways and Transportation Officials (AASHTO)
- B. American Society for Testing and Materials (ASTM)
- C. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)
- D. Concrete Paver Institute (CPI), a division of the National Concrete Masonry Association (NCMA)

1.4 Quality Assurance

- A. Installation shall be performed by an installer with at least one year experience in placing interlocking concrete and brick pavers.

1.5 Submittals

- A. Submit shop or product drawings and product data.
- B. Submit samples of paver units to indicate color and shape selection.
- C. Submit sieve analysis for grading of bedding and joint sand.
- D. Submit test results for compliance of paver unit requirements to ASTM C936 from an independent testing laboratory.

1.6 Environmental Conditions

- A. Do not install sand or pavers during rain or snowfall.
- B. Do not use frozen sand.

PART 2 - MATERIALS

- 2.1 Interlocking concrete pavers shall be manufactured for compliance of paving unit requirements to ASTM C936, as indicated below. Concrete pavers shall be 6 centimeters thick for sidewalk application and 8 centimeters thick for driveways.
- A. Minimum average compressive strength of 8000 psi (55 MPa).
 - B. Maximum absorption of 5% when tested in accordance with ASTM C140.
 - C. Resistance of 50 freeze-thaw cycles, when tested in accordance with ASTM C67.
- 2.2 Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Grading of samples shall be done according to ASTM C136. The particles shall be sharp and conform to the grading requirements of ASTM C33 as shown in Table below.

Table 1

Grading requirements for Bedding and Joint sand

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8 in. (9.50mm)	100
No. 4 (4.75mm)	95 to 100
No. 8 (2.36mm)	80 to 100
No. 16 (1.18mm)	50 to 85
No. 30 (600 um)	25 to 60
No. 50 (300 um)	10 to 30
No. 100 (150 um)	2 to 10

- 2.3 Brick pavers shall be manufactured according to ASTM C-902. Mortar for brick pavers and setting base shall be Type M as specified in Section 04100.
- 2.4 Aggregate used for compacted base shall be well graded crushed limestone or crushed stone specified as VDOT grade 21A, 25 or 26.
- 2.5 PVC edge restraint shall be Pave Tech edging with 12-inch x 3/8-inch diameter galvanized steel pins @ 1' on center or approved equal.

PART 3 - EXECUTION

- 3.1 Base requirements shall be a minimum of 6-inch of compacted aggregate for sidewalks when interlocking concrete pavers are used or 4-inch concrete base for brick pavers and 6-inch concrete slab for residential driveway and 9-inch for commercial driveway conditions.

- 3.2 Aggregate base materials shall be compacted to a density of 95 percent of Modified Proctor density with a tolerance of $\pm 1/4$ -inch to the following grades.
- 6 cm concrete pavers - 3 1/2-inch below finish grade of pavers
8 cm concrete pavers - 4 1/4-inch below finish grade of pavers
brick pavers - N/A
- 3.3 The sand leveling course for concrete pavers shall be screeded loose to a thickness of 1-inch to 1-1/2-inch. The exact thickness shall be determined at the job site. Care shall be taken to ensure the leveling base is loose and is not disturbed.
- 3.4 The leveling base shall be treated with a soil stabilizer to prohibit the growth of grass.
- 3.5 The concrete pavers shall be installed hand tight being careful not to disturb the laying bed. The use of string line may be required to keep straight lines. A motor-driven masonry saw shall be used to cut edges where straight pavers can not be used. Hammer cutting is not acceptable. No cut segment shall be smaller than one third of a paver unit measured in any direction.
- 3.6 Concrete pavers shall then be vibrated into leveling base with a vibratory plate capable of 3,500 to 5,000 pound compaction force. This must be done prior to any rain.
- 3.7 Joints shall be filled after vibration using dry sand. Brush and vibrate sand into joints until they are completely filled, then remove surplus sand.
- 3.8 All work to within three feet of the laying face must be left fully compacted with sand-filled joints at the completion of each day. Cover the remaining uncompacted edge of the laying face and sand with waterproof covering.
- 3.9 Brick pavers shall be laid into a mortar setting bed and leveled. All joints shall be filled completely with mortar.
- 3.10 The color of the concrete or brick pavers shall be as indicated on approved plans. Pavers shall be selected from four or more cubes to blend color and texture variations. The laying pattern shall be herringbone unless specified otherwise.
- 3.11 Do not finish concrete base as provided for in Section 02611.
- 3.12 Edge restraints shall be 1/4-inch below the top of the edge pavers to minimize the potential for tripping and to allow for minor settlement of the pavers and to assure drainage of pavement runoff.
- 3.13 The final surface elevations shall not deviate more than 3/8-inch under a 10 foot long straight edge.
- 3.14 The surface elevation of pavers shall be 1/8 to 1/4 inch above adjacent drainage inlets, concrete collars or channels.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Interlocking concrete and brick pavers for sidewalk application shall be measured to the width shown on the plans, regardless of the actual dimension constructed, unless otherwise approved by the Engineer, times its actual length. Payment shall be in square yards for each type of masonry walk installed, complete in place and shall include the necessary preparation of the sub grade surface, aggregate base, sand leveling base, filter fabric and edge restraints, if required.
- 4.2 Excavation shall be measured in cubic yards in its original condition based on the cut sheets and typical sections. Payment shall be in cubic yards as described in Section 02201.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials, equipment and services necessary to complete the crosswalk as shown on the drawings and specified herein.

1.2 Related Work Specified Elsewhere

Section 02611 - Concrete Walks & Concrete Driveway Entrance

Section 02612 - Interlocking Concrete and Brick Pavers

Section 03100 - Concrete, Formwork, Reinforcement and Materials

Section 04100 - Mortar and Grout

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)
- C. Concrete Paver Institute (CPI), a division of the National Concrete Masonry Association (NCMA)

1.4 Submittals

- A. Samples: Submit the following samples:
 - 1. Five concrete units of masonry showing full range of color and texture.
- B. Certificates of Conformance: Submit certificates from the manufacturer attesting that the concrete pavers meet the requirements specified.
 - 1. Concrete Pavers
 - 2. Mortar Coloring
 - 3.

1.5 Quality Assurance

- A. Handling and Storage
 - 1. Handle, sort, and protect masonry units in a manner to avoid chipping, breakage or contact with the soil. Keep ties, and joint reinforcement free of rust. Steel reinforcing bars shall be free of loose scale and rust. Reject rusted steel reinforcing, ties and joint reinforcement. Deliver cement in unbroken bags, barrels, or other sealed containers, plainly marked and labeled with the manufacturer's names and brands. Store cementitious materials in dry, weather tight sheds or enclosures or under watertight tarpaulins. Sort and handle cement in a manner which will prevent the inclusion of foreign materials and damage by water or dampness.

- B. Environmental Conditions
1. Hot Weather Installation: Protect masonry when the ambient air temperature is more than 99 degrees F in the shade, and the relative humidity is less than 50 percent from direct exposure to wind and sun for 48 hours after installation.
 2. Cold Weather Construction: Do not lay masonry when the air temperature is below 40 degrees F and falling, or when it appears that air temperature will drop to 40 degrees F or below before the mortar has set. Work will not be permitted with or on frozen materials.
 3. Do not install sand or pavers during heavy rain.

PART 2 - MATERIALS

- 2.1 Mortar
- A. General Requirements: Consult paver installers locally to determine the best suited for the project. Hard, naturally occurring sands with symmetrical particles are recommended for pavements subject to vehicular traffic.
 - B. Grading: Bedding and joint sands shall be graded per ASTM-C33 shown in Table 1. below.

Table 1

Grading requirements for Bedding and/or Joint sand

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8 in. (9.50mm)	100
No. 4 (4.75mm)	95 to 100
No. 8 (2.36mm)	80 to 100
No. 16 (1.18mm)	50 to 85
No. 30 (600 um)	25 to 60
No. 50 (300 um)	10 to 30
No. 100 (150 um)	2 to 10

- C. Bedding and joint sand shall be natural or manufactured from crushed rock, and shall be clean, non-plastic, free from deleterious or foreign matter. Particles shall be neither flat nor elongated.
- D. Limestone screenings and stone dust are not acceptable.

- E. Sieve analysis on samples shall be graded per ASTI-C236.

2.2 Concrete Pavers

Concrete pavers shall be 8 centimeters thick for crosswalk application and shall be as specified in Section 02612. The color and laying pattern shall match the adjacent sidewalk as indicated on the drawings.

2.3 Concrete Base Slab

The concrete base slab, slab reinforcing and expansion joints shall be as specified in Section 03100 of these specifications.

2.4 Aggregate Subbase

The aggregate subbase shall be gradation 21A conforming to VDOT Specifications, Section 208.

2.5 Geotextile

Shall be woven of polyester or polypropylene fibers, with a permeability rating 10 times greater than that of soil on which paving is founded and an apparent opening size (AOS), small enough to prevent passage of fines from setting bed into soil sub grade or graded aggregate base.

PART 3 - EXECUTION

- 3.1 Examine the areas and conditions where masonry is to be installed and notify the Engineer of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Engineer.
- 3.2 Lay the aggregate subbase to the compacted thickness shown on the drawings and in conformance with Section 308 of the VDOT Specifications.
- 3.3 The concrete base slab shall be installed in accordance with the drawings, details and Section 03100 of these specifications.
- 3.4 All paving adjoining the crosswalk shall be complete before the sand setting bed is laid. This includes all patching of existing adjoining pavement. Steel rollers used to compact the pavement shall not run over the pavers.
- 3.5 All pavers shall be free of foreign materials before installation. Do not use concrete pavers with excessive chips, cracks, voids stains or other defects that might be visible in the finished work. allowed on the bottom of the pavers.

- 3.6 The base concrete slab shall be cleaned of all asphaltic concrete components, dust, oil, or any other material. The finished surface of the base to receive the bedding sand shall be uniform and even, and shall not deviate by more than +0 and -1/2 inch (13mm) over 10' (3m) when measured in any direction.
- 3.7 Place sand for setting bed and screed to thickness of 1 inch to 1 1/2 inch (25 to 40 mm), taking care that moisture content remains constant and the density if loose and constant until all pavers are set and compacted.
- 3.8 Lay setting bed so that elevation of top surface of pavers shall be 1/8 inch (3mm) min to 1/4 inch (6mm) max. above adjacent drainage inlets, concrete collars, channels, or other pavements after compaction.
- 3.9 Lay unit pavers in joint pattern shown on the drawings.
- 3.10 Set concrete pavers with a minimum joint width of 1/16 inch (1.5mm) and a maximum of 3/16 inch (5mm), being careful no to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Concrete pavers with spacer bars on sides of each unit are recommended when installation is performed with mechanical equipment. Use string lines to deep straight lines. Select units from 4 or more cubes to blend color and texture variations. Fill gaps at edge restraints that exceed 3/8 inch (10mm) with pieces cut to fit from full size unit pavers.
- 3.11 Vibrate concrete pavers into leveling course with a low amplitude plate vibrator capable of a 3,000 to 5,000 pound (13 to 22 KN) compaction force.
- 3.12 Vibrate after edge pavers are installed, and there is a completed, restrained surface: or before surface is exposed to rain. Vibrate installed concrete pavers within 3 feet (1m) of the laying face and cover with sand BEFORE ENDING EACH DAY'S WORK.
- 3.13 Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Brush and vibrate sand into joints until they are completely filled, then remove surplus sand.
- 3.14 Do not allow traffic on installed concrete pacers until sand has been vibrated into joints.
- 3.15 Final surface elevations shall not deviate more than 3/8 inch (10 mm) under a 10 foot (3m) long straightedge.

PART 4 - MEASUREMENT AND PAYMENT

Paver crosswalks shall be measured to the width shown on the plans, regardless of the actual dimension constructed times its actual length. Payment shall be in square yards for the type paver crosswalk installed, including the necessary preparation of sub grade, restoration of adjacent pavement, excavation, aggregate subbase, concrete base and incidentals necessary for a complete installation.

PART 1 - GENERAL1.1 Description of Work

Provide the necessary plant, labor, materials and equipment to restore and maintain the various street and driveway surfaces of all types, pavement and driveway bases, curbs, curb and gutter, and sidewalks disturbed, damaged or demolished during the performance of the work.

1.2 Related Work Specified Elsewhere

Section 02600 - Bituminous Roadway Pavements

Section 02601 - Bituminous Hiking, Biking and Jogging Trails

Section 02611 - Concrete Walks and Concrete Driveway Entrance

Section 02612 - Interlocking Concrete and Brick Pavers

Section 02750 - Curb and Gutters

Section 03100 - Concrete Formwork, Reinforcement and Materials

1.2 Applicable Specifications

A. American Society for Testing and Materials (ASTM)

B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable Reference

American Association of State Highway and Transportation Officials (AASHTO)

1.5 Permits

Before performing any work, secure the necessary permits to work within the County or State right of way and easements when surface materials will be disturbed or demolished.

PART 2 - MATERIALS

2.1 The quality of materials used in the restoration of existing pavements and driveways shall produce a street surface equal to or better than the condition before the work began.

2.2 Concrete shall be Class A3 air-entrained Portland cement type as specified in Section 03100.

2.3 The base and surface courses shall be BM-2 and SM-2A respectively as specified in Section 02600.

- 2.4 Crusher run aggregate shall be size 25 in conformance with Section 206 of the VDOT Specifications.
- 2.5 Joint filler shall be 1/2-inch preformed asphalt expansion joint material conforming at ASTM 1751.
- 2.6 Asphalt for a temporary patch shall be BM-2 as specified in Section 02600.

PART 3 - EXECUTION

- 3.1 Where trenches have been opened in any roadway or street that is a part of the State of Virginia highway system, restore surfaces in accordance with the requirements of VDOT. All other restoration shall be done in accordance with the Contract Drawings, these specifications, and the Construction Standards.
- 3.2 Excavation in the pavement area shall require that pavement surfaces be saw-cut to provide a straight and smooth edge. Cut out pavement 24-inches wider than the trench width or excavation opening as shown on Construction Standard M-6.0.
- 3.3 Upon completion of installation of utility and backfill, fill the top 18-inches of the trench with crusher run and temporary asphalt patch until such time that the permanent pavement patch will be constructed.
- 3.4 Complete the pavement restoration for the various types of streets in conformance with Construction Standard M-6.0 and Section 02600.
- 3.5 Concrete curb and gutter, and sidewalks, shall be restored as required to match existing construction. Replace damaged sections with complete new sections or squares; patching of damaged sections will not be permitted.
- 3.6 Maintain restored sections and surfaces as part of the Contract requirements for a period of one year following the date of final acceptance.
- 3.7 When a manhole top requires adjustment to an elevation one inch or more above the existing pavement grade and is exposed to traffic before final paving is completed, a temporary ramp shall be constructed by feathering bituminous concrete for 360 degrees around the manhole.

A taper slope of not less than two feet per one inch shall be used. During the paving operation but prior to the placement of the topping course the bituminous concrete taper shall be removed from around the manhole to a minimum depth of one inch below the top of manhole.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Pavement restoration shall be measured in square yards of the surface area restored based on the payment width, regardless of actual dimension constructed times its actual

length. Payment shall be in square yards per category of street pavement restored and shall include the necessary preparation of the sub grade surface, tack coats, bituminous concrete materials, and the crusher run backfill required in paragraph 3.3.

- 4.2 Concrete curb and gutter shall be measured in linear feet of actual replacement. Payment shall be in linear feet of curb and gutter at the price bid.
- 4.3 Concrete sidewalk restoration shall be measured in square yards to restore to original width. Payment shall be in square yards for each type of concrete walk, plain concrete or concrete with brick, and shall include the cost of stress columns.
- 4.4 There shall be no payment for temporary asphalt patch.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, materials and equipment to install the concrete curbs and combination concrete curb and gutters as called for on the approved plans, as detailed on the Construction Standards, and as specified herein.

1.2 Related Work Specified Elsewhere

Section 02611 - Concrete Walks and Concrete Driveway Entrance

Section 03100 - Concrete Formwork, Reinforcement and Materials

1.3 Applicable Specification

- A. American Association of State Highway and Transportation Officials (AASHTO)
- B. American Society for Testing and Materials (ASTM)
- C. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS2.1 Concrete

Concrete shall be Portland cement class A3 in conformance with Section 03100.

2.2 Joint Filler

Joint filler shall be 1/2-inch performed asphalt expansion joint material conforming to ASTM D994 or ASTM D1751.

2.3 Subbase

The subbase materials shall be in conformance with VDOT Section 208, gradation size 21A.

PART 3 - EXCAVATION

3.1 Construct the sub grade to the required elevation below the finished surface of the gutter in accordance with dimensions and design as shown on Construction Standards. Remove all soft and unsuitable material and replace with subbase material, which shall be compacted to 95% density in accordance with AASHTO T-99 and finished to a smooth surface. Moisten the subbase prior to placing the concrete.

3.2 Construct forms of wood or metal conforming to VDOT Section 403.03.

- 3.3 Prior to placing concrete, check the line and grade for accuracy and fasten the face forms of the curb to the gutter forms. Spade the concrete and tamp sufficiently to bring the mortar to the surface, after which finish with a magnesium float. Construction shall be in sections of uniform lengths, providing transverse joints at approximately 10-foot intervals and when the time elapsing between placements exceeds 45 minutes. No section shall be less than 6 feet in length. Separate sections by plate steel templates set perpendicular to the grade and center line of the unit specified. The templates shall be 1/8-inch in thickness and shall have a width and depth equal to the unit cross-section. Leave these templates in place until the concrete has set sufficiently to hold its shape.
- 3.4 Form expansion joints at intervals of 100 feet or less. When the curb and gutter is constructed adjacent to rigid pavements, the location and width of expansion joints shall coincide with those in the pavement, where practicable. Where stationary structures, such as catch basins and drop inlets, are within the limits of the curb and gutter, place an expansion joint between the structure and the curb and gutter. Place expansion joints at all returns.
- 3.5 Screed the face and top of curb and surface of gutter smooth and round the edges to a radius as shown on the Construction Standards.
- 3.6 As soon as the concrete has attained sufficient set, remove the face forms of the curb. The exposed surfaces shall be screeded with a straight edge and finished with a steel trowel. Remove all trowel marks with a brush wet with clear water. Do not use mortar in finishing.
- 3.7 The finished surface of curb and gutter shall be true to line and grade with an allowable tolerance as specified in Section 316.05 of the VDOT Specifications.
- 3.8 After the concrete has set in conformance with Section 03100, fill the spaces on both sides of gutter or the back side of curb to the required elevation with suitable material and compact to 95 percent density in accordance with AASHTO T-99 in layers of not more than 6-inches.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Measurement shall be in linear feet of actual construction. Payment will be at the unit price bid per type of curb section bid, except where the curb or curb and gutter is adjacent to catch basins or drop inlets, in which case the unit price for such catch basins or drop inlets shall include that part of the curb and gutter within the limits of the structure.
- 4.2 Subbase material shall be measured to the width and depth shown on the approved plans regardless of the actual dimensions constructed. Payment shall be in cubic yards of material installed.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, materials and labor required to execute this work as indicated on the approved plans, as specified and as necessary to complete the Contract, including, but not limited to, soil treatment; planting of trees, topsoil in planting areas; protection, maintenance, warranty, and replacement of plants; related items of work as indicated on drawings; inspection; and maintenance.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02200 - Earthwork for Structures and Pipelines

Section 02801 - Seeding and Sodding

1.3 Applicable References

- A. Arlington County Cooperative Extension Office
- B. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)
- C. Hortus III, 1979 Edition
- D. American Association of Nurseryman's Standards
- E. Maryland Forest Conservation Manual

1.4 Permits

Before any tree may be planted on public rights-of-way, or County easements, a permit from the Department of Environmental Services shall be obtained, and reviewed and approved by PRCR.

1.5 Plant Warranty and Replacement

- A. Warranty: Guarantee that plants will be alive and in satisfactory growth for a period of two years, beginning the day the County has approved the planting.
- B. Replace dead or dying plants as soon as possible at no cost to the County.
- C. Plants used for replacement shall be the same species and size as specified in Plant List; plant, mulch, maintain and warrant as specified.
- D. Properly maintain all planting and planting areas during the progress of the work and for a maintenance period of 60 days after acceptance.

PART 2 - MATERIALS2.1 Shrubs and Trees

- A. Shrubs and trees shall be of a variety, size and quantity as shown on the approved plans and shall be planted where shown on the planting plan. Plants shall be symmetrical, typical for variety and species, sound, vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, normal root systems, well filling their containers, but not to the point of being root-bound. Plants not conforming to these requirements shall be considered defective, and shall be removed from the site immediately, and replaced with approved stock at the Contractor's expense.

2.2 Water

Water shall be provided by the Contractor for use of this trade.

2.3 Miscellaneous

Mulch: Shredded hardwood.

Soil: Natural for the area, fertile, friable and within acceptable pH limits for the shrubs and trees.

Fertilizer: Of the type and composition recommended by the Arlington County Cooperative Extension Office, 855 North Edison Street, Arlington, Virginia.

Tree Stakes: 2-inch x 2-inch x 8-inch hardwood pointed on one end.

Tree Grates: 180° square, flush, non-bolt, equal of Neenah Type R-8640.

PART 3 - EXECUTION3.1 Delivery, Storage, and Soil Testing

Contact the Arlington County Cooperative Extension Office for soil testing. Deliver plants to the site in a healthy condition and properly store and protect for planting.

3.2 Grading

- A. Do not plant until finish grades are established and planting areas are properly prepared and graded.
- B. Do not work the soil when the moisture content is so great that excessive compaction will occur; nor when it is so dry a dust will form in the air or that clods will not break readily.

Apply water, if necessary, to provide ideal moisture for filling and for planting as herein specified.

- C. Preliminary grading shall be done in such a manner as to anticipate the finish grading. Remove excess soil or redistribute before application of fertilizer and mulch. Where soil is to be replaced by plants and mulch, make allowances so that, when finish grading has begun, there shall be no deficiency in the specified depth of mulched planting beds.
- D. When preliminary grading, including weeding and fertilizing, has been completed and the soil may be readily worked, grade all planting areas to a smooth, even and uniform plane with no abrupt change of surface. Slope soil areas adjacent to buildings away from the buildings, and direct surface drainage as indicated on the drawings.

3.2 Planting of Shrubs and/or Trees

- A. Remove canned stock by cutting can vertically on two opposite sides of can with instrument approved for the purpose.
- B. Spacing: Where plant material is shown on the drawings in a –“loose” pattern, space the material as shown, at all times maintaining an unequal, random spacing and conforming to the Tree Planting Details of the Construction Standards.
- C. Dig tree pits and plant pits in accordance with the Tree Planting Details, Drawing Nos. R-7.1, R-7.2 and R-7.6 of these Construction Standards.
- D. Setting: Plants shall bear some relation to soil level when planted as they did when in container. Place each plant in center of plant pit.
- E. Cut burlap, twine and wire baskets from top 12 inches of rootball and remove from site.
 - 1. Backfill with 1/2 clean existing soil, 1/4 sand, 1/4 peat moss.
- F. Firmly tamp backfill material into plant pits around and under the root ball to force out all air pockets. Backfill in conformance with the Tree Planting Details of the Construction Standards.
- G. Basin each plant with a berm 3 inches in height above crown of root ball immediately after planting and thoroughly water to saturate the root ball and backfill.
- H. Stake all trees with hardwood stakes driven 2' into firm ground and secure tree to stake as per detail R-7.2 (Planting and Guying For Trees Over 2 1/2-inch Caliper).

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Shrubs and trees shall be measured as each, by variety and size. Payment shall include the labor, materials and equipment necessary for a proper and complete installation, but shall not include tree grates.
- 4.2 Tree grates shall be measured as each, by size. Payment shall include the labor, materials and equipment necessary for a complete installation.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials, tools and equipment as required to have topsoil, fertilizer, lime, mulch, seed and/or sod applied on all areas disturbed by construction and all areas called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02200 - Earthwork for Structures and Pipelines

1.3 Applicable Specifications Virginia Field Seed Law1.2 Applicable Reference

Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

Virginia Tech Specification

1.5 Submittals

In accordance with Section 01300 submit proposed names of fertilizers, sod and seed mixtures together with their composition and any certificates requested to the Engineer for approval.

1.6 Quality Assurance

The results of testing two samples from each source of topsoil to ensure that proper types and quantities of soil conditioners, and fertilizers, will be used resulting in a dense, vigorous growth of perennial lawn-quality grass. The results of this test will determine rates and types of fertilizers and lime. For seeding, the Virginia Tech rates for seeding shall be used as specified by VA/MD seed/ sod program, if available.

1.7 Testing

Test seed within 6 months of seeding to meet the requirements of the Virginia Field Seed Law for percentage of germination as follows:

Kentucky 31:	81%
German Foxtail Millet:	78%
Abruzzi Tye:	78%
Red Top:	77%

PART 2 - MATERIALS2.1 Topsoil

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

2.2 Fertilizer

- A. As per Virginia Tech Specifications, soil test will be taken and fertilizer will be applied for seeding areas disturbed by clearing operations.

2.3 Seed

- A. For seeding areas disturbed by clearing operations only; where vegetation remains (per acre):

March to July:

Tall fescue, per current year Virginia Tech Recommended List: 50 pounds

German Foxtail Millet: 30 pounds

August to February:

Tall fescue, per current year Virginia Tech Recommended List: 70 pounds

Abruzzi Rye: 20 pounds

- B. For all other areas (per acre):

Tall fescue, per current year Virginia Tech Recommended List

Red Top : 3 Pounds

Under all conditions, seed shall be of the latest seed crop available.

2.4 Lime

Per acre: 2 tons/ground limestone of such fitness that 50% will pass through a U.S. Standard No. 100 mesh screen and 100% will pass through a U.S. Standard No. 10 mesh screen.

2.5 Mulch

Per acre: 2 tons of small grain mulch of high quality showing no rotting or caking and reasonably free of weeds.

2.6 Sod

Sod shall be vigorous, well-rooted, healthy turf, free from disease, insect pests, weeds, other grass, stones and of similar mix as used in seeding lawns. It shall be suitable character for the purpose intended and for the soil in which it is to be planted. Sod shall be certified at least eight (8) inches wide, not less than twelve (12) inches long, and shall have at least one and one half (1-1/2) inches in thickness, of dirt on its roots. Do not use broken or damaged sod.

2.7 Jute or Fabric

- A. Jute matting shall be of a uniform open plain weave of undyed and unbleached single juteyarn of a width of 4 feet. All material shall be new. Staples shall be made from No. 8gauge or heavier steel wire and bent to form a –“U” with a staple 1 to 1- 1/2 inches wide with 6 inch feet.
- B. Fabric shall be a combination of paper and yarn manufactured into plastic netting interwoven with paper strips as manufactured by Hold/Gro, Gulf States Paper Corporation. Staples shall be 6 inches high carbon iron.

PART 3 - EXECUTION

3.1 Topsoil

- A. After approval of rough grading rototill all areas indicated on the drawings and on other areas damaged by construction, as specified by PRCR, to a depth of 4-inch, removing stumps, all foreign objects and stones larger than one inch diameter; place topsoil approved by PRCR on all areas and incorporate by rototilling into subsoil. Topsoil origin to be specified and approved by PRCR; Certified soil tests specifying pit, % organic matter, textural analysis and N-P-K levels to be made by contractor and approved by PRCR before delivery.
- B. Remove stripped topsoil not used at the job site and dispose in a location approved by the Engineer.

3.2 Fertilizing and Rolling

If required by results of soil tests, Spread soil conditioners and fertilizers and thoroughly incorporate by rototilling work into topsoil to a depth of 4 inches. Rake topsoil until the surface is finely pulverixed and smooth. Compact with rollers weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 3 inches after compaction.

3.3 Seeding

- A. Seed only when weather conditions are suitable between April 1 and May 30, or August 15 to October 1, unless approved by the Engineer. Use only certified seed blending Kentucky bluegrass cultivars with perennial ryegrass varieties approved by PRCR.

- B. If there is a delay in seeding, during which weeds grow or soil is washed out, remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, lightly rake the soil.
- C. If required by soil test results, uniformly apply lime, urea form and triple super phosphate or organic fertilizer approved by (DPRCR), with broadcast spreaders prior to seedbed preparation.
- D. Sow seed with mechanical spreaders at the specified rate on a calm day. Sow one-half the seed in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of 1/4-inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.
- E. If seeding by hydroseeder, add 500 pounds of wood cellulose fiber per acre and mix with the seed and the 10-10-10 fertilizer at the specified rate. Apply all seed mix within 45 minutes after mixing in hydroseeder to prevent fertilizer damage to seed and inoculants.
- F. Keep the surface moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than three (3) square feet, reseed, roll, and water as necessary to obtain proper germination.

3.4 Mulching

Apply mulch immediately after seeding. Loosen baled straw and thoroughly break up before placing. Begin placement of mulch on the windward side and from the toe to slopes. Do not grind, cut or crush mulch into pieces so small as to form a mat. Cutting mulch to aid in distribution may be accomplished, provided that 10 to 25 percent of the seeded area will be exposed.

On slopes 2 to 1 and greater provide jute matting or Hold/Gro stapled 18 inches to 3 feet apart using closer spacing around curves and areas of concentrated storm water runoff.

Install jute strips beginning 12 inches behind the top of slope. Bury the top ends in a slit trench with prior approval by PRCR, urban forester. Trench should be 6 inches deep, and staple to trench bottom. Reinforce slit trench with a new row of staples one foot below trench and space at intervals of 6 to 10 inches. Staple all overlaps and the center of the material at intervals of 18-inch to 3 feet down the slope. After the jute matting is in place, overseed.

Install Hold/Gro with the fabric running vertically from the top of the slope in the direction of anticipated water flow. Do not stretch the material. Staple Hold/Gro in the same manner as specified for the jute.

3.5 Sodding

- A. The Contractor may plant ground cover, not requiring mowing, on grades exceeding a 2 to 1 slope. The contractor may sod all grades not exceeding a 3:1 slope in lieu of jute or Hold/Gro. or equivalent.

- B. On sloping areas where erosion may be a problem, sod shall be laid parallel to the contours of the slope with staggered joints and secured by tamping, pegging or other approved method.
- C. Plant only certified sod only when the soil is moist and favorable for growth. Shape the area to be sodded and finish to the lines and grades indicated on the drawings. Loosen the surface prior to placing sod. Keep the grade moist by sprinkling, if necessary, sod on the prepared surface with the edges in close contact. Each piece of sod laid shall be fitted and tamped into place with hand tampers not less than one hundred (100) square inches in area. Apply a sufficient quantity of water to all sod after laying and to prevent the sod from drying out for a period of at least two weeks to ensure growth.

3.6 Inspection

At the beginning of the next planting season after that in which the permanent grass crop is sown, inspect the seeded areas. Promptly reseed any section not showing dense, vigorous growth. Water, weed, cut and otherwise maintain the lawn until the end of that planting season.

PART 4 - MEASUREMENT AND PAYMENT

Seeding and sodding shall be measured in square yards. Payment shall include all labor, materials, and equipment including topsoil, fertilizers, seed or sod, mulch, jute or other synthetic matting and staples necessary to protect against erosion and required for a satisfactory growth of grass or sod.

PART 1 - General1.1 Description of the Work

Provide all plant, labor, materials and equipment to install water mains or sewer pipes by tunneling under railroad or highway crossings as called for on the approved plans and as specified herein.

1.2 Related Work Specified Elsewhere

Section 02110 - Demolition

Section 02202 - Rock Excavation

Section 02510 - Sanitary Sewers & Appurtenances

Section 02550 - Water Mains & Appurtenances

Section 03100 - Concrete Formwork, Reinforcement & Materials

Section 04100 - Mortar and Grout

Section 04200 - Masonry Units

1.3 Applicable Specifications

A. American Association of State Highway and Transportation Officials (AASHTO)

B. American Society of Testing and Materials (ASTM)

C. United State Bureau of Mines

1.4 Applicable References

Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

1.5 Permits and Regulations

The County will obtain all permits required except those permits required for blasting as specified in Section 02110. The Contractor shall conform to the regulations set forth by the authorities having jurisdiction over the work performed in the areas of tunnel crossings.

1.6 Submittals

Submit detailed shop drawings which shall include the location of the tunnel pits, soils data, method of excavation and support, method of dewatering, tunnel linings showing thickness, size, shape and method of attachment, and grouting details. Include details on the method of installing the carrier pipe.

PART 2 - MATERIALS**2.1 Tunnel Liner Plates**

The tunnel liner plates shall be fabricated from structural quality, hot-rolled, carbon steel sheets or plates conforming to ASTM A-570, Grade B for sheets, or ASTM A-283, Grade B for plates. Liner plates shall be galvanized to meet the requirements of AASHTO M-167 and shall provide a minimum diameter of 4'-0-inch. Where specified, the tunnel liner plates shall be bituminous coated to meet the requirements of AASHTO M-190.

All tunnel liner plates shall be flanged and punched for bolting on both longitudinal and circumferential joints and shall be fabricated so as to permit erection from the inside.

2.2 Bolts and Nuts

Bolts and nuts shall be quick acting, coarse thread not less than 1/2-inch in diameter for specified plate thicknesses up to and including 0.179 inches and 5/8-inch in diameter for liner plates of greater thicknesses. Bolts and nuts shall conform to ASTM A307 Grade A and shall be galvanized as per ASTM A153.

2.3 Carrier Pipe

Water mains and sewers shall be as specified in Section 02550 and Section 02510 respectively.

2.4 Concrete

Concrete used in tunneling construction shall be as specified in Section 03100.

2.5 Brickwork

Brick and masonry work performed at the ends of the tunnel shall be as specified in Sections 04100 and 04200.

2.6 Forced Grout

Grout that is force injected between tunnel line plates and tunnel wall shall be one part Portland cement (ASTM C150, Type II), and six parts sand (ASTM C33).

2.7 Equipment

- A. Tunneling equipment shall be as approved by U.S. Bureau of Mines.
- B. The grout pump and injection system shall deliver the grout in a smooth and even flow without surge while developing a uniform pressure of 50 psi at the grout hole connection.

PART 3 - EXECUTION3.1 General

- A. Maintain free and full use of the surface on private property, streets, roadways and railways, under which tunneling construction takes place. Maintain close observation of surface facilities to detect settlement or displacement. Notify the Engineer immediately if settlement is detected. Take appropriate action to maintain safe conditions and prevent damage.
- B. Should the Contractor elect to sink shafts at any point on the tunnel alignment for more efficient construction, he shall obtain permission from the holders of private property or the agencies having jurisdiction over the property, easement, or right-of-way. Remove excavation from such shaft or shafts, as well as all mucking, from the premises to storage dumps acquired by the Contractor at his own cost and expense. Backfill shafts at no expense to the County with materials approved for backfilling by the Engineer. Line shafts with steel liner plate of structural adequacy to withstand all earth pressures. Plates shall form a concentric circle and be bolted in place as the shaft is sunk. Extend the liner plates above the surface 3-/12' for protection of the public. No shaft shall be less than 12' in diameter. Where shafts are at portals, timber sheeting and bracing of structural adequacy may be used as an alternate to steel liner plates if permission is granted by the Engineer in writing.

3.2 Ventilation System

Furnish, install, operate and maintain a temporary ventilation system for the removal of dust in the tunnel shaft according to local and Federal regulations.

3.3 Electric Lights

Provide temporary electric lights to properly and safely illuminate all parts of the tunnel construction area with special illumination provided at the working face. Lighting circuits shall be thoroughly insulated and separated from power circuits, and shall be enclosed in wire cages. Secure all necessary electrical permits for successful completion of this aspect of the work.

3.4 Excavation for Tunnel Liner Plates

On initial set-up, support the tunneling equipment on a concrete cradle poured to permit the proper installation of the tunneling. During forward movement of tunneling operations, provide sufficient support at the tunnel face to ensure that only materials physically displaced by the tunneling equipment are removed.

Excavation for liner plates shall proceed in increments sufficient for the erection of one ring of liners; install liner plates immediately after each increment of excavation. Keep voids behind liner plates to a minimum.

3.5 Installation of Tunnel Liner Plates

Handle liner plates in such a manner as to prevent bruising, scaling, or any other damage to the linings and coatings.

Ensure that the plate edges are clean and free from material that could interfere with proper bearing during installation.

Assemble liner plates to the lines and grades shown on the Contract Drawings in accordance with the manufacturers recommendations. Retention or replace any bolt that does not meet the requirements.

On 8' centers and in the liner plate at the top of each ring, there shall be a 2-inch standard half pipe coupling welded into a hole in the liner plate and cast iron closure plugs screwed therein. On the completion of each day's work the cast iron plugs shall be removed and the voids between the outside of the liner plate and the earth or rock shall be completely filled by pressure grouting with one part Portland cement and 6 parts mortar sand. The pressure shall be adequate to fill all the voids, but not great enough to bulge the liner plates.

3.6 Installation of Carrier Pipe in Tunnel

The carrier pipe shall be laid to the true line, grade, and elevations called for in the approved plans. Mount pipe on blocks, saddles, or other approved methods to obtain the exact lines and grades. Secure carrier pipe against flotation or vertical movement in accordance with standard details or as otherwise approved by the Engineer. Protect the ends of tunnel against entry of foreign matter and water with brick and masonry construction of 6-inch minimum grout. Provide 2-inch weep hole at each end of tunnel. Grout or provide sand as shown on the Standard Detail M-5.0.

3.7 Rock Excavation

Rock excavation shall be carried out as specified in Section 02202.

PART 4 - MEASUREMENT AND PAYMENT

Measurement shall be in linear feet of the tunnel liner plate invert. Payment shall include the liner plates, sand or grouting, dewatering and carrier pipe installed, complete in place

PART 1 - GENERAL1.1 Description of the Work

Provide all plant, labor, materials and equipment to install water mains or sewer pipes by boring and jacking under highway crossings as called for on the approved plans and as specified herein.

1.2 Related Work Specified Elsewhere

Section 02202 - Rock Excavation

Section 02510 - Sanitary Sewers and Appurtenances

Section 02550 - Water Mains and Appurtenances

Section 03100 - Concrete Formwork, Reinforcement and Materials

Section 04100 - Mortar and Grout

Section 04200 - Masonry Units

1.3 Applicable Specification

American Water Works Association (AWWA)

1.4 Applicable Reference

Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

1.5 Permits and Regulations

The County will obtain all permits. The Contractor shall conform to the regulations set forth by the authorities having jurisdiction over the work performed in the areas of bore and jack construction.

1.6 Submittals

Submit detailed drawings which shall include the location and size of pit, the method of boring and jacking, the size, capacity and arrangement of equipment, the method of dewatering, and the method of controlling line and grade.

PART 2 - MATERIALS2.1 Casing Pipe

The casing pipe used shall be black seamless steel pipe with a minimum thickness of 3/8-inch of the sizes shown on the Standard Detail. Pipe shall have a minimum yield strength of 35,000 psi and shall conform to AWWA C-200.

2.2 Carrier Pipe

Water mains shall be as specified in Section 02550 and sewer pipes as specified in Section 02510.

2.3 Concrete

Concrete shall be as specified in Section 03100.

2.4 Brickwork

Brick and masonry work as performed at the ends of the casing pipe shall be as specified in Sections 04100 and 04200.

2.5 Equipment

Boring and jacking equipment shall be at the Contractor's option.

PART 3 - EXECUTION

3.1 General

- A. If an obstruction is encountered during installation which stops the forward action of the pipe and makes it impossible to advance the pipe, notify the Engineer immediately. If necessary, operations will cease and the pipe shall be abandoned in place and either plugged or filled completely with grout.
- B. Maintain close observation of surface facilities to detect settlement or displacement. Notify the Engineer immediately if settlement or displacement is detected. Take action to maintain safe conditions and prevent damage.

3.2 Construction of Boring Pit

Excavate boring pit in accordance with detailed drawing specified in Paragraph 1.6. The pit shall be of adequate length to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks and two sections of casing pipe. The pit shall be wide enough to allow ample working space on either side of the jacking frame. The depth of the pit shall be such that the invert of the pipe when placed on the guide frame will be at the desired elevation for the finished line. The pit shall be tightly sheeted and kept dry at all times.

Design and install the reaction blocks to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.

Provide adequate protective railings and/or fences at the top of the pit at all times.

3.3 Boring and Jacking Operation

Provide removable auger and cutting head arrangement. Arrange the face of the cutting head to provide reasonable obstruction to the free flow of soft material. Push the pipe with boring auger rotating within the pipe to remove the spoil. Over cut by the cutting head shall not exceed the outside diameter of the casing pipe by more than 1/2-inch.

Use hydraulic jacks in the jacking operation and take extreme care to hold the pipe to the exact lines and grades shown on the Contract Drawings. Excavation at the heading shall not exceed on foot ahead of the lead pipe. As one section of casing pipe is installed, the next section shall be aligned on guide timbers and welded to preceding section, and the boring and jacking process continued.

3.4 Installation of Carrier Pipe

Lay the carrier pipe to the true line, grade and elevations called for on the Contract Drawings. Use rollers, timber skids or other supports, approved by the Engineer, strapped to the carrier pipe inside of the casing pipe to avoid the pipe resting on any bells and to keep the completed installation at the required line and grade.

Protect the ends of the casing pipe against entry of foreign matter and water with brick and masonry construction or 6-inch minimum grout. Provide 2-inch weep hole at each end of casing pipe.

3.5 Rock Excavation

Rock excavation shall be as specified in Section 02202.

PART 4 - MEASUREMENT AND PAYMENT

Measurement shall be in linear feet of casing pipe installed. Payment shall include the casing pipe and carrier pipe installed, complete in place.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, materials and equipment necessary for the completion of the plain and reinforced concrete called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 03400 - Precast Concrete

1.3 Applicable Specifications

- A. American Concrete Institute (ACI)
- B. American Society for Testing and Materials (ASTM)
- C. United States Product Standards PS I-66
- D. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)
- E. Wire Reinforcement Institute (WRI)

1.4 Quality Assurance The following codes and standards are hereby made a part of this specification and concrete work performed shall conform with the applicable references except as specified otherwise in this section.

ACI Standard 318-71 - Building Code Requirements Reinforced Concrete (Working Stress Design) ACI Standard 318 - Building Code Requirements for Reinforced Concrete ACI Standard 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures ACI Committee Report - Concrete Sanitary Engineering Structures, ACI Committee 350 ACI Standard 301 - Specifications for Structural Concrete for Buildings Wire Reinforcement Institute, Inc., WRI - Manual of Standard Practice Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.5 Submittals

- A. Shop drawings shall include bar tabulations, placement drawings and details.
- B. The Concrete Plant shall provide the concrete mix design and certified test reports on the aggregate, admixture, cement, and curing materials to be incorporated in the concrete for the project.
- C. The steel fabricator shall provide certified mill test reports for the reinforcing steel and accessories to be incorporated in the work.

- D. The Contractor shall provide delivery tickets for concrete and shall include the date, time, truck identification, concrete plant, plant inspector, ticket and load number, concrete class and design mix, moisture content of aggregates, quantity and location of placement.

PART 2 - MATERIALS**2.1 General**

Concrete materials, methods of mixing, conveying, curing, placing, reinforcement, and the making and removal of forms shall conform to the latest requirements of Section 217 of the VDOT Specifications.

2.2 Class of Concrete

Cast-in-place concrete shall be Class A3 General Use (3,000 psi) or Class B2 (2,200 psi) unless stated otherwise on the approved plans.

2.3 Earth Forms

Except for the bearing surface of thrust blocks, concrete cradle, concrete encasements, and the second pours of drop manholes, do not place concrete directly against vertical surfaces of the soil.

2.4 Plywood

Except where noted otherwise on the approved plans, use plywood forms for all concrete which will be exposed in the finished work, and for all exterior walls below grade which are to receive membrane waterproofing. Plywood shall conform to U.S. Product Standard PS 1-66 and shall be a minimum of 5/8-inch thick. Each panel shall carry the grade trademark of the American Plywood Association along with the DFPA (Douglas Fir Plywood Association) Quality stamp.

2.5 Form Coating

Use non-grain raising and non-staining type that will not leave residual matter on surface of concrete or adversely affect proper bonding of subsequent application of other material applied to concrete surface, such as "Nox-Crete Form Coating" as manufactured by the Nox-Crete Company, "Arcal-80" as manufactured by Arcal Chemical Corporation, "Synthex" as manufactured by Industrial Synthetics Company, or approved equal. Do not use coatings containing mineral oils or other non-drying ingredients.

PART 3 - EXECUTION**3.1 General**

SECTION 03100

**CONCRETE FORMWORK,
REINFORCEMENT AND MATERIALS**

- A. Employ a competent and acceptable crew leader for concrete work. This crew leader shall be thoroughly familiar with all phases of concrete construction, including forms.
- B. Be responsible for the capacity of all form work, shoring and bracing to carry all superimposed live and dead loads before, during and after concrete is poured.
- C. Provide form work with adequate cleanout openings to permit inspection and easy cleaning after reinforcement has been placed. Where possible, place these openings in the side of the unexposed surfaces.

3.2 Construction of Forms

- A. General: Construct wood forms of sound material, and of the correct shape and dimensions, constructed tightly and of sufficient strength. Brace and tie the forms together so that the movement of men, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position. Forms shall be strong enough to maintain their exact shape under all imposed loads. Camber where necessary to assure level finished soffits. Construct forms that may be easily removed without damage to the concrete. Before concrete is placed in any form, the horizontal and vertical position of the form shall be carefully verified and all inaccuracies corrected. Complete all wedging and bracing in advance of placing concrete.
- B. Chamfered Corners: Unless otherwise indicated, provide chamfered corners on all exposed corners. Provide 3/4 inch moldings in forms for all chamfering required.
- C. Embedded Items: Make provision for sleeves, anchors, inserts, water stops, and other features.
- D. Form Ties: Use form ties of sufficient strength and in sufficient quantities to prevent spreading of the forms. Place ties at least 1-inch away from the finished surface of the concrete. Do not use ties consisting of twisted wire loops. Leave inner rods in concrete when forms are stripped. Space all form ties equidistant, and symmetrical, and line up both vertically and horizontally.
- E. Cleanouts and Access Panels: Provide removable cleanout sections or access panels at the bottom of all forms to permit inspection and effective cleaning of loose dirt, debris, and waste material. Clean all forms and surfaces to receive concrete of all chips, sawdust, and other debris and thoroughly blow out with compressed air just before concrete is placed.
- F. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

SECTION 03100

3.3 Preparation for Placing

- A. Remove water from excavations before concrete is deposited. Divert any flow of water through proper side drains and remove water without washing over freshly-deposited concrete. Remove hardened concrete, debris, ice, and other foreign materials from the interior of the forms, and from the inner surfaces of mixing and conveying equipment. Do not place on frozen ground. Secure reinforcing in position and place vapor barrier and have inspected and approved before the concrete is poured. Do not wheel equipment used to deposit concrete over reinforcement.
- B. Prior to placing of any concrete, and after placement of reinforcing steel in the forms, notify the Engineer so that proper inspection may be made. Such notification shall be made at least 48 hours in advance of placing concrete to permit proper arrangements for inspection.

3.4 Delivery

- A. Submit a delivery ticket indicating the mix and design strength of the concrete, design slump, and time of leaving the truck mixer with each batch at the time of delivery. Record on the back of the delivery ticket: (a) the time of arrival of the truck mixer on the site; (b) the time of deposit of the concrete from the truck; and (c) the place of deposit of the concrete. The completed delivery ticket shall be delivered to the Engineer. Failure to deliver such completed ticket to the Engineer will be cause for the Engineer to reject the deposited concrete at any time and cause it to be removed and replaced at no additional expense to the County.
- B. Do not use concrete on the job site when it has exceeded the allotted mixing time as specified in Section of the 217.09 of the VDOT Specifications.

3.5 Placing Concrete

- A. Before placing concrete, remove all construction debris, water and ice from the places to be occupied by the concrete. Give particular attention to the removal of dirt and debris from all formed construction joints.
- B. Concrete, when deposited, shall have a temperature ranging between a minimum of 50 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit. When the temperature of the surrounding air is below 50 degrees or above 90 degrees Fahrenheit, concreting shall be done in accordance with the recommendations noted in ACI-306 and ACI-305 respectively.
- C. Mix concrete in such quantities as required for immediate use and place prior to loss of slump. Do not retemper concrete.
- D. Spade, work and vibrate concrete as it is being poured, to secure its maximum density, free from voids and completely filling the forms. Thoroughly work concrete to secure the complete envelopment of all parts of the reinforcing steel and completely fill the corners of the forms. Maintain not less than 2 approved

vibrators on the work at all times. Use tremies or chutes for drops of more than 5-feet.

- E. Fill under Slabs on Grade: Clean sand, or aggregate, evenly spread and compacted to the full depth, unless otherwise shown on the Contract Drawings.

3.6 Removal of Forms

- A. After concrete has been placed, all forms, bracing and supports shall remain undisturbed long enough to allow the concrete to reach the strength necessary to support with safety its own weight plus any live load and earth pressure that might be placed upon it without causing excessive settlement or deflection or any temporary or permanent damage to the structure. Prevent the breaking of edges and corners of concrete in the stripping of forms. Upon removal of formwork, immediately patch honeycombed areas and other voids to the satisfaction of the Engineer.
- B. Thoroughly clean forms and recoat with specified form coating before each reuse. Do not reuse any form for exposed work which cannot be reconditioned to "like new" condition. Discard forms considered unsatisfactory by the Engineer. Apply form coating to all forms in accordance with the manufacturer's specifications. Apply form coatings before placing reinforcing steel.

3.7 Protection of New Work

- A. Protect all freshly placed concrete from mechanical injury or action of the elements until such time as the concrete is thoroughly set.
- B. Protect projecting inserts, anchor bolts and other embedded items from disturbances until the concrete has sufficiently set to hold such items. \

3.8 Preformed Joints

- A. Furnish and install preformed expansion joint material at locations shown on the Contract Drawings. Cut preformed expansion joint material slightly less than the full width of the cross section of the concrete to allow for a liquid joint sealant with any backup material.
- B. Tool the concrete edges at expansion or contraction joints to a one-eighth (1/8)-inch radius.

3.9 Finishing

- A. All areas of exposed concrete walls and appendages from the top of the wall to 1'-6-inch below the finished grade or water level of the structure shall receive a rubbed finish applied in the following manner:
 - 1. After removal of forms, point cavities, stone pockets, and tie holes in exposed surfaces with mortar by thoroughly wetting the repair area. Cut out honeycombs down to dense concrete, and then patch and point as

described above. The mortar mix for patching shall be determined by trial to obtain a good color match with the concrete when both patch and concrete are cured and dry. The amount of mixing water shall be as little as consistent with the requirements of handling and placing the mortar.

2. Ground off form joint marks and fins to a smooth surface, dense and free of prominent grain markings and bulges or depressions more than 1/8-inch in 4 feet.
 3. When the mortar pointing has set, the entire exposed concrete surface shall be thoroughly covered with water by means of brush and rubbed with carborundum brick to remove all blemishes and leave the entire exposed surface uniform in color and texture.
- B. All areas of walls not covered above shall have all fins and projections removed. Patch all voids and depressions exceeding 3/8-inch in any dimensions.
- C. Unless otherwise noted or specified, all slabs shall be finished monolithically. Exposed concrete slabs shall have a tolerance of 1/8-inch in 10 feet with maximum high and low variance not occurring in less than 20 feet, and with 1/16-inch tolerance in any one running foot with no abrupt variations.
- D. After screeding and floating, give concrete steps and slabs a light steel troweling to seal the surface and remove any irregularities left by the float. Just before the concrete becomes non-plastic, the surface of the concrete shall be given a fine broom finish perpendicular to the line of traffic and so executed that the corrugations thus produced will be uniform in character and width. The broomed surface shall be free from porous spots, irregularities, depressions, and small pockets or rough spots such as may be caused by accidentally disturbing particles of coarse aggregate embedded near the surface. Use a coarse broom to provide a non-slip surface for ramps.

3.10 Curing

- A. Curing shall be started as soon as it is possible to apply the curing medium without damaging the surface, preferably immediately upon completion of the finishing operation.

Curing shall continue uninterrupted for a minimum period of 14 days. Rapid drying upon completion of the curing period shall be prevented. At no time during the curing period shall the temperature of the concrete be permitted to drop below 40 degrees Fahrenheit.

3.11 Sampling, Testing and Enforcement

- A. The Contractor shall furnish such facilities as the Engineer may require for on site testing and for collecting and forwarding concrete samples for testing to an approved independent laboratory selected by the Engineer. The laboratory shall establish the mix proportions and test the concrete. One test shall be performed

for each 10 cu. yds. of concrete. The laboratory shall maintain records showing brand of cement, brand and quantity of admixtures, time and location of the batch from which the test was made, air content, slump, and compressive strength. The laboratory shall supply the test cylinders, slump cones, field technicians, and all equipment necessary for performance of field and laboratory testing specified herein.

- B. One strength test shall consist of four field specimens. One (1) specimen for testing at seven (7) days, one (1) specimen for testing at fourteen (14) days, and two (2) specimens for testing at twenty-eight (28) days. The samples for strength tests shall be taken in accordance with –“Method of Sampling Fresh Concrete” (ASTM C-172). Cylinders for acceptance tests shall be molded and laboratory-cured in accordance with “Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field” (ASTM C-31) and tested in accordance with “Method of Test for Compressive Strength of Molded Concrete Cylinders” (ASTM C-39). Each strength test result shall be the average of two cylinders from the same sample tested at seven (7), fourteen (14) and twenty-eight (28) days.
- C. When the frequency of testing will provide less than five strength tests for a given class of concrete, make tests from at least five randomly selected batches or from each batch if fewer than five are used. When the total quantity of a given class of concrete is less than 30 cu. yds., the strength tests may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided.
- D. Should individual tests of laboratory-cured specimens produce results more than 500 psi below specified strength ($f'c$), or tests of field-cured cylinders indicate deficiencies in protection and curing, take steps to assure that load-carrying capacity may have been significantly reduced, tests of cores taken from the area in questions shall be required in accordance with “Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete” (ASTM C-42). Three cores shall be taken for each cylinder test more than 500 psi below specified strength ($f'c$). If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be immersed in water for at least 48 hours and tested wet.
- E. Concrete represented by the above core tests will be considered structurally adequate if the average of the three cores is equal to at least 85 percent of specified strength ($f'c$) and if no single core is less than 75 percent of $f'c$. To check testing accuracy, locations represented by erratic core strengths may be retested. If these strength acceptance criteria are not met by the core tests, and if structural adequacy remains in doubt, the Engineer shall order load tests for the questionable portion of the structure, or declare the section to be defective.

3.12 Defective Concrete

- A. Defective concrete is defined as concrete in place which does not conform to strength, shapes, alignments, appearance, and/or elevations as shown on the drawings; areas which contain faulty surface areas and/or concrete surfaces not finished in accordance with these specifications.

- B. Remove all defective concrete and replace in a manner meeting with the Engineer's approval. Should only surface imperfections occur, patch at the discretion of, and in a manner satisfactory to, the Engineer. Permission to patch the work shall not be considered as a waiver of the County's right to require complete removal and replacement of such defective work should the patching fail to satisfactorily restore the required quality and appearance of the work.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Concrete work associated with cast-in-place structures, curbs, sidewalks shall be paid for under the appropriate unit item called for in the bid proposal.
- 4.2 Concrete steps shall be measured by step per width category. Payment shall include all labor, materials and equipment necessary for a complete installation.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, equipment and material to provide the precast concrete structures including manholes but excluding pipe, as called for on the approved plans, Construction Standards and this section.

1.2 Related Work Specified Elsewhere

Section 02500 - Storm Sewers and Drainage Systems

Section 02510 - Sanitary Sewers and Appurtenances

Section 03100 - Concrete, Formwork, Reinforcement and Materials

1.3 Applicable Specifications

A. American Society for Testing and Materials (ASTM)

B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Quality Assurance

A. All precast concrete items shall be products of one or more manufacturers having demonstrated competence in the design and production of precast concrete specialties of the types specified herein for a minimum of 3 years.

B. The referenced documents of Section 03100 shall become a part of this section.

1.5 Submittals

A. Prior to delivering any material to the project site, submit to the Engineer for approval shop drawings for fabrication and setting of the precast concrete work, along with manufacturer's detailed descriptive literature.

B. Submit certified concrete mix design for the structures to be furnished to the job site.

C. Submit certified test reports for the aggregate, cement, admixtures, reinforcing and curing materials used in the fabrication of the structures.

1.6 Class of Concrete

Concrete for precast structures shall be VDOT Class A4 General. Use unless stated otherwise on the approved plans.

PART 2 - MATERIALS2.1 General

Concrete materials, methods of mixing, conveying, curing, placing, reinforcement, and the making and removal of forms shall conform to the latest requirements of the VDOT Section 217.

2.2 Precast Concrete Manholes

Precast concrete manhole bases, risers and cones shall conform to requirements of ASTM C-478 with configurations as shown in the drawings. Cones shall be eccentric. Manhole sections for sanitary sewers shall be of male and female end type with a preformed groove provided in the male end for placement of a round rubber gasket ring. Rubber gasket rings shall meet the requirements of ASTM C-361 or C-443. The gasket shall be the sole element utilized in sealing the joint from either external or internal hydrostatic pressure. Use the appropriate lubricant as directed by the manufacturer. Manhole sections for storm sewers may use mortared joints.

Each precast section shall be clearly marked on the inside near the top with the following information where applicable: ASTM designation, Standard detail or drawing number, station location and designation, date of manufacture and name or trademark of manufacturers. Precast concrete manholes shall be manufactured by the Virginia Precast Corp., Valley Blox, Inc., or equal.

2.3 Precast Concrete Catch Basin

Precast concrete catch basins shall conform to the requirements of ASTM A-185 for welded wire fabric construction, or ASTM A-165 for deformed steel billet bars and the applicable provisions specified in Section 03100 except that the design mix (f'c) shall be 4,000 psi concrete.

PART 3 - EXECUTION

Fabrication and testing of the precast concrete structures shall be in accordance with the stipulated execution procedures of Section 03100.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It is covered under other work to which it relates.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials and equipment necessary to furnish and install mortar required for the masonry and mortared rubble work and miscellaneous grout as called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 04200 - Masonry Units

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS2.1 General

Mortar and grout shall conform to the latest requirements of Section 218 of the VDOT Specifications.

2.2 Mortar for Unreinforced Masonry and Brick

The mix for unreinforced masonry shall conform with ASTM C270, Type "M" with the following options:

- A. Portland Cement Mortar: 1 part Portland cement; 1/4 part hydrated lime and lime putty; 3-1/2 parts sand.
- B. Masonry Cement Mortar: 1 part Portland cement; 1 part masonry cement; 4-1/2 parts sand.

2.3 Mortar and Grout for Reinforced Masonry

The mix for reinforced masonry shall conform with ASTM C476 Type PM or PL.

PART 3 - EXECUTION3.1 Storage of Materials

Protect materials from moisture, foreign material and deterioration.

3.2 Weather Requirements

Hot Weather: Add water as needed to supplement evaporation losses. Cold Weather: When air temperatures range between 32°F and 40°F, heat mixing water or aggregate to between 70°F and 160°F maximum. When air temperature is below 32°F, and only with the approval of the Engineer, heat both the mixing water and aggregate to between 70°F and 160°F maximum.

3.3 Quality Control

- A. Prepare sample batches of mortars and grouts prior to beginning masonry work.
- B. Test in accordance with ASTM C270 (Unit Masonry) or ASTM C476 (Reinforced Masonry), whichever applies. Send copies of test results to the Engineer for approval.

3.4 Mixing Mortar and Grout

Mix mortar in accordance with ASTM C270 (Unity Masonry) and mortar and grout in accordance with ASTM C476 (Reinforced Masonry). Mortar or grout not within 2-1/2 hours after mixing shall not be used in masonry work.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, materials and equipment necessary to furnish and install masonry as called for on the approved plans and as specified herein.

1.2 Related Work Specified Elsewhere

Section 04100 - Mortar and Grout
Section 09900 - Protective Coatings

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Submittals

Submit to the Engineer, two representative samples of each kind and type of masonry specified for the project and sample of anchors and ties. Do not purchase masonry until samples are approved by the Engineer.

PART 2 - MATERIALS2.1 Masonry Units

Masonry block and brick units shall conform to Section 222 of the VDOT Specifications.

2.2 Welded Wire Fabric

Welded wire fabric shall conform to Section 228 of the VDOT Specifications.

2.3 Steel Reinforcement

Steel reinforcement called for on the approved plans shall be deformed bars, grade 40, in conformance with Section 223 of the VDOT Specifications.

2.4 Reinforcement, Anchors and Ties

- A. Masonry joint reinforcement shall be factory fabricated from zinc coated cold-drawn steel wire, ASTM A82. Reinforcement shall consist of two or more deformed longitudinal wires minimum size No. W1.5, weld connected with minimum size No. 21.5 cross wires, forming a truss or ladder design. Zinc

coating, ASTM A116, Class 1, except that cross wires used for cavity wall ties shall be Class 3. Out-to-out spacing of longitudinal wires shall be approximately 2-inches less than the nominal width of the block or with in which it is placed. Distance between welded contacts of cross wires with each longitudinal wire shall not exceed 16-inches. Joint reinforcement shall be furnished in flat sections 10 to 20 feet in length, except that factory-formed corner reinforcements and other special shapes may be less in length.

- B. Anchors and ties shall be zinc-coated, ferrous metal of the types specified. Zinc coating ASTM A153, Class B-1, B-2, or B-3 as applicable. Cooper cladding of steel wire shall conform to the requirements as specified for Grade 30 HS wire in ASTM Specification B227.

PART 3 - EXECUTION

3.2 General

- A. Build into masonry, bolts, anchors, nailing blocks, inserts, expansion joints and other items necessary and incidental to the completion of the project.
- B. Masonry shall be laid with plumb, true to line, with level courses accurately spaced with a story pole, and unless otherwise shown, with each course breaking joints with the course next below. Each unit shall be adjusted to its final position in the wall while mortar is still soft and plastic. Any unit that is disturbed after mortar has stiffened shall be kept plumb throughout. Corners and reveals shall be plumb and true. Courses shall be so spaced that backing masonry will level off flush with the face work at all joints where metal ties are used. Anchors, accessories, and other items required to be built in with masonry shall be built in as the masonry work progresses. Cutting and fitting of masonry shall be done by masonry mechanics with power-driven masonry saws.
- C. Weather Requirements: Precondition and protect masonry units in cold weather as follows:
 - 1. Avg. daily air temperature between 32°F and 40°F -- protect newly laid masonry from rain and snow 24 hours.
 - 2. Avg. daily air temperature between 25°F and 32°F -- provide heat on both sides of construction masonry; use wind breaks for winds above 15 mph; cover masonry with insulating blankets for 24 hours.
 - 3. Avg. daily temperature below 20°F -- provide enclosure and heat to maintain air at 32°F for 24 hours. Do not lay masonry units at temperatures colder than 30°F.
- D. Before resuming work, top surface of masonry in place shall be cleaned of loose mortar and foreign material.

3.2 Storage

- A. Store cementitious materials on pallets under a tarpaulin cover in a dry place. Covers shall overhang 2 feet down each side and be held securely in place.
- B. Reinforcing, metal ties, and anchors shall be protected from contact with soil and before being placed shall be free from loose rust and other coatings that will destroy or reduce the bond.

3.3 Laying Concrete Masonry Units

- A. All sections herein shall apply to both ordinary masonry units and concrete catch basin units.
- B. All concrete masonry units shall be running bond with units in the courses above regularly breaking joints with the units below, unless otherwise indicated on drawings.
- C. Layout all openings before construction. The final location of openings shall be adjusted so that partial size units may be kept to a minimum.
- D. Reinforcing mesh shall be installed in the three courses above all openings and shall extend 3 ft. 9 in. beyond each side of opening. Mesh shall be installed in every third course of all masonry unit walls.
- E. Do not set patched, chipped, cracked, broken or otherwise defective units. Cut out defective joints and repoint.
- F. All intersecting walls shall be keyed together with masonry units.
- G. Cut block with a carborundum saw. Do not cut with hammer chisel.
- H. Use solid load-bearing block where required for structural purposes. Use hollow load-bearing block at all other locations.
- I. Leave all necessary openings for the passage of pipes and drains. At completion of the work of other trades, return and close all openings.
- J. Keep the open space at control joints and expansion joints free of mortar by using a continuous wood or metal strip temporarily set in the wall. Caulk control and expansion joints.
- K. Standard width of mortar joints for both horizontal and vertical joints shall be 3/8 inch. Joints shall have full mortar coverage on vertical and horizontal face shells, but mortar shall not extend through unit on the web edges. Compact mortar joints on the weather side of exterior walls and press tight against the edges of the units with a proper tool.

3.4 Brick

- A. Lay all face brickwork in straight running bond, level, with joints struck flush, then tooled with a concave pointing tool. Courses shall equal 3 to 8 inches in height. Mortar beds shall be full. Fill voids solid with mortar. Fill all vertical joints with mortar except weep holes.
- B. Carry facing and backing of exterior walls simultaneously and bond as required.
- C. Set reinforcement flashing and ties every 2 sq. ft. of wall surface.
- D. Provide rope wick weep holes, spaced approximately 32 in. on center, in vertical joints of first course, over all counter flashing and through wall flashing on all exterior walls.
- E. Project bolts from the face of the masonry a sufficient distance to allow for the proper attachment intended. Oil all threads and protect by waterproof caps.
- F. All joints shall be uniform and 3/8 inch thick unless otherwise indicated.
- G. Joints in exposed or painted surfaces shall be tooled when thumbprint hard with a round jointer. Joints shall be flush on the vertical and concave on the horizontal.
- H. Joints in unparged masonry below grade shall be pointed tight with a trowel.
- I. Mortar joints in surfaces to be plastered, stuccoed, or covered with other masonry shall be cut flush.
- J. Mortar protrusions extending into cells or cavities to be reinforced and filled shall be removed.
- K. Fill horizontal joints between top of masonry partitions and underside of concrete slabs or beams with mortar.

3.5 Bonding with Masonry Bonders

- A. Where two or more masonry units are used to make up a thickness of a wall, inner and outer wythes shall be bonded at vertical intervals not exceeding 34 inches by transverse lapping of stretcher units at least 3 inches over units below, or by lapping with units at least 50 percent greater in width than unit below at vertical intervals not exceeding 17 inches.
- B. Bond intersecting bearing walls with metal ties at vertical intervals not to exceed 16 inches.
- C. When intersecting bearing walls are carried up separately, regularly block (tooth) vertical joint with 8-inch maximum offsets. Provide joints with rigid steel anchors at vertical intervals not to exceed 48 inches. When approved,

blocking may be eliminated and rigid steel anchors provided at vertical intervals not to exceed 24 inches.

- D. Anchor abutting or intersecting interior non-load bearing walls with metal ties at vertical intervals not to exceed 24 inches and extending at least 4 inches into the masonry.
- E. Construct all concrete masonry in accordance with the National Concrete Masonry Associations.

3.6 Angles and Beams

- A. Adjust as required to keep masonry level and at proper elevation.
- B. Embed beams firmly in mortar of same quality as used in laying masonry wall.

3.7 Jointing and Cleaning

- A. At the completion of the work, all holes in joints of masonry surfaces, except weep holes, shall be filled with mortar and suitably tooled.
- B. Dry brush masonry surface at the end of each day's work and after final pointing using wire brushes if necessary to remove mortar but exercise care not to scratch or damage work.

PART 4 - MEASUREMENT AND PAYMENT

Manholes, catch basins, and yard inlets constructed of masonry block and concrete block shall be measured as each. Payment shall include all masonry/block work, mortar, manhole steps, manhole frame and cover, inlet frame and cover, concrete slab, grout, excavation and backfill, and all necessary appurtenant items. Other use of the masonry block and concrete block is covered under the work to which it relates.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, materials and equipment for the construction of mortar rubble retaining walls as called for on the approved plans and as detailed in the Construction Standards and specified herein.

1.2 Related Work Specified Elsewhere

Section 04100 - Mortar and Grout

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

PART 2 - MATERIALS2.1 Mortar

Mortar shall conform to Section 222 of the VDOT specifications.

2.2 Stone

Stone shall conform to Section 204 and 508.03(a) of the VDOT specifications.

2.3 Concrete Rubble

Concrete rubble shall be approved by the Engineer. Concrete rubble available from the County will be so noted on the approved plans.

2.4 Concrete Rubble Backing

Class A3 concrete conforming to Section 217 of the VDOT Specifications.

2.5 Filter Material

Filter material shall be Miraf 140, Typar 3401 or approved equal.

2.6 Backfill

Porous backfill shall be clean crushed stone or gravel aggregate size no. 57 or 68, in conformance with Section 204 of the VDOT Specifications.

PART 3 - EXECUTION

Construct mortar rubble masonry walls in conformance with the approved plans and the standard details. Shaping, dressing, cleaning, wetting, laying and other construction procedures for the walls shall be performed in accordance with Section 508.03(b) of the VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

Mortar rubble masonry walls shall be measured in cubic feet based on the approved plans and sections. Payment shall include the concrete rubble backing, excavation, backfill, testing of materials, labor, material and equipment necessary for a complete and structurally sound retaining wall in place.

PART 1 - GENERAL

1.1 Description of Work

- A. Provide all plant labor, supervision, material and equipment to furnish and install all structural steel and miscellaneous metal items, with accessories, fasteners, anchors, etc., complete in place as shown on the approved plans.

1.2 Related Work Specified Elsewhere

Section 09900 - Protective Coatings

1.3 Applicable Specifications

- A. American Institute of Steel Construction (AISC)
- B. American Society for Testing and Materials (ASTM)
- C. American Welding Society (AWS)
- D. Virginia Department of Transportation, Road and Bridges Specifications (VDOT)

1.4 Submittals

- A. Before any fabrication is begun, submit detailed shop drawings of all miscellaneous metal items showing sizes of metal components, method of assembly, hardware, and anchorage or connection to other work.
- B. Submittals shall include detailed descriptive literature of manufactured items specified herein.

1.5 Quality Assurance

- A. Fabrication and installation procedures shall conform to the specifications and practices of the American Institute of Steel Construction.

PART 2 - MATERIALS

3.1 General

- A. Standard Structural Steel Shapes and Plates shall be in conformance with ASTM A-36.

SECTION 05500

**STRUCTURAL STEEL
& MISCELLANEOUS METAL**

- B. Steel Pipe shall be in conformance with ASTM A-53, Type E or S, Grade A or B.C.Cast Iron shall be in conformance with ASTM A-48, Class 30, unless otherwise indicated. D. Fastenings shall be in conformance with Section 232(d), (e) and (f) of the VDOT specifications.
- C. Welding Electrodes shall be as permitted by AWS Code D1.0.
- D. The primers shall be as specified in Section 09900: Protective Coatings.

2.2 Pipe Handrails

A. General

Pipe handrails shall be galvanized steel pipe in conformance with Sections 233 of the VDOT Specifications. The rails shall be standard weight and the post shall be extra strong steel pipe. Standard or special fittings shall be used or the joints may be welded. Painting of railings shall meet the requirements of Section 09900.

B. Rail and Post Spacing

Post spacing shall not exceed 7' on center. Unless shown otherwise on the drawings, the top rail shall be located at a height of 3' 6-inch, (4'6-inch for bike trails), except stair runs shall have top rail at a height of 3' 6-inch and enclosed stair landings shall have top rail at a height of 3' 0-inch. Intermediate rails shall be located as shown on the Construction Standard R-3.1.

2.3 Gratings

All gratings shall be as indicated on the standard drawings.

2.4 Expansion Bolts

- A. Bolts shall be “Wej-It” concrete anchors as manufactured by “Wej-It” Expansion Products, Inc., Broomfield, Col., ”Taper Bolt” as manufactured by U.S. Expansion Bolt Co., York, Pa., or approved equal.

Self-drilling expansion anchors where called for on the plans shall be “Red Heads” as manufactured by the Phillips Drill Co., Michigan City, Indiana, or approved equal.

Contractor shall submit certified test reports establishing shear and tensile pull out for the anchors used.

- B. Bolts shall be of the same type as the members which they support, that is Type 2024-T6 alloy for aluminum shapes and hot dipped galvanized steel for structural steel shapes. Stainless steel bolts shall be used in all process units.

3.1 General

- A. Furnish all bolts, nuts, screws, clips, washers, and any other fasteners necessary for proper installation of items specified or called for on the approved plans. For ferrous metal, use stainless steel or galvanized on exterior. On interior, match adjacent material.
- B. Metal for shop-fabricated items shall be well formed to shape and size, with crisp lines or angles. Shearing and punching shall leave clean, true lines and surfaces. Weld permanent connections and grind smooth where exposed to view. Dress all sharp edges.
- C. Verify all measurements at job.
- D. Field drilled or punched holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.
- E. Construct to sizes indicated using rolled shapes and/or plates as detailed. Include wall and sill anchors for construction indicated.
- F. Set all work plumb, true, rigid, and neatly trimmed out.
- G. Grout plates, bolts, and similar items with non-shrink grout.
- H. Ship railings with factory-preassembled posts and fittings. Assemble on location in accordance with manufacturer's instructions, keeping posts plumb and posts parallel to either horizontal or rake.
- I. Castings subject to foot or street traffic shall have bearing surfaces machined to prevent rocking and rattling.
- J. Protect all dissimilar metals from galvanized corrosion by pressure tapes, coatings or isolators.

3.2 Welding

- A. Perform all ferrous metal welding in accordance with AWS Code D1.0. Use only pre-qualified welding procedures in accordance with AWS paragraph 103(a) and only by operators experienced in performing the type of work indicated.
- B. Weld pipe handrail in accordance with Section 407 of VDOT Specifications.

3.3 Bolted Connections

SECTION 05500

**STRUCTURAL STEEL
& MISCELLANEOUS METAL**

- A. In general, use bolts for field connections only and then only as detailed. Provide washers under all heads and nuts bearing on wood. Draw all nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.
- B. Provide grating with necessary minimum clearances and fit so as to lie flat and not rock in any fashion. Provide U-clips in each corner of the grating sections.

3.4 Protection of Surfaces

- A. Provide protection by strippable coating, protective sleeves, polyethylene sheets, boarding, or other suitable means during fabrication, shipment, site storage, and erection to prevent damage to the finished work due to stains, discolorations, scratches, or any other cause. Replace damaged elements at no expense to the County.
- B. After installation, and after danger of subsequent damage has passed, remove all protective coverings from all exposed surfaces, and clean those surfaces of all soil and discoloration, ready for acceptance.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Handrails shall be measured in linear feet installed. Payment shall include all labor, equipment and materials necessary for a complete installation.
- 4.2 Structural steel, including beams, girders, and miscellaneous steel, will be paid for at the contract lump sum price or when specified in pounds of metal in the fabricated structure.
- 4.3 No separate measurement and payment will be made for other work under this section. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL1.1 Description of Work

Provide all labor, material and equipment to furnish and construct with structural timber and lumber as called for on the approved plans and specified herein. The work includes timber and lumber construction and all other incidental construction.

1.2 Related Work Specified Elsewhere

Section 02100 - Clearing and Grubbing

Section 02110 - Demolition

Section 09800 - Wood Preservatives

1.3 Applicable Specifications

A. American Lumber Standards

B. Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable References

A. American Association of State Highway and Transportation Officials (AASHTO)

B. National Forest Products Association (NFPA)

1.5 Product Handling

All structural timber and lumber shall be delivered, stored, handled and installed in a manner to prevent twisting, warping or other damage that would preclude satisfactory installation.

PART 2 - MATERIALS

2.1 Structural timber and lumber shall conform to Section 236 of the VDOT Specifications.

2.2 Where treated timber or lumber is required, the preservative and treatment shall be as specified in Section 09800 of these specifications titled: Wood Preservatives.

PART 3 - EXECUTION3.1 Inspection

Timber and lumber shall be grade marked in accordance with grading rules and basic provisions of the "American Lumber Standards" by a lumber grading or inspection bureau of agency approved by the Engineer.

3.2 Installation

The structural timber of lumber shall be installed properly in the sizes and grades and to the alignment with fastenings as shown on the approved plans.

PART 4 - MEASUREMENT AND PAYMENT

All timber and lumber will be measured in units of 1,000 feet-board-measure (MFBM) based on nominal sizing for the materials actually placed in the finished structure according to the approved plans or as directed by the Engineer. Payment shall include all labor, materials and equipment, including preservatives and coatings, necessary for a complete installation.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, equipment and materials to waterproof all sanitary manholes and other structures subject to hydrostatic head when called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 07150 - Damp proofing

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable References

A. American Association of State Highway and Transportation Officials (AASHTO)

B. American Society of Testing and Materials (ASTM)

1.5 Quality Assurance

Provide certified test reports of testing required by referenced specifications.

PART 2 - MATERIALS

2.1 Primer, asphalt, fabric and joint sealers shall conform to Section 213 of the VDOT Specifications.

2.2 Membrane: System A, B, C or D as specified in Section 214.04 of VDOT Specifications or preformed elastomeric waterproofing as manufactured by Polyguard (No. 650), B.F. Goodrich (20 mil vinyl water barrier) or Grace (Bithuthene 3000).

PART 3 - EXECUTION

3.1 Waterproof exterior, below grade structures when called for on the approved plans.

3.2 Conform to Section 416 of VDOT Specifications when applying System A, B, C, or D expect that structures shall be treated as that specified for decks.

3.3 Conform to the manufacturer's printed instructions when applying preformed elastomeric waterproofing.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, equipment and materials to damp proof structures not subject to hydrostatic head when called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 07100 - Waterproofing

1.3 Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4 Applicable References

A. American Association of State Highway Transportation Officials (AASHTO)

B. American Society for Testing and Materials (ASTM)

1.5 Quality Assurance

Provide certified test reports of testing required by referenced Specifications.

PART 2 - MATERIALS

Primer and asphalt shall conform to Section 213 of the VDOT Specifications.

PART 3 - EXECUTION

Conform to Section 417 of VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL**1.1 Description of Work**

Provide all labor, materials and equipment for the complete application of paint to new and or existing ferrous metal structures in the conformance with the requirements of the various sections of these specifications.

Painting shall conform to the requirements specified in the specifications and where called for on the approved plans or special provisions.

For safety precautions, the Contractor shall wear protective goggles and masks for the cleaning and painting of metal structures.

1.2 Related Work

Section 09900 - Protective Coatings

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. American Association of State Highway and Transportation Officials (AASHTO)
- C. Steel Structures Painting Council (SSPC)
- D. Virginia Department of Transportation (VDOT)
- E. Occupational Safety and Health Administration (OSHA)
- F. Toxic Substance Control Act (TSCA)
- G. Hazardous Material Transportation Act (HMTA)
- H. United States Environmental Protection Agency (USEPA)
- I. Virginia Department of Health, Solid & Hazardous Waste Management Division (VDH)

1.3 Surfaces not to be Painted

Refer to Section 09900, Paragraph 1.4

1.4 Submittals

Refer to Section 09900, Paragraph 1.5

1.5 Quality Assurance

A. Refer to Section 09900, Paragraph 1.6

B. Steel Structures Painting Council (SSPC):

SSPC-SP1-82	Solvent Cleaning
SSPC-SP2-82	Hand Tool Cleaning
SSPC-SP3-82	Power Tool Cleaning
SSPC-SP6-85	Commercial Blast Cleaning
SSPC-Visual	Pictorial Surface Preparation Standards For Painting Steel Surfaces

C. To assure quality control and the quality of the paint a representative of the paint manufacturer shall be present during the initial stages of mixing and application of the paint system.

1.7 Product Delivery, Storage and Safety Data

Product delivery, storage and safety data shall conform to the manufacturer's specification and Section 09900, Paragraph 1.7. All containers shall be labeled with:

- A. Manufacturer's Name
- B. Product Name & Number
- C. Batch Number
- D. Date of Manufacturer

1.8 Guarantee

Refer to Section 09900, Paragraph 1.8.

1.9 Weather Conditions

Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather conditions. Blasting and/or painting will not be permitted when the atmospheric temperature is at or below 40°F. in the shade; when the relative humidity exceeds 85% at the site of work or when weather conditions would prevent obtaining a satisfactory job, such as anticipating rain, fog or any type of condensation, dust or when it can be anticipated that atmosphere temperature will drop below 40°F. Painting shall not be permitted on surfaces that are sufficiently hot to cause blistering or when the surface is damp. The surface should be dry and at least 5°F above the dew point. Or as specified by the manufacturer.

1.10 Protection Against Damages

The Contractor shall provide protection devices such as tarps, screens, covers, as necessary to prevent damage to the work, other property, persons, or environment from all cleaning and painting operations.

A water trap acceptable to the Engineer, shall be furnished and installed on all equipment used in spray painting.

Paint or paint stains which result in an unsightly appearance on a surface not designated to be painted shall be removed by the Contractor at his expense and to the satisfaction of the Engineer.

All painted surfaces that are marred or damaged as a result of the Contractor's operation shall be repaired by the Contractor, at his expense, with materials and to a condition equal to the coating specified herein. Upon the completion of all painting operations and any other work that would cause dust, grease, or any other foreign materials to be deposited upon the painted surfaces, shall be thoroughly cleaned off to the satisfaction of the Engineer. If traffic conditions start to cause dust, the Contractor, when directed by the Engineer, shall sprinkle water or a dust palliative on area of the traveled way to control the problem. No additional payment will be made for this work.

1.11 Special Stenciling

The date (month and year) of painting shall be stenciled by the Contractor in two locations on the structure, as directed by the Engineer. The block letters shall be 2 1/2-inch high, and the paint used shall be in distinct contrast with the background.

PART 2 - MATERIALS

2.1. Acceptable Manufacturers

The protective coating system specified under this specification is in reference to the Tnemec Company. Other systems are acceptable provided that they are equal or better than the system referenced to:

TNEMEC Company Incorporated, Richmond, VA.
Ditsler Company (Manufacturer's representative)
302 West Cary Street
Richmond, VA 23220DC Metro (804)780-3077

2.2 Paint Materials

The paint for new or existing structural steel or other metal surfaces shall conform to the requirements of this section, unless otherwise specified on the plans or in the special provisions. The following descriptions apply to the TNEMEC system for primers, and top coat coating profile. Other systems will be accepted if proven to be equal or better than the system specified in this section.

<u>Coating</u>	<u>Description</u>
90-97 Tneme-Zinc: Zinc-Rich organic moisture cured	A two-component moisture cured urethane primer

zinc-rich primer, used in conjunction with chemical and corrosion resistant top coats. When used as a shop primer, may be recoated the same day.

Conforms to SSPC-PS 12.01.

Endura-Shield III

Series 73:

High build

acrylic polyurethane

A high-solids, high-build, fast-drying coating that is highly resistant to abrasion, corrosive fumes and chemical contact. Can be applied in a single coat directly to properly applied organic zinc-rich primers and other compatible coatings without the use of an intermediate or tie coat. Provides long-term color and gloss retention.

2.3 Material Preparation

- A. Do not use any material older than the manufacturer's recommended shelf life.
- B. Mix and thin materials according to manufacturer's latest printed instructions.
- C. Do not use mixed materials beyond manufacturer's recommended pot life.

2.4 Paint System

Unless specified in the plans or special provisions, it is understood that the coating application for primers, intermediate coats and top coats received shall be as recommended by the manufacturer. The minimum acceptable thickness is that enclosed in the parenthesis.

A. System – 1

Produced by TNEMEC

Primer- 9097 Tneme-Zinc

SURFACE PREPARATION
(SSPC-SP6)

Commercial Blast Cleaning

COLOR

Reddish-Gray

METALLIC ZINC CONTENT

83% by weight in dry applied film

SOLID BY VOLUME

63.0% ±2.0% (Mixed)

THEORETICAL COVERAGE

1003 mil sq. ft. per gallon

DRY FILM THICKNESS

2.5 to 3.5 mils per coat

CURING TIME

At 75°F To handle: 1 hour

To recoat: 4 hours

TEMPERATURE RESISTANCE

(Dry) Continuous 250°F

Intermittent 300°F

SPECIAL QUALIFICATIONS

This product meets the requirements of the United States Department of Agriculture for use in federally inspected meat and poultry processing plants

Intermediate Coat – (None applicable with this system)

Top Coat - Series 73 Endura Shield III

SURFACE PREPARATION

Prepare surfaces by method suitable for exposure and surface (see prime coat data). All surfaces must be dry and clean.

COLORS

Refer to Tnemec CHROMACOLORS

FINISHES

Semi-gloss

SOLIDS BY VOLUME*

58.0 + 2.0% (Mixed)

THEORETICAL COVERAGE*

930 mil. sq. ft. per gallon

DRY FILM THICKNESS

3.0 to 5.0 mils per coat

CURING TIME - AT 75oF

To touch: 1 hour

To handle: 5 hours

To recoat: 12 hours

To resist moisture condensation:

3 to 6 hours

TEMPERATURE RESISTANCE

(Dry) Continuous 170oF. Intermittent 200°F

MIXING RATIO

By volume-Four (Part A) to One (Part B)

CHEMICAL RESISTANCE

Organic Acids

Mineral Acids

Oxidizing Agents

Alkali Solutions

FREQUENT CONTACT

Alcohols

Aliphatic Hydrocarbons

Aromatic Hydrocarbons

Salt Solutions

Ketones

Fresh Water

Waste Water

Mineral Oils

Vegetable Oils

*Values may vary with color.

2.5 Performance Criteria

This product will meet or exceed the following test requirements

90-97 Theme-Zinc

Type: Zinc-rich Urethane Primer

Adhesion

Method:	Elcometer Adhesion Tester (0 to 1,000 psi). Coating applied to sandblasted steel panels and cured 7 days at 77°F./50% R.H.
System:	90-8 One-Coat 90-97 Theme-Zinc.
Requirement:	Not less than 800 psi pull, average of three trials.
Method:	ASTM D 3359 (Method B). Substrate: 4-inch x 12-inch x 1/8-inch steel panels.
Surface Preparation:	SSPC-SP10.
System:	90-8 One-Coat 90-97 Theme-Zinc cured 7 days at 77°F./50% R.H.
Requirement:	No less than a rating of 5, average of three trials.

Salt Spray (Fog)

Method:	ASTM B117-73. System: 90-8 One-Coat 90-97 Theme-Zinc.
Requirement:	No blistering, cracking, softening or delamination of film. No rust creepage at scribe and no rusting at edges after 3,000 hours of exposure.
Method:	ASTM B 117-73.
System:	90-97 Theme-Zinc/Series 73

Endura-Shield III.

Requirement :	No blistering, cracking, softening or delamination of film. No more than 1/16-inch rust creepage at scribe and no rusting at edges after 3,000 hours of exposure.
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Series 73 Endura-Shield III

Type: High-Build Acrylic Polyurethane Enamel

Abrasion Resistance: Federal Test Method Std. No. 141, Method 6192, CS-17 Wheel, 1,000 gram load. No more than 95 mg. loss after 1,000 cycles.

<u>Adhesion:</u>	ASTM D 3359 Method B (Crosshatch Adhesion). Coating systems applied to sandblasted steel panels and cured 30 days @ 77°F. Not less than a rating of 5, average of three tests.
<u>Humidity:</u>	ASTM D 2247-68. No blistering, cracking, softening or delamination of film after 600 hours exposure.
<u>Salt Spray:</u>	ASTM B 117-73. No blistering, cracking, softening or delamination of film. No rust creep age at scribe and no more than one percent rusting at edges after 1,000 hours exposure.

PART 3 - EXECUTION

3.1 Inspection

Refer to Section 09900 - PART 3.1

- A. Make visual comparison of cleanliness or prepared surfaces with pictorial standards in accordance with SSPC-VIS-1.
- B. Measure dry film thickness using a magnetic film thickness gage in accordance with SSPC-PA2.

3.2 Surface Preparation

All surfaces of new or existing structural steel or other metals to be painted shall be blast cleaned unless otherwise specified in the special provisions, or approved in writing by the Engineer.

In repainting existing steel structures the method of cleaning will be specified in the special provisions. Any damage to sound paint on areas not designated for treatment, resulting from the Contractor's operations shall be repaired by him at his expense to the satisfaction of the Engineer.

3.3 Blast Cleaning

Surfaces prepared by Commercial Blast Cleaning shall be in accordance with SSPC-SP6. The blast cleaning shall remove all rust, mill scale and other substances down to bright metal. Special attention shall be given to cleaning of corners and reentrant angles. Before painting, sand adhering to the metal in the corners and elsewhere shall be removed. The cleaning shall be approved by the Engineer prior to any painting. Bare metal shall be prime painted as soon as practicable after it is cleaned. All surface will be primed the same day they are blast cleaned. Any reblasted that is required will be done by the Contractor at his expense.

Abrasive used for blast cleaning shall meet all local state and federal specifications, regulations and laws to produce satisfactory results. The Anchor Pattern on the blast surface shall not exceed 1 1/2 to 2 mils.

3.4 Disposal and Removal of Lead Primer

All lead base primer shall be blasted off the structure, in accordance with OSHA (Occupational Safety and Health Administration) health and safety regulations. The regulations are outlined in the code of federal regulations section 1910.1025 "Lead".

The Contractor will have all testing required by regulations or by the selected waste hauler or landfill, such as Toxicity Characteristic Leaching Procedure Testing (TCLP Testing), or subsequent testing required by the Resource Conservation and Recovery Act (RCRA) or local or state regulations, to determine proper treatment and/or disposal requirements, including any follow-up testing, shall be done at the Contractor's expense. The Cost of all disposal on shall be paid for by the Contractor. Copies of all manifests, testing results and treatment procedure documents as shall be sent to the County.

The citizen and environmental protection will conform to all Local, State and Federal specifications, regulations, and laws governing the removal of lead paint. Each site will be reviewed for compliance with environmental and industrial containment standards and safe guards.

List of Agencies to contact:

Occupational Safety and Health Administration (OSHA)	(202) 523-9655
Environmental Protection Agency (E.P.A.)	(202) 260-4134
Water Pollution (Arlington County)	(703) 228-6820
Environmental Health (Arlington County)	(703) 228-4826
Hazardous Waste Violation, Health Dept. (VA)	(804) 225-2667
VA. State Air Pollution Control Board	(703) 644-0311

3.5 Notification

The Contractor shall notify the Engineer in writing, at least one week in advance of the date that cleaning and painting operations are to begin.

3.6 Coating Schedule

First coat: Series 90-97 Theme-Zinc at 2.5 - 3.5 dry mils. (Note: two coats of primer applied to severely rusted areas, bolts, bearing areas, pitted areas at a minimum of 2 feet from beam end as determined by the Engineer. Brush apply first full coat forcing material into these areas).

Second coat: Series 73 Endura-Shield III at 3 - 5 dry mils.

3.7 Method

Painting shall be done in a neat and workmanlike manner. Unless otherwise specified, paint shall be applied by conventional air spray, airless spray brush or any combination thereof. Refer to the manufacturer's recommendation on the application of their painting system.

- A. Apply a smooth, uniform coat, free of any skips, holidays, runs, sags, dry spray or any other film defects. Correct the deficiencies before the succeeding application.
- B. On all surfaces that are inaccessible for painting by regular means, the paint shall be applied by sheep skin daubers, bottle brushes or any means approved by the Engineer.
- C. Do not apply successive coats until the Engineer has completed inspection. Succeeding coats shall be applied within the following 24 hours. A minimum of 30 minutes shall elapse between applications or as specified by the manufacturer. Refer to the manufacturer's specification on application of succeeding coats.

3.8 Curing

Allow the prime coat to cure a minimum of 12 hours, or as specified by the manufacturer, before top coating.

The top coat shall be applied within 24 hours, or as specified by the manufacturer, to minimize contamination.

Refer to the manufacturer's recommendations or curing time for their brands of paints.

3.9 Field Painting

Surfaces which will be inaccessible after erection shall be cleaned free from any foreign material and painted prior to erection with such field coats as are called for on the plans or specified in the special provisions or authorized by the Engineer. Field painting, except for retouching, shall be performed only after all form work, such as concrete, is completed and the forms removed. When the paint applied for retouching has thoroughly dried, such field coats as called for on the plans or authorized shall be applied. However, no coat of paint shall be applied until the preceding coat has dried. Paint shall be considered dry when another coat can be applied without the development of any film irregularities.

To secure a minimum coating on edges of plates or shapes, bolt heads and nuts and other parts subjected to special wear and attack, the edges, shall first be stripped with a longitudinal motion and the bolt heads and nuts with a rotary motion, followed immediately by the general painting of the whole surface, including the edges and bolt heads nuts.

If traffic produces an objectionable amount of dust, the Contractor shall allay the dust for the necessary distance on each side of the structure and take any other precautions necessary to prevent dust and dirt from coming in contact with freshly painted surfaces or with surfaces before the paint is applied.

The second field coat shall not be applied in less than 2 days after the first field coat. The application of the final field coat shall be deferred until after all construction operations which might mar the finished coat are complete.

The Contractor shall protect adjacent property and pedestrian, vehicular and other traffic upon or underneath the structure and also all portions of the superstructure and substructure against damage or disfigurement by the painting operation.

PART 4 - MEASUREMENT AND PAYMENT

Preparing and painting of structural steel will be measured by the square foot or as noted. Measurement will be determined along the surface of the actual area painted. Payment shall be per square foot for preparing and painting structural steel and shall include full compensation for furnishing all labor, materials, tools, equipment, disposing and incidentals, and for doing all the work involved in preparing the steel and applying the paint to the surfaces as shown on the plans, specified in these specifications and the special provisions, and as directed by the Engineer.

PART 1 - GENERAL1.1 Description of Work

Provide all plant, labor, material and equipment to treat piles, structural and miscellaneous timber called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 06100 - Structural Timber & Lumber

Section 09900 - Protective Coatings

1.3 Applicable Specifications

A. American Association of State Highway Transportation Officials (AASHTO)

B. Virginia Department of Transportation, Road and Bridge Specifications(VDOT)

1.4 Applicable Reference

American Wood Preserver's Association (AWPA)

1.5 Quality Assurance

Provide certified test reports as required by AASHTO M-133.

PART 2 - MATERIALS

2.1 Materials shall conform to Section 236 of the VDOT Specifications.

PART 3 - EXECUTION

3.1 Preparation, treatment and penetration shall conform to Section 236 of the VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL1.1 Description of the Work

Provide all labor, materials and equipment for the complete application of protective coatings for interior and exterior surfaces as required in accordance with these specifications and where called for on the approved plans.

1.2 Related Work Specified Elsewhere

Section 09800 - Wood Preservatives

1.3 Applicable Specifications

- A. American Society for Testing and Materials (ASTM)
- B. Steel Structures Painting Council (SSPC0)

1.4 Surfaces Not to be Painted

The following surfaces are not to be painted. (If surfaces referenced below are to be coated, specific instructions will be given on the approved plans.)

- A. Non-ferrous metals; for example - Aluminum Copper Monel Brass
- B. Stainless Steel
- C. Chain link fencing
- D. Concrete walks, curbs
- E. Exterior concrete foundations
- F. Plastic
- G. Brick
- H. Galvanized steel

1.5 Submittals

In accordance with Section 03100, submit a complete list of materials and color charts. The Engineer will select colors.

1.6 Quality Assurance

- A. Primers, intermediate and top coats for each surface shall be supplied by one manufacturer.
- B. Thinner, solvents, cleaning compounds shall comply fully with the recommendations of the coatings manufacturer.

- C. The protective coating systems shall be tested and inspected for acceptance in accordance with Part 3.

1.7 Product Delivery, Storage and Handling

Deliver painting materials to the site in the original manufacturer's containers with labels intact and seals unbroken. Store materials in an area specifically assigned for storage. Storage area shall be well ventilated and kept locked. Keep storage area clean. Remove oily rags daily and dispose same properly. Take all necessary precautions to avoid fires.

1.8 Guarantee

Protective coatings shall be guaranteed for a period of one year after acceptance of the project by the County. Approximately one month prior to the expiration of this guarantee period, the Engineer will notify the Contractor to coordinate inspection of the coatings. All coatings for the project shall be inspected and failures repaired at no cost to the County. Normal wear, abrasion, or physical damage as determined by the Engineer will not be considered as failures.

PART 2 - MATERIALS

2.1 Acceptable Manufacturers

The protective coating systems specified under this section are generic in form. The systems are manufactured by a number of acceptable manufacturers, no one of which can provide all of the systems for this contract. It is intended, therefore, that the systems be provided by the following manufacturers:

Koppers Company,, Pittsburgh, PA

Tnemec Company, Inc., Kansas City, MO

Hughson Chemicals, Lord Corp., Erie, PA

Wise Chemical Company, Pittsburgh, PA

Carboline Company, St. Louis, MO

Pennsbury Coating Corp., Bucks Co., PA

2.2 Paint Materials

The following descriptions apply to the short form identifications of the primers, intermediate and top coats specified under the various systems of paragraph 2.3 following. Other acceptable coatings of the above named manufacturers exist, but have not been defined herein.

<u>Coating</u>	<u>Description</u>
Coal Tar - Black	High build coal tar solution containing 65% solids by volume.
Coal Tar Epoxy-White	High build 2-component white coal tar epoxy coating having a minimum epoxide resin content of 34% by weight in the weight
Epoxy - Polyamide	Two component Polyamide epoxy containing 55% solids by volume. With exposure at 45o facing ocean exhibit no blistering, cracking delamination after 36 months' exposure. Exhibits no more than 130 mg. loss after 100 grams load of Federal Test Method Std. No. 141 Method 6192.
Eproxy-Primer - Red	Two component polyamide epoxy containing a minimum of 53% solids by volume having performance equal to the epoxy-polyamide above.
Modified Epoxy	High build decorative sand texture finish suitable for use on new and previously painted concrete and masonry and having 50% minimum solids by volume. When subject to ASTM D-2247 test for humidity will exhibit no blistering, softening, or loss of film integrity, or change in color after 1,000 hours.
Polyurethane Enamel	Two component aliphatic polyurethane highly-resistant to abrasion; corrosive fumes, moisture and chemical contact and containing a minimum of 50% solids by volume. Shall show no blistering, cracking, softening or delamination of film after 5,000 hours' exposure (ASTM D-2247 humidity) and shall meet the abrasion and gloss test of the polyurethane aliphatic-1.

2.3 Paint Systems

Unless specified otherwise, it is understood that each stage of coating (primer, intermediate and top) receives only 1 coat. Note that the dry film thicknesses specified denotes the average. The minimum acceptable for the thickness tests are noted in parenthesis ().

A. Concrete and Masonry

1. System "A-1"

Interior – Immersion

Primer

Epoxy-Polyamide

5.0 mils d.f.t.
(4.0 mils minimum)

FINAL COAT

Polyurethane Enamel

2.0 mils d.f.t.

Semi-gloss (color)

(1.5 mils minimum)

2. Systems "A-4"

Interior - Immersion or Non-immersion - Storm or Sewer Structures when specifically called for on the approved drawings.

1 COAT

Coal Tar Epoxy – White 22.0 mils d.f.t.
(20.0 mils minimum)

3. System "A-3"

Interior Walls or Exterior Walls Above Grade

FINISH COAT

Modified Epoxy 10.0 mils d.f.t. (8.0 mils
minimum)

4. System "A-5"

Exterior Walls to be Backfilled

PRIMER

Coal Tar - black 15.0 mils d.f.t.

FINAL COATS

Coal Tar - black 15.0 mils d.f.t.

Total: 30.0 mils d.f.t.
(27.0 mils minimum)

B. Steel and Iron

1. System "B-1"

Non-Immersion - Severe Corrosive Condition

PRIMER

Epoxy - Polyamide 5.0 mils d.f.t.
(semi-gloss) (4.0 mils minimum)

TOP COAT

Polyurethane Enamel 2.0 mils d.f.t.
(semi-gloss - color) (1.5 mils minimum)

2. System "B-2"

Non-Immersion - Mild Corrosive Condition

PRIMER

Epoxy Primer - Red 4.0 mils d.f.t. (3.0 mils minimum)

TOP COAT

Epoxy - Polyamide 5.0 mils d.f.t. (4.0 mils minimum)

- C. Wood
1. System "C-1"
 - All Exposures
 - PRIMER AND TOP COAT
 - Epoxy - Polyamide - 2 coats 2.5 mils d.f.t.(2.0 mils min.) each coat
- 2.4 Galvanizing
- A. All exterior and/or interior steel work, where indicated on the Contract Documents, shall be galvanized by the hot-dip process, conforming to ASTM A-386 for assembled steel products. All required hot-dip galvanizing shall be done after fabrication, in the largest sections possible. Items too large for available dip tanks shall be sprayed, by approved methods, with molten zinc to coating thickness of .003 inch to .004 inch.
 - B. Weight of zinc coating per square foot of actual surface shall average not less than 2.0 ounces and no individual specimen shall show less than 1.8 ounces.
 - C. All bolts and screws for attachment of galvanized items shall be galvanized or non-corrodible material.

PART 3 - EXECUTION

- 3.1 Inspection
- A. Complete records shall be kept by the Contractor and furnished to the Engineer. These records shall identify the particular paints that were applied to a surface, the date of application, area coated, climatic conditions, and the following post-application quality control data:
 1. Wet film thickness: 3 readings per 100 sq. ft.
 2. Dry film thickness: 1 reading per 250 sq. ft.
 - B. Repair all damaged coated areas, holidays and thickness test areas in accordance with the coating manufacturer's recommendations so that the repaired area is equal to the undamaged coated areas in all respects.

3.2 Surface Preparation

All surfaces to be coated shall be cleaned, free of harmful scale, rust, dirt, oil, grease, moisture, concrete mortar, loose and damaged coatings and all foreign matter.

- A. Concrete:

Concrete shall be fully cured prior to coating. Fully cured shall be defined as 28 days at 75°F or 49 days at 50°F or 53 days at 50°F. Rebuild rough, chemically attacked and/or abraded surfaces. Rebuild concrete surfaces

containing air, water pits, splatter, fins, protrusions, bulges, or other surface irregularities while the concrete is still "green".

B. Steel and Iron:

1. Remove all weld splatter. Grind all edges, projections, sharp corners and welds to a smooth, rounded contour.
2. Remove oil and grease from surfaces by solvent cleaning in accordance with the Steel Structures Painting Council Specifications (SSPC).
3. Abrasive blast steel and iron surfaces in accordance with SSPC-SP-20 (Near-White Blast).
4. In areas where blasting is not feasible, obtain the approval of the Engineer to use power tool cleaning in accordance with SSPC-SP-3.
5. Remove dust and spent sand from the surfaces after sand blasting by brushing and vacuum cleaning.
6. Apply the prime coat as soon as possible after the preparation is complete and before the dew point is reached. All surfaces blasted and power-tooled in one day shall be coated on the same day. Leave whip-blast or power tool areas exposed overnight.

C. Galvanized Steel Surfaces:

Conform to ASTM A-384 and A-385 (Recommend Practices) pertaining to galvanizing assembled steel products. Unless otherwise permitted, do all galvanizing after fabrication, in largest sections practicable. Where galvanizing is removed by welding or other assembly procedure, touch up abraded areas with molten zinc or zinc-rich paint.

D. Concrete or Cinder Block:

Concrete or cinder block substrates shall be clean, dry and free of oils and release agent contaminants. If necessary, spot clean with solvent and wash with strong detergent and warm water. Flush with high pressure water and allow to dry for approximately one hour before application.

E. Brick:

Clean off all mortar, uneven loose or detrimental foreign matter. Apply a cleaning compound approved by the coating manufacturer. Allow to stand on the brick for at least 15 minutes. Thoroughly remove the cleaning compound by high pressure spray delivering 1 to 3 gpm at 1,000 psig. Allow to dry for at least one hour and paint as soon as possible after drying.

F. Wood:

Maintain the surface in a clean and dry manner. Fill cracks and nail holes with putty after the first coat has been applied. Seal knots and sap streaks with material approved by the manufacturer. Sand surfaces to a fine smooth finish.

3.3 Application

- A. Mix all paint and tinting colors in strict accordance with the specifications of the paint manufacturer. Except for epoxies, mix paints at storage area and deliver to the site ready-mixed.
- B. Apply coatings uniformly and in a continuous film by brush or spray, leaving no sags, holidays, pinholes, bubbles or other defects. Coatings judged unsatisfactory by the Engineer's representative shall be corrected at no additional cost to the County.
- C. Do not apply paint when the surrounding air temperature, as measured in the shade, is below 50°F or less than 5°F above the dew point. Do not apply paint to wet or damp surfaces or when the humidity exceeds 85%.
- D. Vary the colors of successive coats.
- E. Do not apply successive coats until the Engineer has completed inspection.
- F. All shop galvanized steel work necessitating field welding which in any manner removes original galvanizing shall be restored by field cold galvanizing with "Ferralloy", "Tin Easy Fluid", "galvaloy", or approved equal.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this work. It shall be considered a subsidiary obligation of the Contract under other work to which it relates.

PART 1 - GENERAL1.1 Description of the Work

Provide all labor, material and equipment to furnish and install, complete in place, the bus shelter in accordance with these specifications and to the lines, grades and dimensions shown on the approved plans.

1.2 Related Work Specified Elsewhere

Section 02611 - Concrete Walks and Concrete Driveway Entrance
Section 02612 - Interlocking Concrete and Brick Pavers
Section 03100 - Concrete Formwork, Reinforcement and Materials
Section 09900 - Protective Coatings

PART 2 - MATERIALS2.1 Bus Shelter Unit

The bus shelter shall be either an Arlington County type or a Metro type bus passenger shelter as specified on the plans. The Metro type bus shelter will be provided by Washington Metro Area Transit Authority (WMATA). The Arlington County bus shelter shall be furnished by the Contractor, unless otherwise specified on the approved plans.

2.2 Paint

Paint for the Metro shelter shall be custom blend, Metro Brown, available from MAB Paint Co., 3312 Wisconsin Ave. NW, Washington, DC, Phone: (202) 966-5445.

2.3 Concrete Pad

The concrete pad and aggregate base shall be in conformance with Section 02611 of these specifications.

2.4 Pavers

Pavers when specified on the approved plans, shall match the adjacent sidewalk and be as specified in Section 02612 and on the plans.

PART 3 – EXECUTION

- 3.1 The Contractor is responsible for the pick-up and delivery of the Metro passenger shelter unit from the Washington Metropolitan Area Transit Authority. Three weeks prior to installation, contact the Arlington County, Department of Environmental Services, Planning Division at 228-3681 to arrange for pick-up and directions.

- 3.2 The unit is to be mounted on a 4-inch thick concrete pad on a 3-inch compacted aggregate base. Construct concrete pad in accordance with Section 02611. When pavers are specified on approved plans, lay pavers in accordance with Section 02612. Match elevation of pavers or concrete pad with adjacent sidewalk and provide 1/4-inch/ft positive drainage to street. Extend anchor bolts from concrete base pad through pavers to mount on shelter brackets.
- 3.3 Install bus shelter in accordance with the approved plans and the details provided in these specifications.
- 3.4 Paint the Metro bus shelter in accordance with Section 09900 and manufacturer's application instructions.

PART 4 - MEASUREMENT AND PAYMENT

Bus shelters shall be measured as each. Payment will be at the unit price stated in the bid proposal and shall include all materials, labor and incidentals necessary for a complete installation of the bus shelter unit and the supporting concrete pad.

**ARLINGTON COUNTY DES
STANDARD DETAILS**

Section M – Miscellaneous Standards

M-1.0	Standard Legend
M-1.1	Standard Legend – Cont'd
M-1.2	Standard Legend – Cont'd
M-1.3	Standard Legend – Cont'd
M-1.4	Standard Legend – Cont'd
M-1.5	Standard Legend – Cont'd
M-1.6	Standard Legend – Cont'd
M-2.0	Standard Manhole Steps
M-3.0	Pipe Bedding Details for Trench Conditions
M-4.0	Jacking & Boring Details
M-5.0	Tunneling Details
M-6.0	Standard Pavement Patching for Utility Cuts
M-6.1	Modified Pavement Patching for Cuts on Newly Paved Street
M-7.0	Concrete Pier and Reinforced Concrete Cradle Details for Utility Crossing
M-8.0	Typical Road Cross Section Cable & Riser Shield Installation on Poles
M-8.1	Typical Road Cross Section Cable & Riser Shield Installation on Poles

Section R – Roadway Standards

R-1.0	General Notes for Roadway
R-1.1	Typical Section – Local Residential Streets
R-1.2	Typical Section – One Half Local Residential Street Construction
R-1.3	Typical Section – Neighborhood Collectors and Undivided Thoroughfares
R-1.4	Typical Section – Divided Thoroughfares
R-2.0	Concrete Curb & Gutter and Sidewalk
R-2.1	Interlocking Concrete and Brick Pavers for Sidewalk Application
R-2.2	Sidewalk Stress Columns
R-2.3	Driveway Entrance Placement
R-2.4A	Concrete Driveway Entrance (Standard)
R-2.4B	Concrete Driveway Entrance (Depressed)

R-2.4C	Concrete Driveway Entrance (Mountable Curb)
R-2.4D	Combination Driveway Entrance/Curb Ramp
R-2.5	Curb Cut Ramp
R-2.6	Paver Crosswalks
R-2.7	Mountable Curb Detail at Traffic Circle
R-2.8	Flat Top Profile Speed Hump
R-2.9	Concrete Valley Gutter
R-3.0	Concrete Steps on 2:1 Slope
R-3.1	Pipe Handrail
R-3.2	Ornamental Handrail
R-3.3	Trail Railing
R-4.0	Mortar Rubble Retaining Wall Level Backfill
R-4.1	Mortar Rubble Retaining Wall with Concrete Base, Level Backfill
R-4.2	Mortar Rubble Retaining Wall with Infinite Surcharge or Deck Surcharge
R-4.3	Mortar Rubble Retaining Wall with Concrete Base and Infinite Surcharge or Deck Surcharge
R-5.0	Utility Pole Location
R-6.0	Hiking – Biking – Jogging Trail Details Removable Post Barrier
R-6.1	Typical Section – Hiking – Biking – Jogging Trail
R-7.0	Continuous Soil Panel
R-8.0	Bike Rack
R-8.1	Bike Rack Layout

Section D – Storm Drain Standards

D-1.1	General Notes for Catch Basins
D-1.2	Standard Catch Basin, CB-2
D-1.3	Catch Basins with Extended Throats for Sags, CB-2A
D-1.4	Catch Basin with Extended Throats for Slopes, CB-2B
D-1.5	Precast Catch Basin, PCB-2
D-1.6	Details for Precast Catch Basin, PCB-2
D-1.7	Catch Basin with Grate Top, CB-3
D-1.8	Catch Basin with Double Throat, CB-4
D-1.9	NonRoadway Shallow Grate Inlet 15” to 24” Pipe Maximum

- D-1.10 Yard Inlet
- D-1.11 Precast Yard Inlet
- D-1.12 Driveway Grate
- D-1.13 Catch Basin Frame and Cover
- D-2.0 Manhole and Catch Basin Block
- D-2.1 Method for Shaping Manhole and Basin Inverts
- D-3.0 Storm Sewer Manhole, MH-1 for Pipe Sizes 15" through 36"
- D-3.1 Storm Sewer Precast Manhole, PMH-1 for Pipe Sizes 15" through 36"
- D-3.2 Storm Sewer Manhole, MH-1 with Standard CB-3 Grate Cover
- D-3.3 Storm Sewer Manhole, MH-2 for Pipe Sizes 42" through 54"
- D-3.4 Storm Sewer Manhole, MH-3 for Pipe Size Greater than 54"
- D-3.5 Storm Sewer Manhole, MH-4 for Pipe Sizes Greater than 24" and Alignment Changes Greater than 30"
- D-3.6 Manhole Frame and Cover
- D-4.0 Gabion Revetment

Section W – Water Main Standards

- W-2.0 Concrete Thrust Blocks for Horizontal Bends
- W-2.1 Concrete Thrust Clocks for Tees and Caps
- W-2.2 Concrete Thrust Blocks for Lower Vertical Bends
- W-2.3 Concrete Thrust Block Upper Vertical Bends
- W-2.4 Concrete Thrust Blocks Inserting Valves
- W-3.0 Restrained Joint Detail
- W-4.0 Blowoff Details
- W-5.0 Gate Valve Setting
- W-6.0 Air Release Valve
- W-6.1 Air and Vacuum Valve
- W-7.0 Fire Hydrant Setting
- W-8.0 Water Service Connections 2-Inch and Smaller
- W-8.1 Water Service Connections 3-Inch and 4-Inch
- W-8.2 Water Service Connections 6-Inch and 8-Inch
- W-8.3 Utility Vault Precast Reinforced Concrete
- W-9.0 Water Meter Installation ¾-Inch and 1-Inch

	Service
W-9.1	Water Meter Installation 1 ½-Inch Service
W-9.2	Water Meter Installation 2-Inch Service
W-9.3	Water Meter Installation 3-Inch Service
W-9.4	Water Meter Installation 4-Inch Service
W-9.5	Water Meter Installation 6-Inch Service
W-9.6	Water Meter Installation 8-Inch Service
W-9.7	22"x28" Frame and Cover for 24" I.D. Water Meter Box
W-9.8	24"x40" Frame and Cover for 36" I.D. Water Meter Box
W-9.9	36"x54" Frame and Cover for Concrete Water Meter Vault
W-10.0	Water Meter Fact Sheet

Section S – Sanitary Sewer Standards

S-2.0	Manhole Precast Concrete 4'-0" I.D.
S-2.1	Manhole Precast Concrete 5'-0" & 6'-0" I.D.
S-2.2	Manhole Construct Over Existing Sewer
S-2.3	Sanitary Sewer Manhole with Outside Drop Connection
S-2.4	Manholes Channel and Foundations
S-2.5	Manholes Adjustments to New Grades
S-3.0	Manhole Frame and Cover 24-Inch Diameter (MHC-1)
S-3.1	Manhole Frame and Cover 24-Inch Bolted (MHC-2)
S-3.2	Manhole Frame and Cover 36-Inch Bolted (MHC-3)
S-4.0	PVC Sewer Pipe Installation Detail
S-5.0	Maximum Allowable Backfill for Sanitary Sewers
S-6.0	Manhole Protection Detail

LINETYPES AND PROPERTIES

Existing

Proposed

Easement	- - - - -	- - - - -
Asphalt	- - - - -	—————
Building	—————	—————
Cable TV	————— CATV —————	
Center Line	—————	—————
Concrete	—————	—————
Contours	- - - - - 250 - - - - -	————— 250 ———
Curb	- - - - -	—————
Cut		CUT ■■■ CUT ■■■ CUT ■■■ CUT ■■■ .
Electric (Underground)	————— UGE ————— UGE —————	
Fence	————— X —————	————— X —————
Fiber Optic	————— FO ————— FO —————	
Fill		FILL ■■■ FILL ■■■ FILL ■■■ FILL ■■■ .
Guardrail	· ○ ○ ○ ○ ○ ○ ○ ·	· * * * * * * * * * * ·
2" Gas	————— 2" G ————— 2" G —————	
3" Gas	————— 3" G ————— 3" G —————	
6" Gas	————— 6" G ————— 6" G —————	
8" Gas	————— 8" G ————— 8" G —————	
Gas	————— GAS ————— GAS —————	
Limits Of Clearing		————— LOC ————— LOC —————
Overhead Wires	————— OH ————— OH —————	
Property Line	—————	—————
8" Sanitary	————— 8" S ————— 8" S —————	
12" Sanitary	————— 12" S —————	
Sanitary Sewer	————— SAN ————— SAN —————	————— See M-1.9 —————
Sanitary House Con.	————— SHC ————— SHC —————	————— For Examples —————
Sidewalk	- - - - -	—————
Storm (size noted)	= = = = =	—————

STANDARD LEGEND




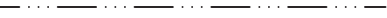




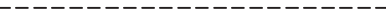
11/13/06	
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ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
M-1.0

LINETYPES AND PROPERTIES (CONT.)

	Existing	Proposed
Telephone (Underground)	—— UGT —— UGT ——	
Wall		
6" Water	—— 6" W —— 6" W ——	
8" Water	—— 8" W —— 8" W ——	
12" Water	—— 12" W ——	
Water	—— W ——	See M-1.9 
Water House Con.	—— WHC —— WHC ——	For Examples
Flow Line		
Lane Marking		
Tree Line		
PVC (Street Lights)		

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ARLINGTON COUNTY, VIRGINIA
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DRAWING NO.
M-1.1

TEXT STYLES AND PROPERTIES

L80 (2)
existing ground data
existing dimensions

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

L100 (2.5)
existing row dimensions
PROPOSED DATA
PROPOSED DIMENSIONS

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

L120 (3)
Parcel Information

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

LW200 (5)
STREET NAME
SUBDIVISION NAME

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

DOT (5) - [8Pin Matrix]
Adjacent Parcels
(Survey Use Only)

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Font Case

existing ground data

all lowercase

PROPOSED DATA
STREET NAME
SUBDIVISION NAME

ALL UPPERCASE

Property Data

First Letter Capitalized

(X) X = Text Size

Font = Tahoma (unless noted above)

STANDARD LEGEND

03/06/08	
03/05/08	
11/13/06	
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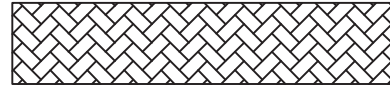
DRAWING NO.
M-1.2

HATCHING PATTERNS & PROPERTIES

Proposed Use Only

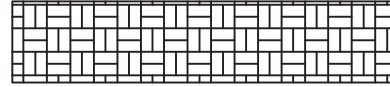
Brick or Concrete Pavers (Herringbone)

Layer Name: H-BRICK
 Hatch Name: AR-HBONE Scale: 0.25
 Color: 22 Shading: 100%



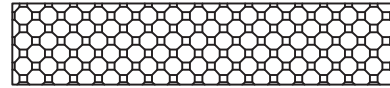
Brick or Concrete Pavers (Basket Weave)

Layer Name: H-BRICK
 Hatch Name: BASKETWV Scale: 0.25
 Color: 22 Shading: 100%



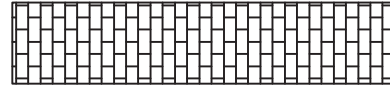
Brick or Concrete Pavers (Uni-Decor)

Layer Name: H-BRICK
 Hatch Name: UNIDECOR Scale: 0.25
 Color: 22 Shading: 100%



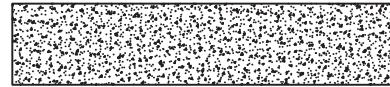
Brick or Concrete Pavers

Layer Name: H-BRICK
 Hatch Name: BRICK Scale: 3
 Color: 22 Shading: 100%



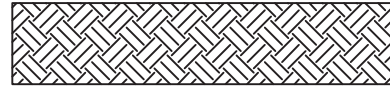
Sand

Layer Name: H-SAND
 Hatch Name: AR-CONC Scale: 0.1
 Color: 52 Shading: 100%



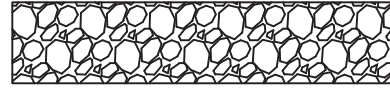
Earth

Layer Name: H-EARTH
 Hatch Name: EARTH Scale: 3
 Color: 92 Shading: 100%



Gravel

Layer Name: H-GRAVEL
 Hatch Name: GRAVEL Scale: 3
 Color: 252 Shading: 100%



Asphalt - Mill & Overlay

Layer Name: H-MILL_OVERLAY
 Hatch Name: ANSI37 Scale: 7
 Color: 253 Shading: 30%



Asphalt - Overlay

Layer Name: H-OVERLAY
 Hatch Name: ANSI31 Scale: 1
 Color: 253 Shading: 30%



Asphalt - Full Depth

Layer Name: H-ASPHALT
 Hatch Name: SOLID Scale: 1
 Color: 254 Shading: 20%



Concrete

Layer Name: H-CONCRETE
 Hatch Name: SOLID Scale: 1
 Color: 253 Shading: 30%



Water Main (Shown on Profile Only)

Layer Name: H-PD WATER
 Hatch Name: SOLID Scale: 1
 Color: 252 Shading: 25%



STANDARD LEGEND

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DRAWING NO.
M-1.3



ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

ABBREVIATIONS

ACP	Asbestos Cement Pipe	P.I.	Point At Intersection
ARV	Air Release Valve	P.O.C	Point On Curve
ASPH	Asphalt	P.O.T	Point On Tangent
CATV	Cable Television	PVC	Poly-VInyl Chloride
CB	Catch Basin	R	Radius
CLF	Chain link Fence	RCP	Reinforced Concrete Pipe (Class As Indicated)
CLR	Clearance	RED.	Reducer Or Reducing
CMP	Corrugated Metal Pipe	R/W	Right of Way
CMU	Concrete Masonry Units	S.D.	Storm Sewer
C.O.	Cleanout	S.S.	Sanitary Sewer
Conc.	Concrete	SDMH	Storm Drain Manhole
D	Diameter	SHC	Sanitary Sewer House Connection
DI	Drop Inlet	SMH	Sanitary Sewer Manhole
DIP	Ductile Iron Pipe	S.ST.	Stainless Steel (Type as shown)
UGE	Underground Electric	STD.	Standard
E.P.	Edge of Pavement	SW	Sidewalk
Elev.	Elevation	UGT	Underground Telephone
Esmt.	Easement	T.C.	Top of Curb
Ex.	Existing	T/L	Tavel Lane
Fin.	Finished	T.H.	Test Hole
F.M.	Force Main	XWALK	Cross Walk
G	Gas	TS&V	Tapping Sleeve & Valve
Gr.	Grade	V.B.	Vertical Bend
H.B.	Horizontal Bend	WM	Water Main
Inv.	Invert	W.M.	Water Meter
MH	Manhole	W.V.	Water Valve
OHE	Overhead Electric		
PL	Property Line		
PM	Parking Meter		
Prop.	Proposed		

STANDARD LEGEND



























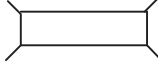





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DRAWING NO. M-1.4



ARLINGTON COUNTY, VIRGINIA
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STANDARD SYMBOLS

<p> Prop. Storm Catch Basin Size: 1</p> <p> Ex. Storm Catch Basin Size: 1</p> <p> Prop. Storm Grate Size: 1</p> <p> Ex. Storm Grate Size: 1</p> <p> Prop. Storm MH Size: 1</p> <p> Ex. Storm MH Size: 1</p> <p> Prop. Sanitary MH Size: 1</p> <p> Ex. Sanitary MH Size: 1</p> <p> Prop. Cobra Head Light Size: 1</p> <p> Prop. Carlyle Light Size: 1</p> <p> Prop. Light Pole Size: 1</p> <p> Ex. Light Pole Size: 1</p> <p> Prop. Utility Pole Size: 1</p> <p> Ex. Utility Pole Size: 1</p> <p> Ex. Utility MH (Type Indicated Elec. Tele. etc) Size: 1</p>	<p> Traffic Sign Size: 1</p> <p> Guy Wires Size: 1</p> <p> Ex. Traffic Control Box Size: 1</p> <p> Ex. Gas Valve Size: 1</p> <p> Prop. Handicap Ramp</p> <p> Ex. Handicap Ramp</p> <p> Metro Station</p> <p> Benchmark Size: 1</p> <p> Deciduous Tree</p> <p> Coniferous Tree</p> <p> Bush</p> <p> Bridge</p> <p> North Arrow Size: 25</p> <p> Telephone Ped.</p> <p> Electric Box</p> <p> Cable Ped.</p> <p> Gas Marker</p>
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STANDARD LEGEND


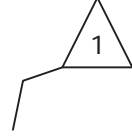







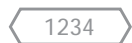

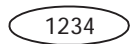

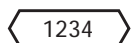















11/13/06	
9/22/06	
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

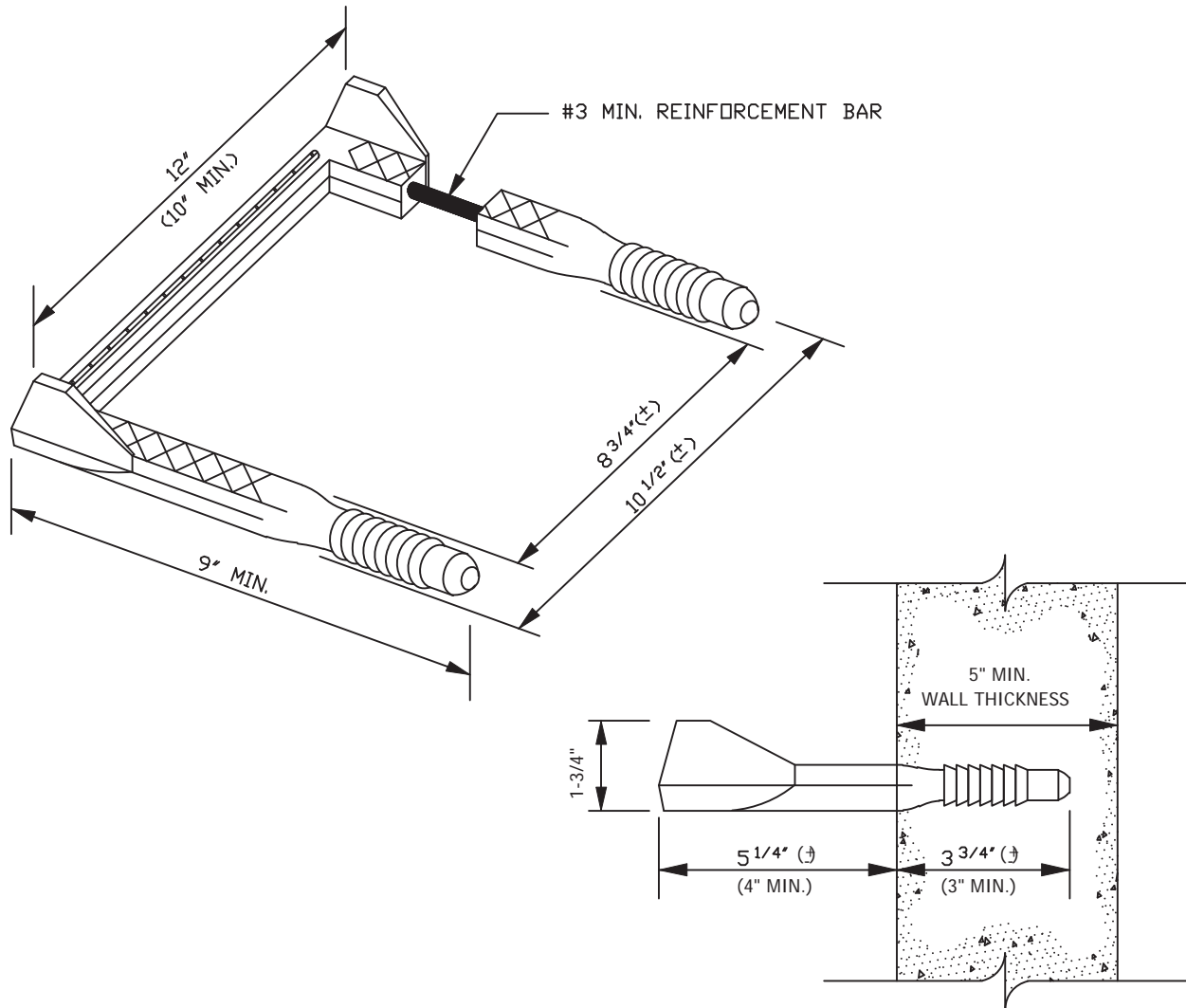
DRAWING NO.
M-1.5

STANDARD SYMBOLS (CONT.)

	Prop. Water MH Size: 1		Construction Notes (Leader to area affected)
	Ex. Water MH Size: 1		Curve Number (See Curve Table)
	Prop. Water Valve Size: 1		Line Number (See Line Table)
	Ex. Water Valve Size: 1		Ex. Sanitary Sewer Structure Number (Number obtained from WSE)
	Prop. Water FH Size: 1		Ex. Storm Sewer Structure Number (Number obtained from WSE)
	Ex. Water FH Size: 1		Prop. Sanitary Sewer Structure Number (Number obtained from WSE)
	Prop. Water Meter Size: 1		Prop. Storm Sewer Structure Number (Number obtained from WSE)
	Ex. Water Meter Size: 1		Parking Meter Size: 1
	P.K. Nail Found Size: 1		Mailbox Size: 1
	P.K. Nail Set Size: 1		Ground Light Size: 1
	Rebar Rod Found Size: 1		Traverse Size: 1
	Rebar Rod Set Size: 1		Bus Sign Size: 1
	Iron Pipe Size: 1		Existing Test Hole Test Hole Requested and Data Received Size: 1
	Monument (GPS) Size: 1		Prop. Test Hole Test Hole Requested Size: 1
	Monument Size: 1		

STANDARD LEGEND

9/22/06	
REVISION & DATE	



NOTES :

1. MANHOLE STEPS SHALL BE MADE OF POLYPROPYLENE PLASTIC OR RUBBER REINFORCED WITH A #3 MINIMUM REINFORCEMENT BAR, AS MANUFACTURED BY M.A. INDUSTRIES; DELTA PIPE PRODUCTS, INC.; AMERICAN STEP COMPANY, INC.; OR APPROVAL EQUAL.
2. PLACE STEPS AT A MAXIMUM SPACING OF 16" O.C.
3. PLACE THE BOTTOM STEP AT LEAST 12" ABOVE THE TOP OF PIPE OR AS INDICATED ON APPROPRIATE DRAWINGS. IN NO CASE SHALL STEPS BE LOCATED BELOW TOP OF PIPE.
4. STEPS SHALL BE POSITIONED IN VERTICAL ALIGNMENT OVER THE BENCH.
5. IN PRECAST UNITS, STEPS MAY BE CAST IN PLACE, MORTARED INTO HOLES PROVIDED BY THE FABRICATOR, OR DRIVEN.
6. ALL STEPS SHALL WITHSTAND A MINIMUM VERTICAL LOAD OF 800 LBS AND A HORIZONTAL PULL OUT LOAD OF 400 LBS.
7. WHEN NECESSARY, 6"X6" STEPS SHALL BE NOTCHED IN THE PAVED INVERT IN LIEU OF STANDARD MANHOLE STEPS.

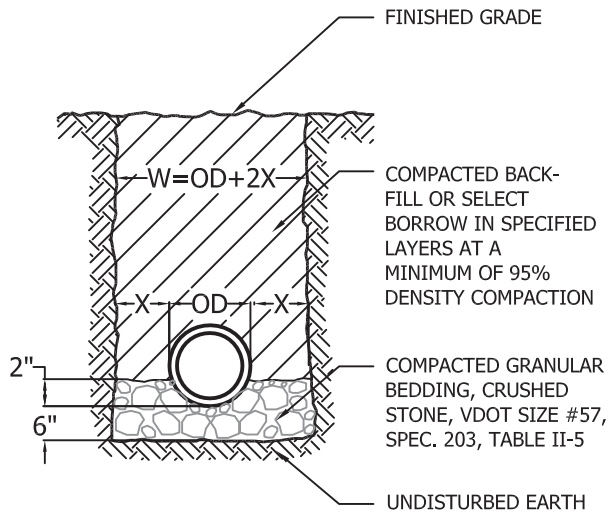
STANDARD MANHOLE STEPS

REVISION & DATE

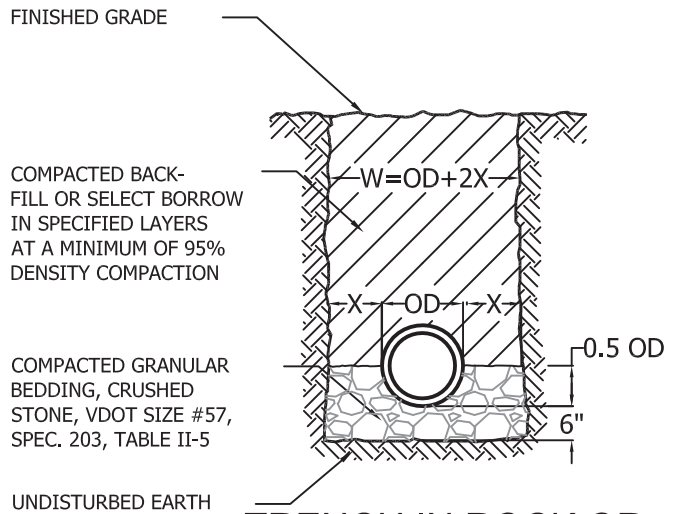


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DEPARTMENT OF ENVIRONMENTAL SERVICES

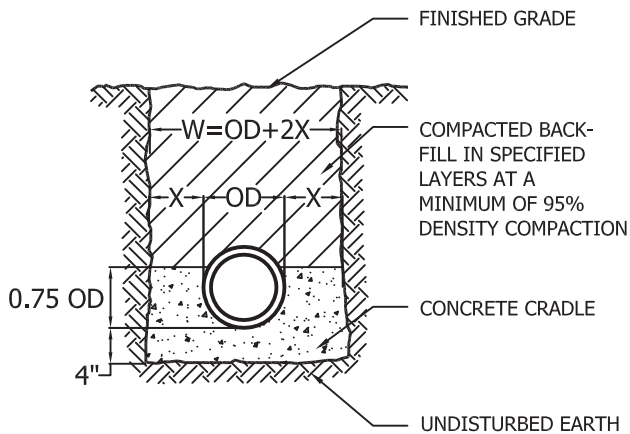
DRAWING NO.
M-2.0



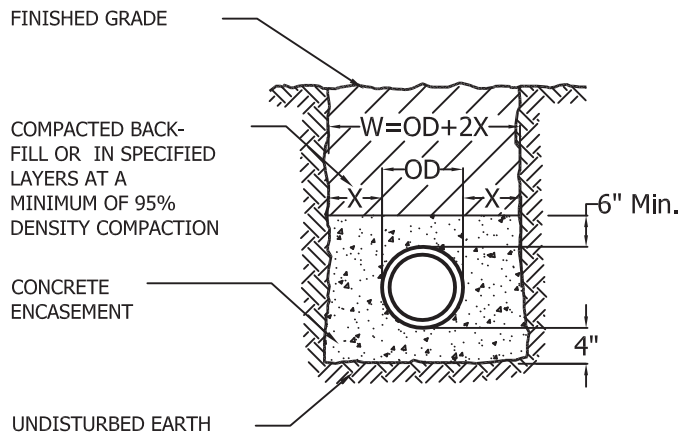
**TRENCH IN EARTH
(STD CONDITION)**



**TRENCH IN ROCK OR
UNFAVORABLE SOIL
CONDITION**



CONCRETE CRADLE



CONCRETE ENCASEMENT

NOTES:

1. CONCRETE FOR CRADLES AND ENCASEMENTS TO HAVE $f'_c = 3000$ psi AT 28 DAYS.
2. POUR CONCRETE AGAINST UNDISTURBED EARTH.
3. FOR CONTINUOUS CONDUIT IN TRENCH CONDITIONS THE WIDTH OF TRENCH (W) SHALL BE $OD+2X$ Max.
4. THE WIDTH OF TRENCH FOR ALL OTHER PIPE DIAMETERS SHALL BE ACCORDING TO TABLE 3.
5. FOR PAVEMENT RESTORATION SEE M-6.0.

TABLE 3

PIPE SIZE	X
12" & LESS	**
12" - 30"	12"
33" - 42"	15"
48" & LARGER	18"

** TRENCH WIDTH (W) SHALL BE 3'-0" Max.

WIDTH OF TRENCH (W) = $OD+2X$ WHERE X IS DISTANCE FROM OUTSIDE OF PIPE TO EDGE OF TRENCH

**PIPE AND BEDDING DETAILS
FOR TRENCH CONDITIONS**

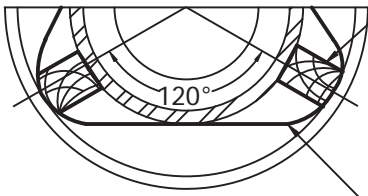
Clarified dims 07/11/2013

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**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
M-3.0**



THE OAK CHOCKS WITH 1" DEEP GROOVES SHALL HAVE DIMENSIONS OF 4"x6" ±x18" AND BE PLACED 6'-0" O.C. 1" METAL BANDS ARE TO BE BOUND & BOLTED IN CHOCK GROOVED AREAS.

1" METAL BAND

SLEEVE OR CASING PIPE SIZE VARIES; BLACK SEAMLESS STEEL (AWWA-C200) PIPE WITH A MIN. THICKNESS OF 3/8" UP TO AND INCLUDING 24".

FOR WATERMAINS, FILL ANNULAR SPACE WITH SAND. FOR SEWERS, FILL ANNULAR SPACE WITH GROUT.

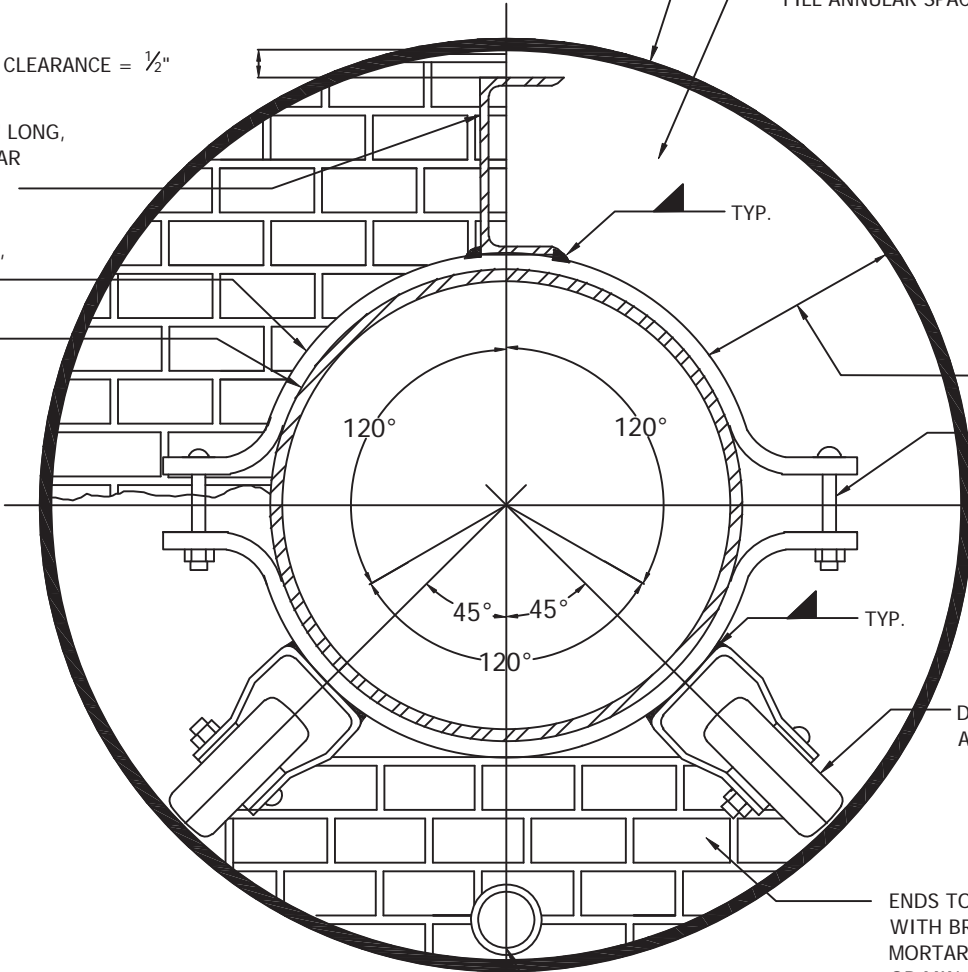
ALTERNATE METHOD

MAXIMUM CLEARANCE = 1/2"

1/4" STEEL CHANNEL 8" LONG, CENTER AT EACH COLLAR SIZE AS REQUIRED

2"x3/8" STEEL COLLARS, 2 PER LENGTH.

CARRIER PIPE



VARIABLE

1/2" BOLTS

DOLLEY WHEELS OR APPROVED SKIDS

ENDS TO BE CLOSED WITH BRICK AND MORTAR CONSTRUCTION OR MIN. 6" GROUT.

PROVIDE 2" PIPE THROUGH BULKHEAD

CONSTRUCTION SIZE	
CARRIER PIPE	CASING PIPE
6"	18"
8"	20"
10"	24"
12"	24"
14"	30"
16"	30"

NOTE

ALTERNATIVE METHODS OF SUPPORTING CARRIER PIPES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

JACKING AND BORING DETAILS

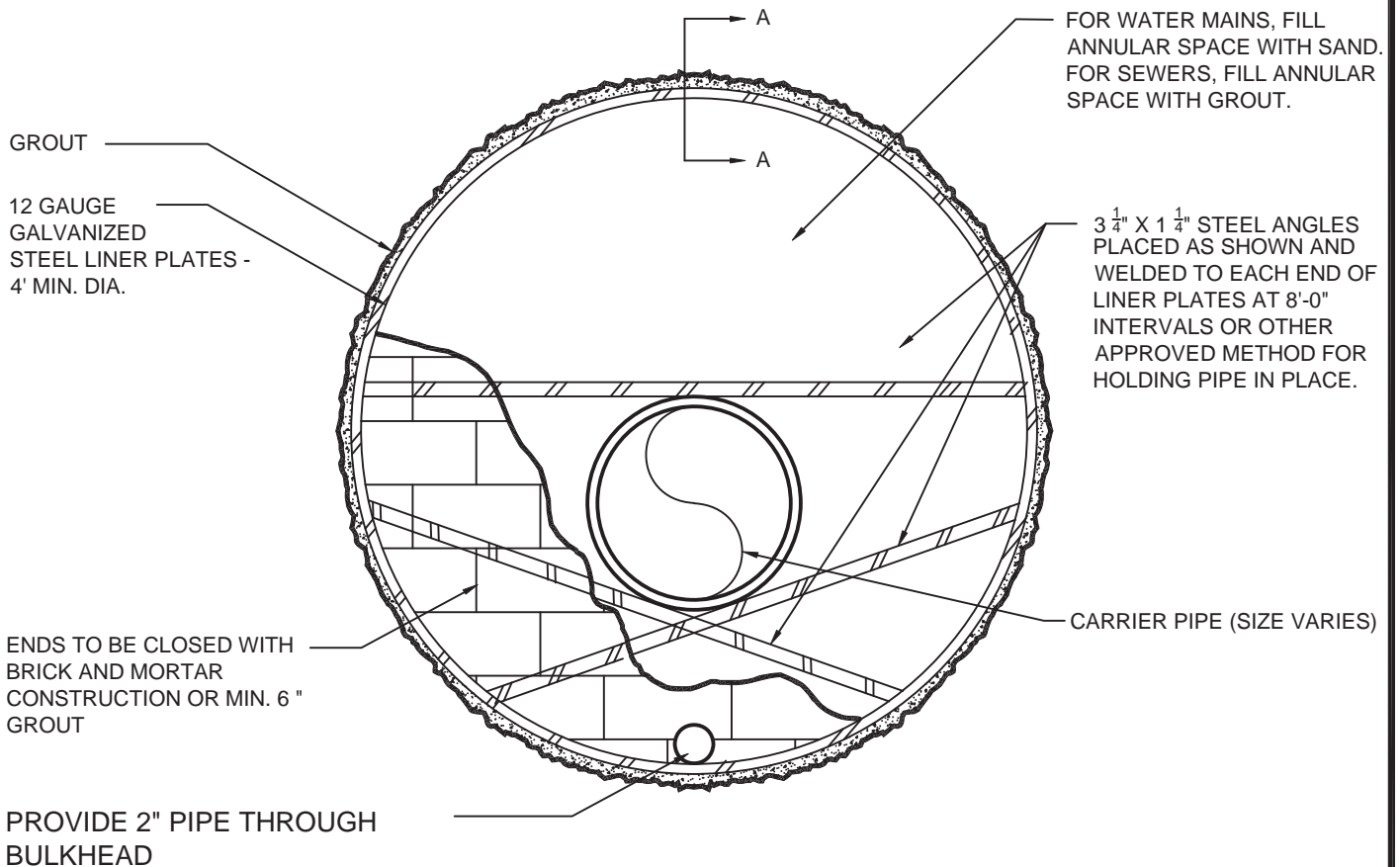
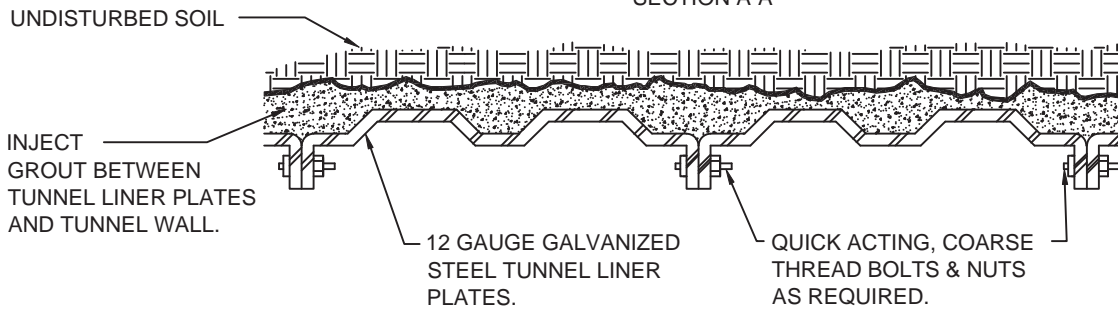
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ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
M-4.0

SECTION A-A



TYPICAL SECTION

NOTES:

1. BLACK STEEL LINER PLATES WILL BE ALLOWED FOR CONDITIONS WHERE PIPE WILL BE FULLY GROUTED IN PLACE.
2. PROVIDE 6" MINIMUM CLEARANCE BETWEEN TOP AND BOTTOM OF CARRIER PIPE AND TUNNEL LINER PLATES.

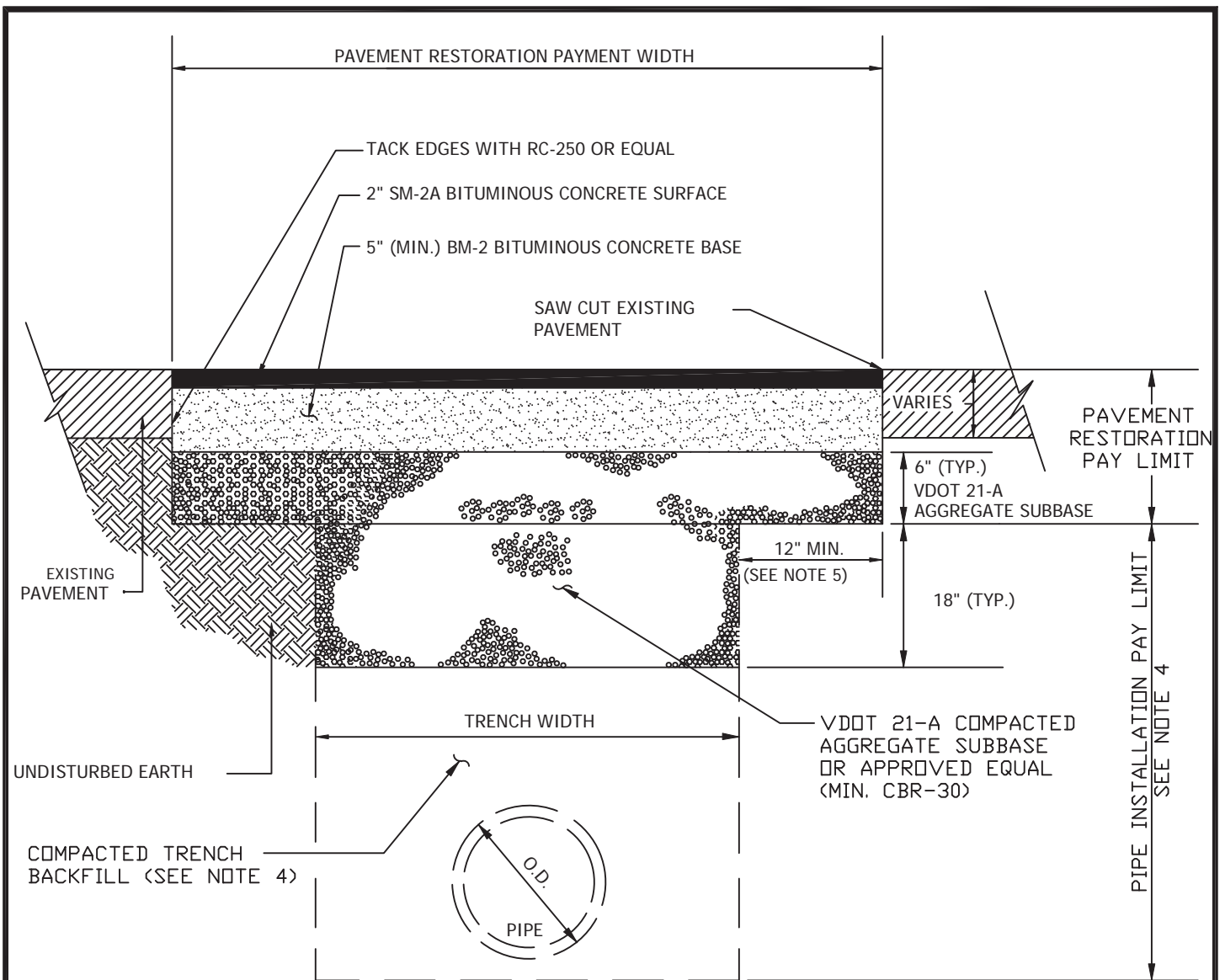
TUNNELING DETAILS

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
M-5.0



TYPICAL SECTION

NOTES :

1. WHEN THE DISTANCE FROM THE EDGE OF EXISTING PAVEMENT TO THE EDGE OF THE PAVEMENT RESTORATION PAYMENT WIDTH IS 3' OR LESS THEN THE ADDITIONAL PAVEMENT SHALL BE REMOVED AND REPLACED BACK TO THE EDGE.
2. THICKNESS OF BM-2 BASE MAY BE REDUCED TO 3" WHEN PATCH IS BEING MADE IN PAVEMENTS OF SURFACE TREATED GRAVEL, AND DIRECTED BY THE ENGINEER.
3. WHEN WIDENING OR PATCHING A STREET WITH ASPHALT, A NEAT, CLEAN JOINT OF AT LEAST ONE (1) INCH IN DEPTH BETWEEN OLD AND NEW PAVEMENT SHALL BE PROVIDED FOR TOPPING SO AS TO ELIMINATE THE NEED FOR FEATHERING OF THE OVERLAY.
4. FOR TRENCH AND BEDDING DETAILS, SEE DRAWING No. M-3.0.
5. WHEN THE UTILITY TRENCH REQUIRES SHEETING & SHORING, A WIDER PAYMENT WIDTH SHALL BE APPROVED BY THE ENGINEER TO ACCOMMODATE TRENCH BOX.

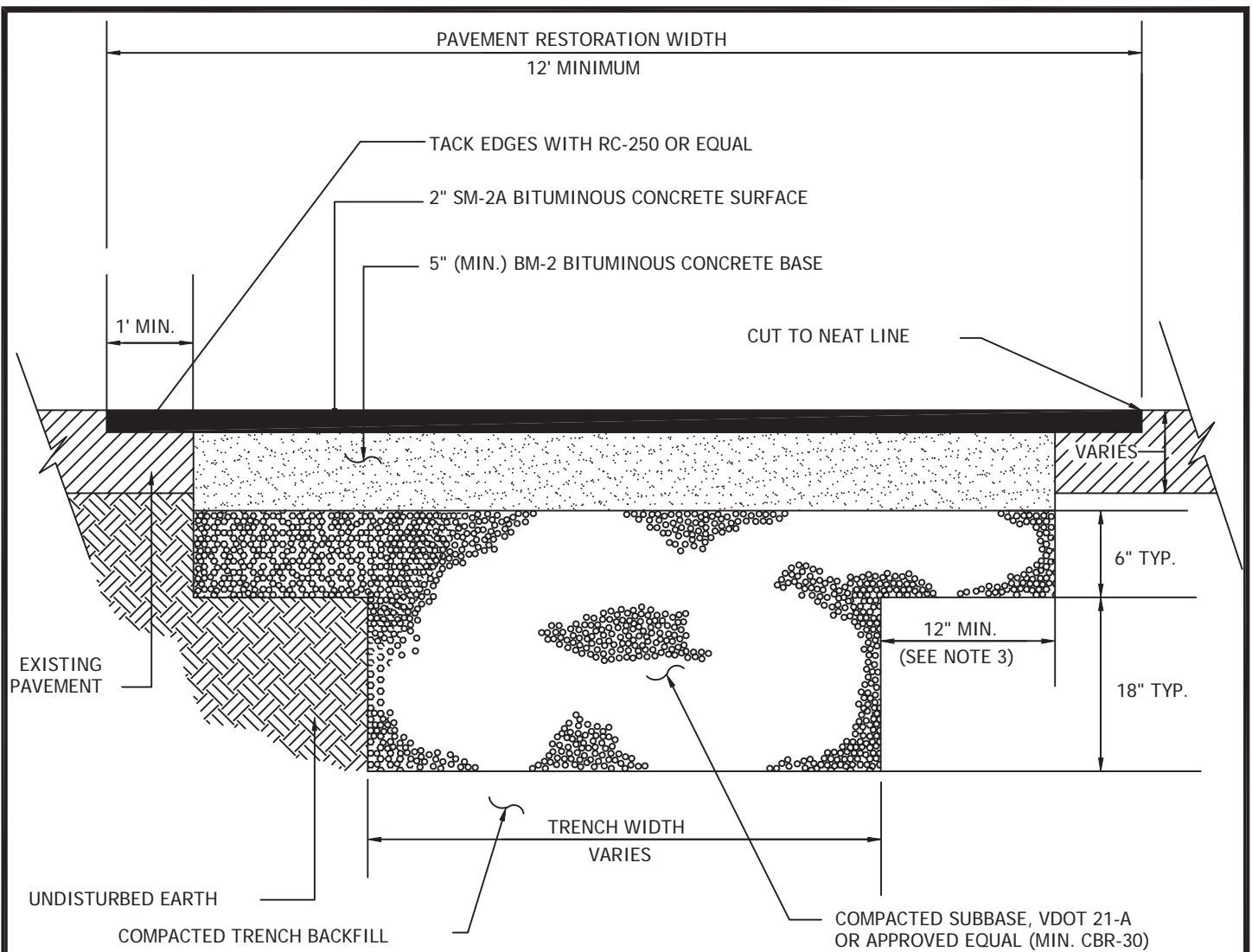
**STANDARD PAVEMENT RESTORATION
FOR UTILITY CUTS**

REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
M-6.0**



TYPICAL SECTION

NOTES :

1. THIS DETAIL SHALL BE REQUIRED ON UTILITY CUTS IN COUNTY STREETS PAVED WITHIN 5 YEARS OF DATE OF ISSUANCE OF PERMIT.
2. WHERE PRACTICAL, LIMITS OF 12 FOOT WIDE OVERLAY SHALL CORRESPOND WITH TRAVEL LANES AS DIRECTED BY THE ENGINEER.
3. WHEN THE DISTANCE FROM THE EDGE OF EXISTING PAVEMENT TO THE EDGE OF THE PAVEMENT RESTORATION WIDTH IS 3' OR LESS , THE ADDITIONAL PAVEMENT SHALL BE REMOVED AND REPLACED BACK TO THE EDGE.
4. THICKNESS OF BM-2 BASE MAY BE REDUCED TO 3" WHEN PATCH IS BEING MADE IN PAVEMENTS OF SURFACE TREATED GRAVEL, AND DIRECTED BY THE ENGINEER.
5. WHEN WIDENING OR PATCHING A STREET WITH ASPHALT, A NEAT, CLEAN JOINT OF AT LEAST ONE (1) INCH IN DEPTH BETWEEN OLD AND NEW PAVEMENT SHALL BE PROVIDED FOR TOPPING SO AS TO ELIMINATE THE NEED FOR FEATHERING OF THE OVERLAY.
6. FOR TRENCH AND BEDDING DETAILS, SEE DRAWING No. M-3.0.
7. WHEN THE UTILITY TRENCH REQUIRES SHEETING & SHORING, A WIDER PAYMENT WIDTH SHALL BE APPROVED BY THE ENGINEER TO ACCOMMODATE TRENCH BOX.

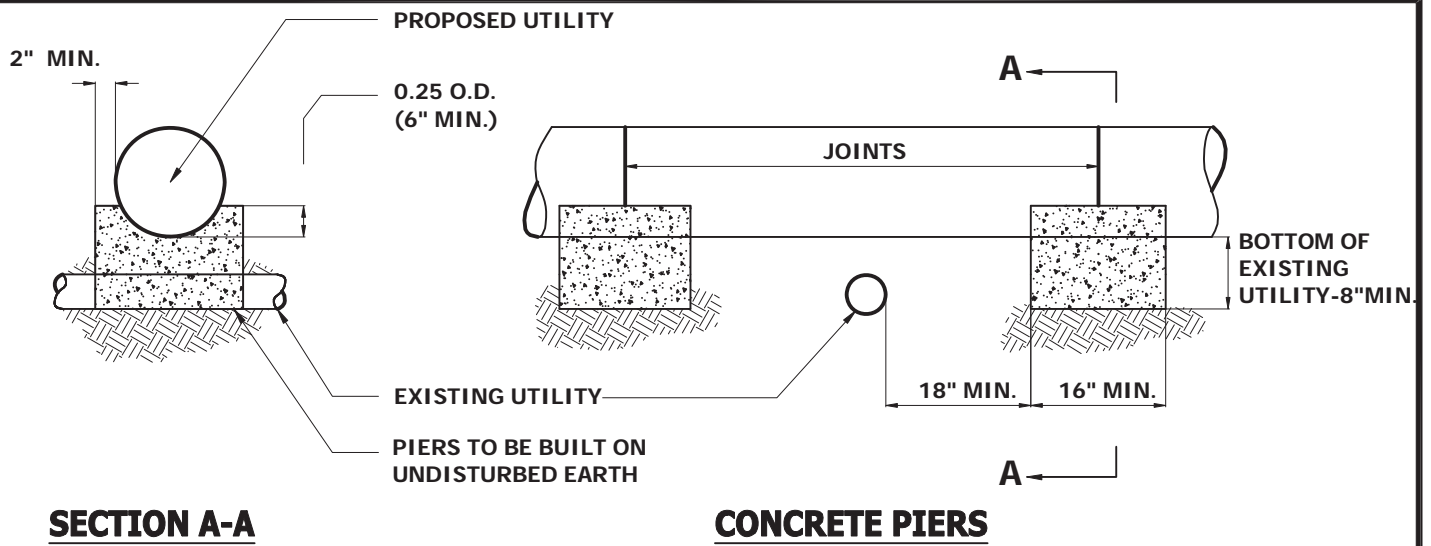
**MODIFIED PAVEMENT PATCHING
FOR UTILITY CUTS ON NEWLY PAVED STREET**

REVISION & DATE

DRAWING NO.
M-6.1

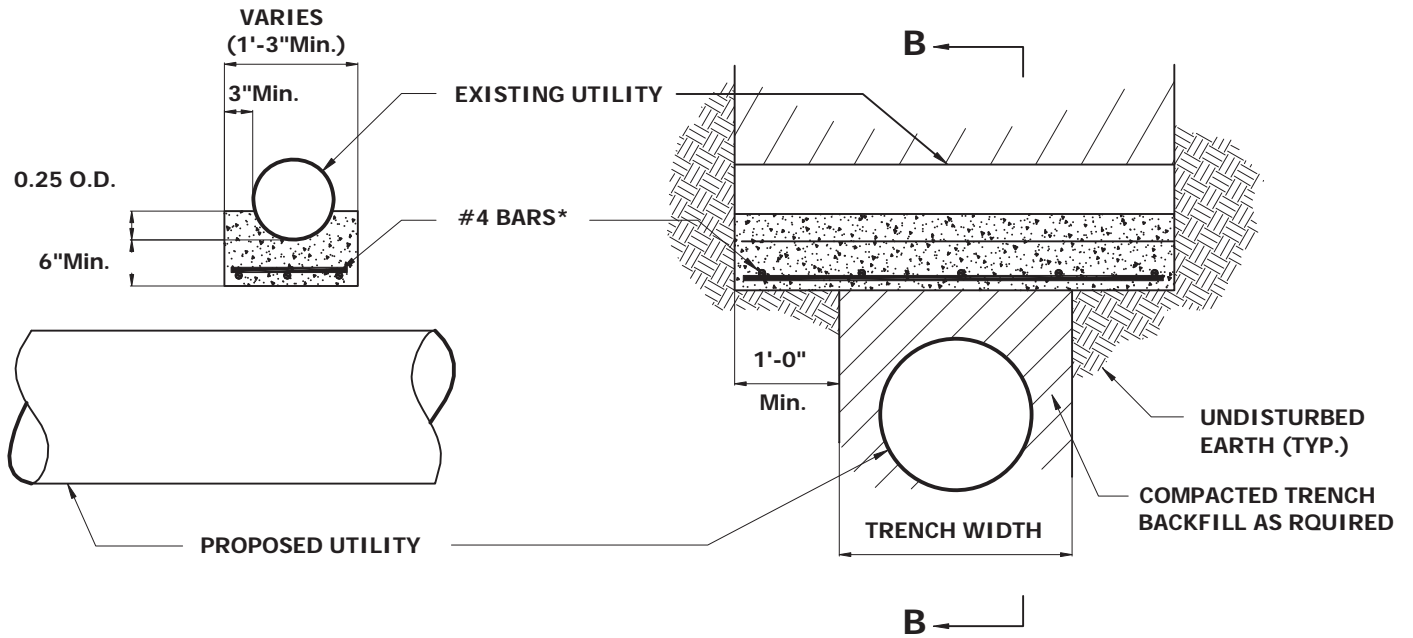


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES



SECTION A-A

CONCRETE PIERS



SECTION B-B

REINFORCED CONCRETE CRADLE

*REBARS: LONGITUDINAL - 6" O.C. (3 BARS MIN.)
 TRANSVERSE - 18" O.C.

1. ALL CONCRETE SHALL BE CLASS A3.
2. FOR NONREINFORCED CRADLE DETAIL AND OTHER NOTES AND DIMENSIONS NOT SHOWN SEE DRAWING M-3.0.

**CONCRETE PIER AND REINFORCED CONCRETE CRADLE
 DETAILS FOR UTILITY CROSSINGS**

REVISION & DATE	

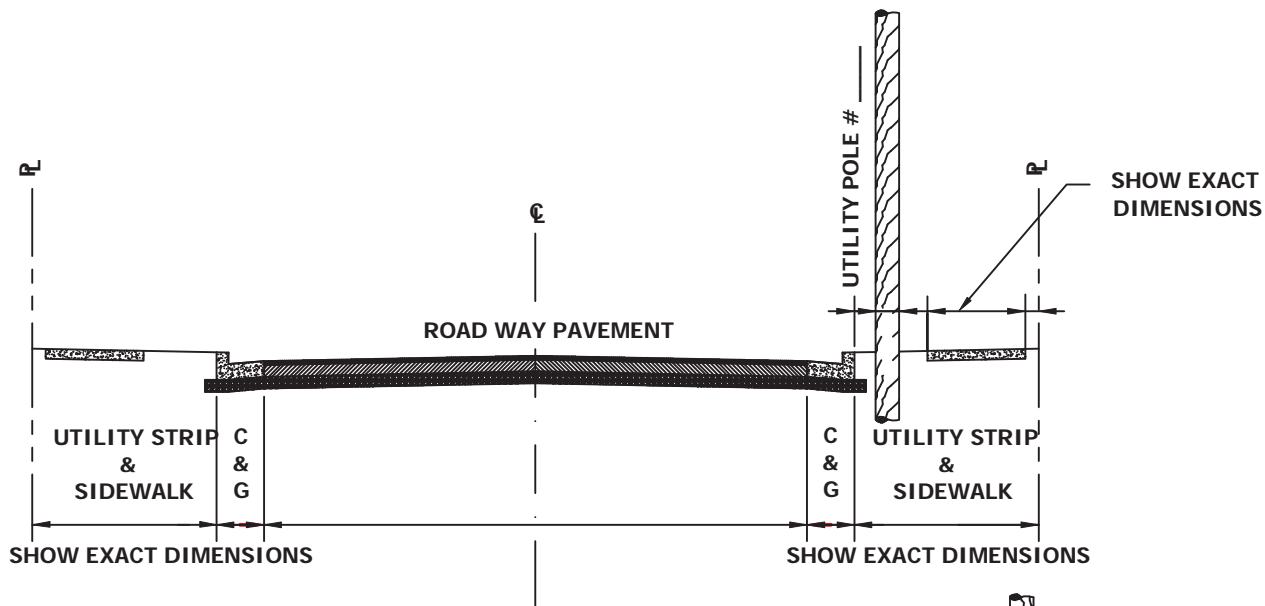


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
 M-7.0

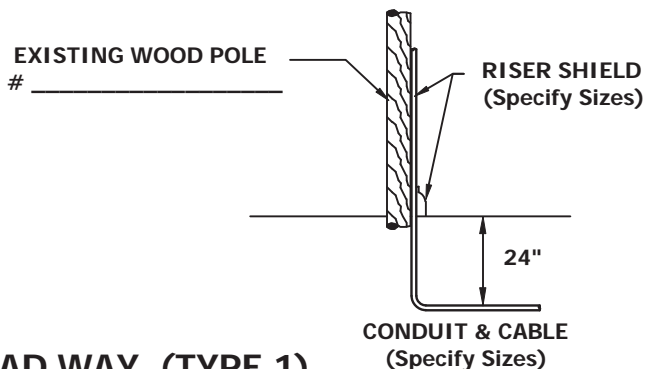
TYPICAL ROAD CROSS SECTION (TYPE 1)

(LIST THE NAME AND ROUTE NUMBER OF THE ROAD)



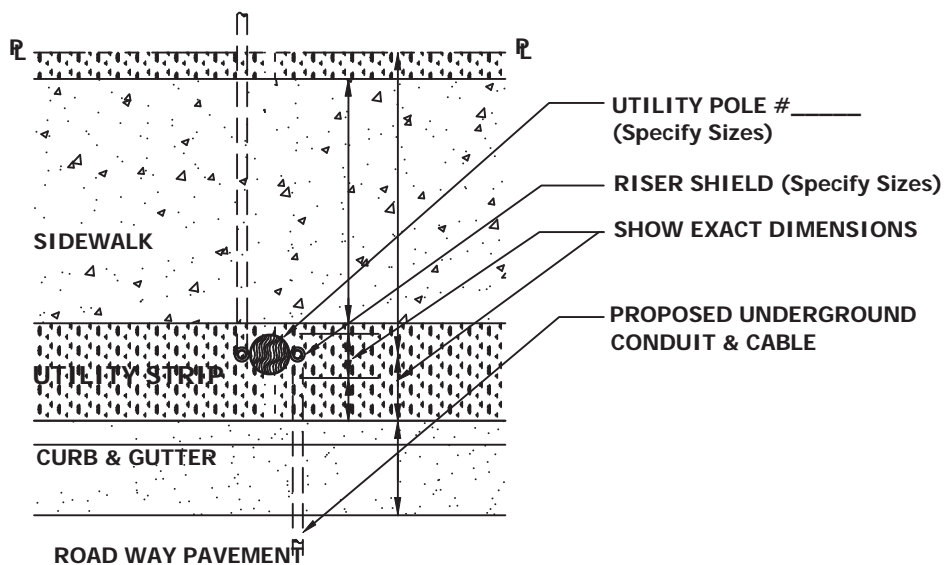
NOTE:

1. RISER SHIELD TO BE INSTALLED TO LEFT OR RIGHT SIDE OF POLE, AWAY FROM PEDESTRIAN TRAFFIC.
2. APPLICANT SHALL DRAW ALL RISERS, TURNED-UP CONDUIT AND CABLES IN PROPOSED LOCATION AND TO SCALE.
3. NO RISER SHIELDS ALLOWED IN CLEAR SIDEWALK AREA.



TYPICAL PLAN VIEW OF ROAD WAY (TYPE 1)

(LIST THE NAME AND ROUTE NUMBER OF THE ROAD)



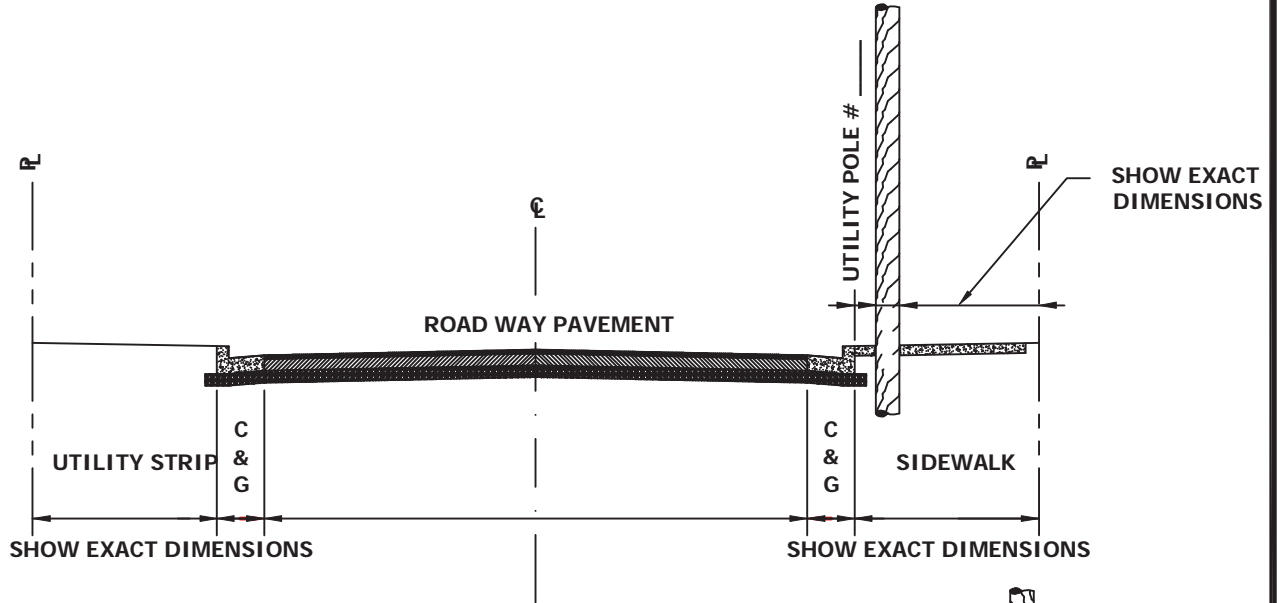
TYPICAL ROAD CROSS SECTION
CABLE & RISER SHIELD INSTALLATION ON POLES

11/13/06

REVISION & DATE

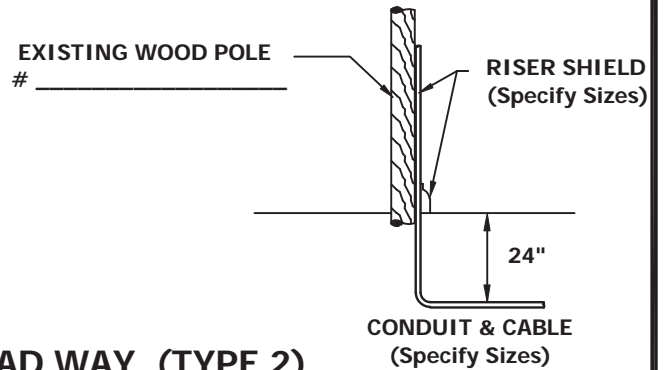
TYPICAL ROAD CROSS SECTION (TYPE 2)

(LIST THE NAME AND ROUTE NUMBER OF THE ROAD)



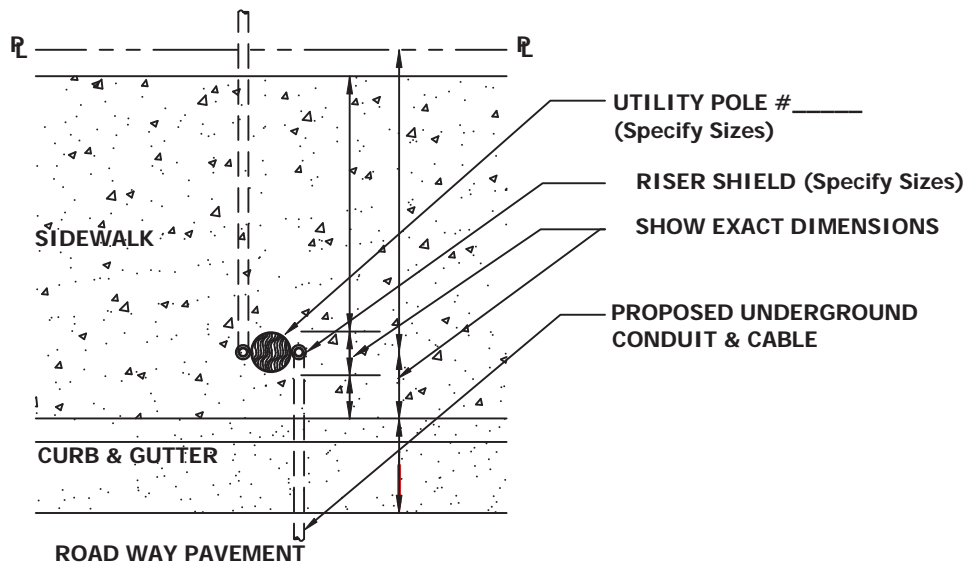
NOTE:

1. RISER SHIELD TO BE INSTALLED TO LEFT OR RIGHT SIDE OF POLE, AWAY FROM PEDESTRIAN TRAFFIC.
2. APPLICANT SHALL DRAW ALL RISERS, TURNED-UP CONDUIT AND CABLES IN PROPOSED LOCATION AND TO SCALE.
3. NO RISER SHIELDS ALLOWED IN CLEAR SIDEWALK AREA.



TYPICAL PLAN VIEW OF ROADWAY (TYPE 2)

(LIST THE NAME AND ROUTE NUMBER OF THE ROAD)



TYPICAL ROAD CROSS SECTION
CABLE & RISER SHIELD INSTALLATION ON POLES

11/13/06

REVISION & DATE

1. STABLE SUBGRADE SHALL COMPRISE SOLID, WELL DRAINED, UNDISTURBED EARTH CAPABLE OF SUPPORTING STREET LOADING WITHOUT RESULTING IN ANY DAMAGING SETTLEMENT AS DETERMINED BY THE ENGINEER.

2. WHERE UNSUITABLE SUBGRADE, AS DETERMINED BY THE ENGINEER, IS ENCOUNTERED, IT SHALL BE MADE STABLE BY DRAINING, COMPACTING, AND/OR REPLACING AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.

3. ALL CONCRETE SHALL BE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) CLASS "A4" FOR PRECAST STRUCTURES AND VDOT CLASS "A3" FOR ALL OTHER USES, UNLESS SPECIFIED OTHERWISE.

4. ALL ASPHALT PAVEMENT COURSES SHALL BE IN CONFORMANCE WITH VDOT SPECIFICATIONS UNLESS OTHERWISE SPECIFIED BY THE ENGINEER AND/OR AS SHOWN ON THE APPROVED PLANS.

5. ALL PAVING DETAILS SHALL BE SUBJECT TO THE FINAL APPROVAL OF STREET PLANS AND SHALL BE NOTED ON THE FINAL PLANS.

6. ALL PROPOSED UTILITIES SHALL BE PLACED UNDERGROUND ON NEWLY CREATED STREETS.

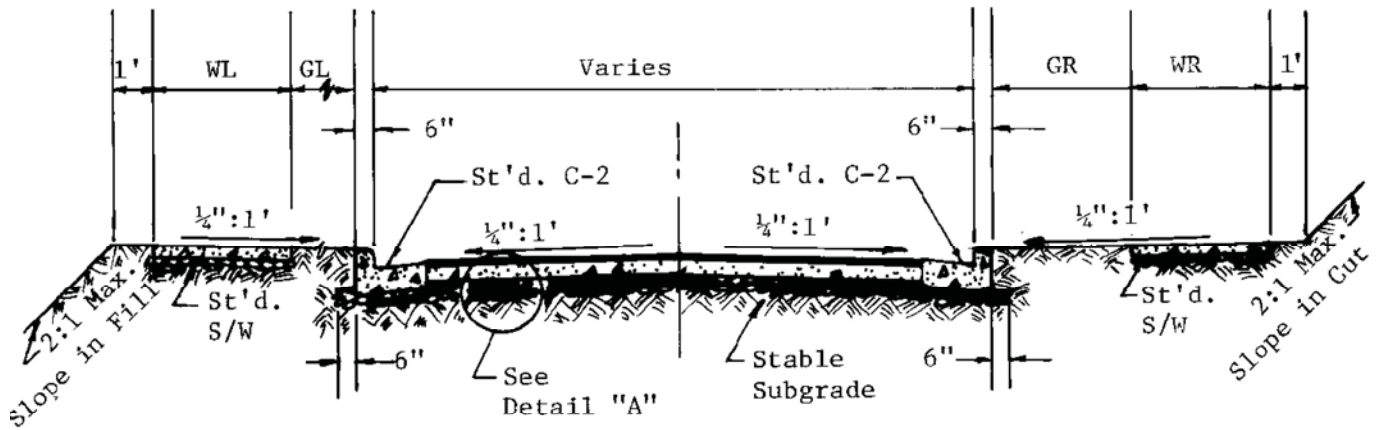
GENERAL NOTES FOR ROADWAYS

REVISION & DATE	



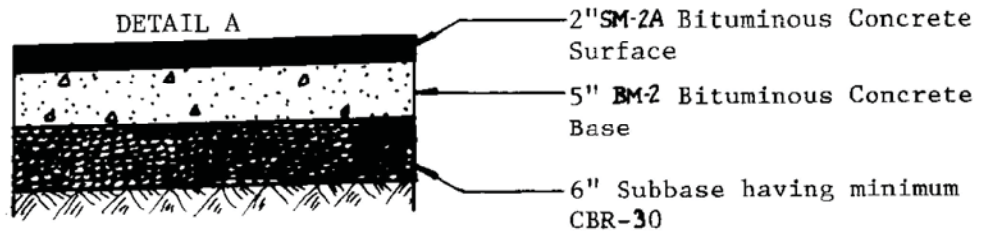
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-1.0



ADJACENT RESIDENTIAL DENSITY	WL (FT)	GL (FT)	GR (FT)	WR (FT)
Low Density	4	4	4	4
Medium Density	6	4	4	4
High Density	10*	4	4	10*

*Width of Sidewalk may vary with land use to a maximum of 20' as shown on approved plans.



NOTES:

1. Paving details shall be as shown above unless specifically noted on the approved engineering plans.
2. When there is a difference in elevation between the right side and left side curb & gutter, the crown of the street shall be no closer than 8' from the edge of the gutter on the high side.

LEGEND

- WL/R - Width Sidewalk Left/Right Side
- GL/R Grass Strip (planting area) Left/Right Side

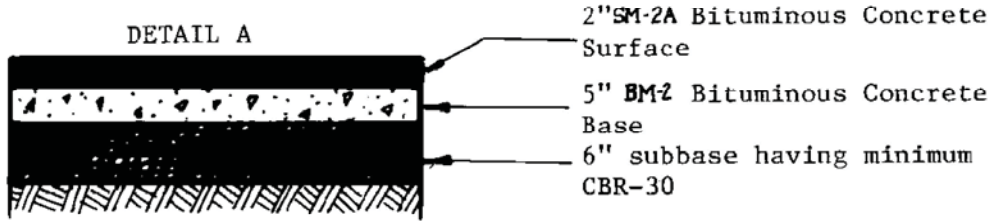
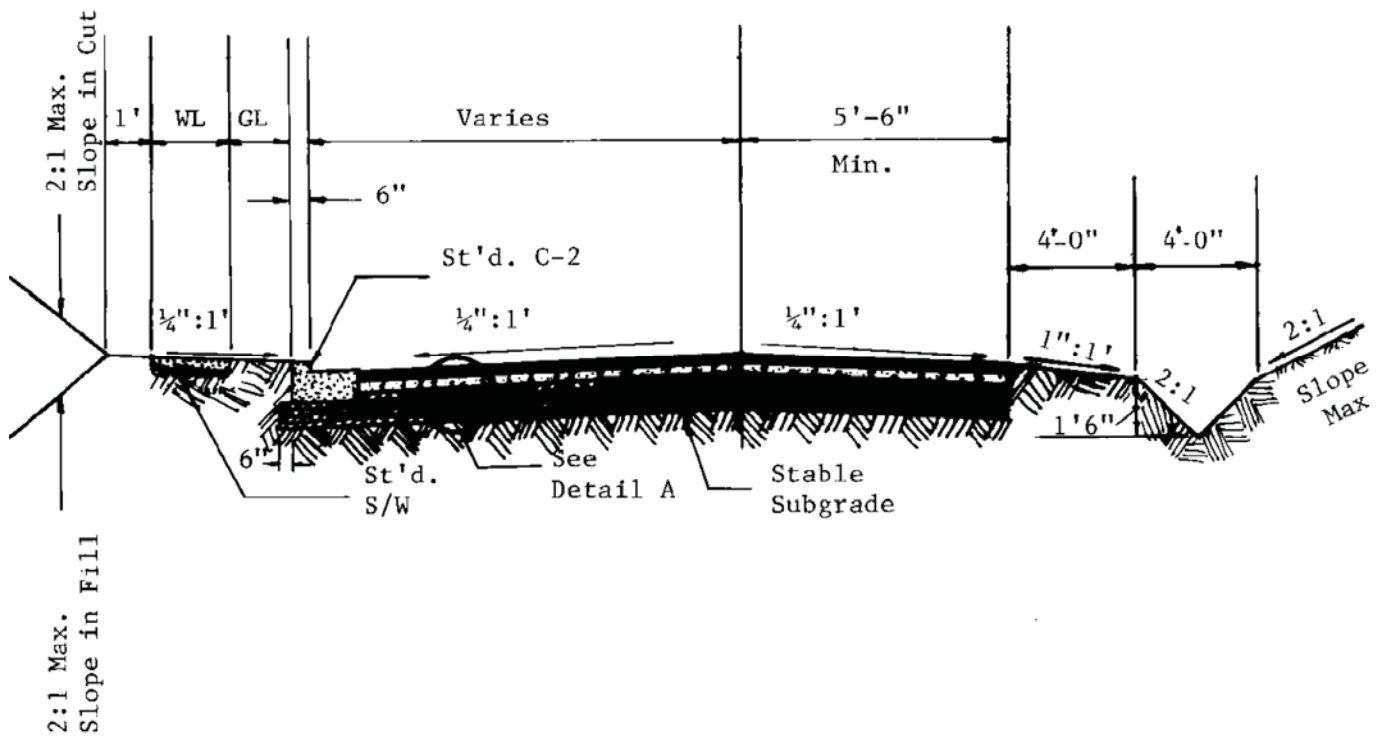
**TYPICAL SECTION
LOCAL RESIDENTIAL STREETS**

REVISION & DATE




ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

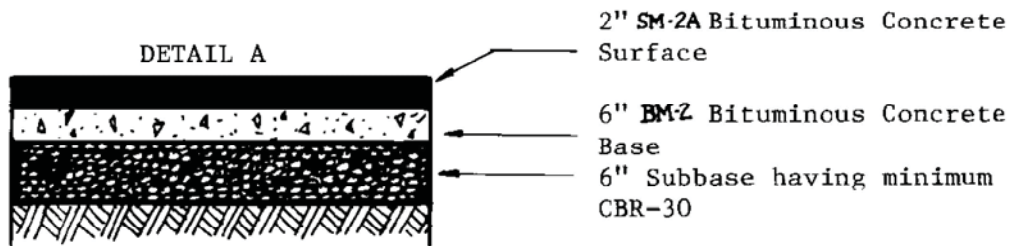
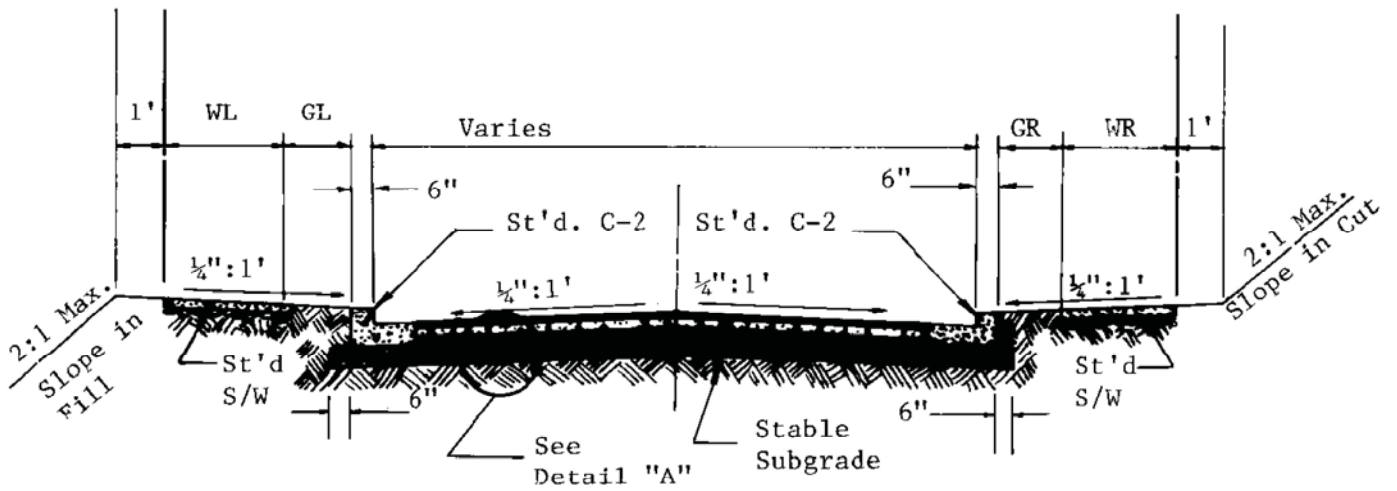
DRAWING NO.
R-1.1



- NOTES:
1. Paving details shall be as shown above unless specifically noted on the approved engineering plans.
 2. For notes and dimensions, see Drawing R-1.1.

- LEGEND
- WL - Width Sidewalk - Left Side
- GL - Grass Strip (planting area) - Left Side

TYPICAL SECTION ONE HALF LOCAL RESIDENTIAL STREET CONSTRUCTION			
		REVISION & DATE	
	ARLINGTON COUNTY, VIRGINIA DEPARTMENT OF ENVIRONMENTAL SERVICES		DRAWING NO. R-1.2



NOTES:

1. Paving details shall be as shown above unless specifically noted on the approved engineering plans.
2. For notes and dimensions, see Drawing R-1.1.

LEGEND

- WL/R - Width Sidewalk - Left/Right Side
- GL/R - Grass Strip (planting area) - Left/Right Side

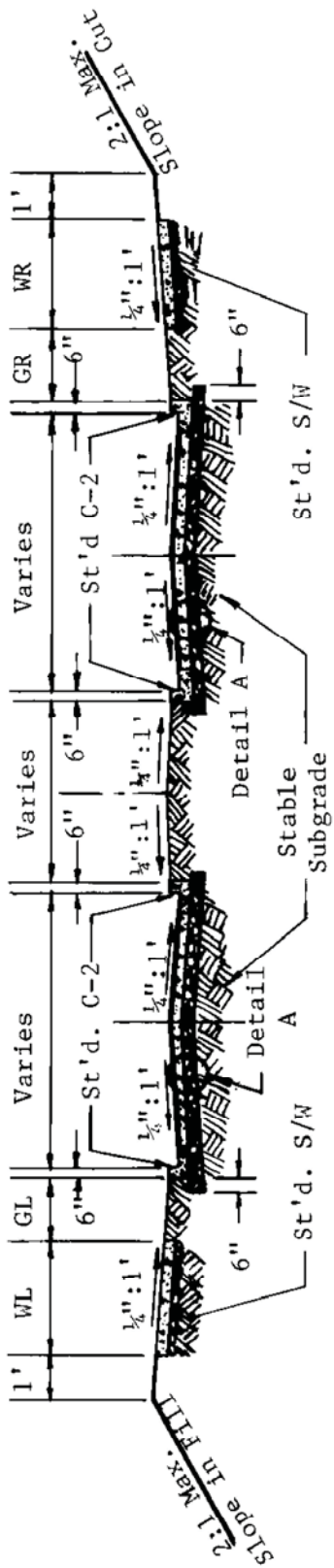
**TYPICAL SECTION
NEIGHBORHOOD COLLECTORS
AND UNDIVIDED THOROUGHFARES**

REVISION & DATE	

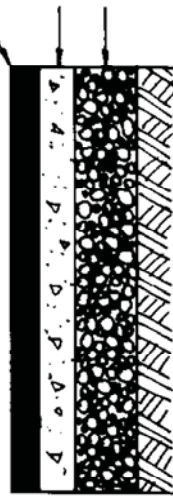


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-1.3



DETAIL A
 2" SM-2A Bituminous Concrete
 6" BM-2 Bituminous Concrete Base
 6" Subbase having minimum CBR-30



LEGEND

- NOTES:
1. Paving details shall be as shown above unless specifically noted on the approved engineering plans.
 2. For notes and dimensions, see Drawing R-1.1.
- WL/R - Width Sidewalk Left/Right Side
 GL/R - Grass Strip (planting area) - Left/Right side

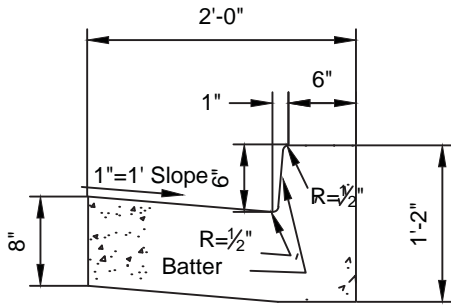
TYPICAL SECTION, DIVIDED THOROUGHFARES

REVISION & DATE	

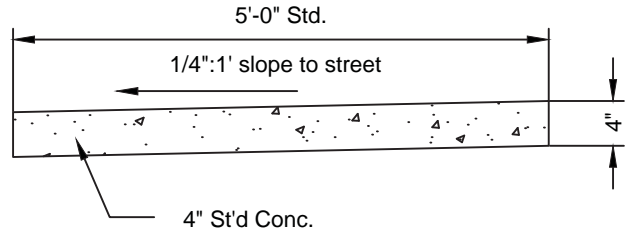


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

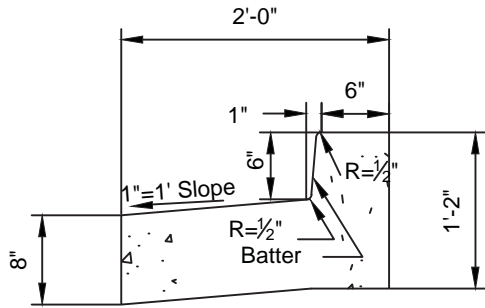
DRAWING NO.
R-1.4



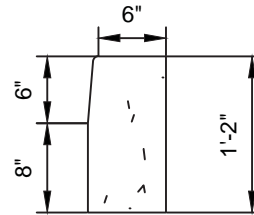
(C-2) STANDARD CURB & GUTTER



STANDARD CONCRETE SIDEWALK



(C-2R) STANDARD REVERSE PITCH CURB & GUTTER



(C-3) STANDARD HEADER CURB

NOTES:

1. SECTION C-3 IS TO BE USED ONLY WITH RIGID TYPE PAVEMENT UNLESS OTHERWISE DIRECTED IN WRITING OR WHEN SHOWN ON APPROVED PLANS.
2. EXPANSION JOINTS IN HEADER CURB AND STANDARD CURB AND GUTTERS SHALL BE 40' APART OR AT EXPANSION JOINTS IN CONCRETE PAVEMENT.
3. EXPANSION JOINTS MAY BE OMITTED IF 1/8" JOINTS ARE PLACED EVERY 10' OR LESS
4. EXPANSION JOINTS IN THE SIDEWALK SHALL BE 40' APART. IF ADJACENT TO CONCRETE CURB, EXPANSION JOINTS SHALL MATCH JOINT OF CURB. AN EXPANSION JOINT SHALL BE PLACED BETWEEN CURB AND SIDEWALK.
5. SEE DRAWING R-2.2 FOR DETAIL OF SIDEWALK STRESS COLUMN TO BE PLACED UNDER SIDEWALK WHEN PLACED ADJACENT TO BACK OF CURB.
6. SEE ARLINGTON COUNTY SPECIFICATION SECTIONS 02611 AND 03100 FOR MATERIAL SPECS.
7. PROVIDE 6" MINIMUM AGGREGATE BASE HAVING CBR-30 UNDER CURB AND GUTTER.
8. PROVIDE 3" MINIMUM AGGREGATE BASE HAVING CBR-30 UNDER SIDEWALK

CONCRETE CURB & GUTTER AND SIDEWALK

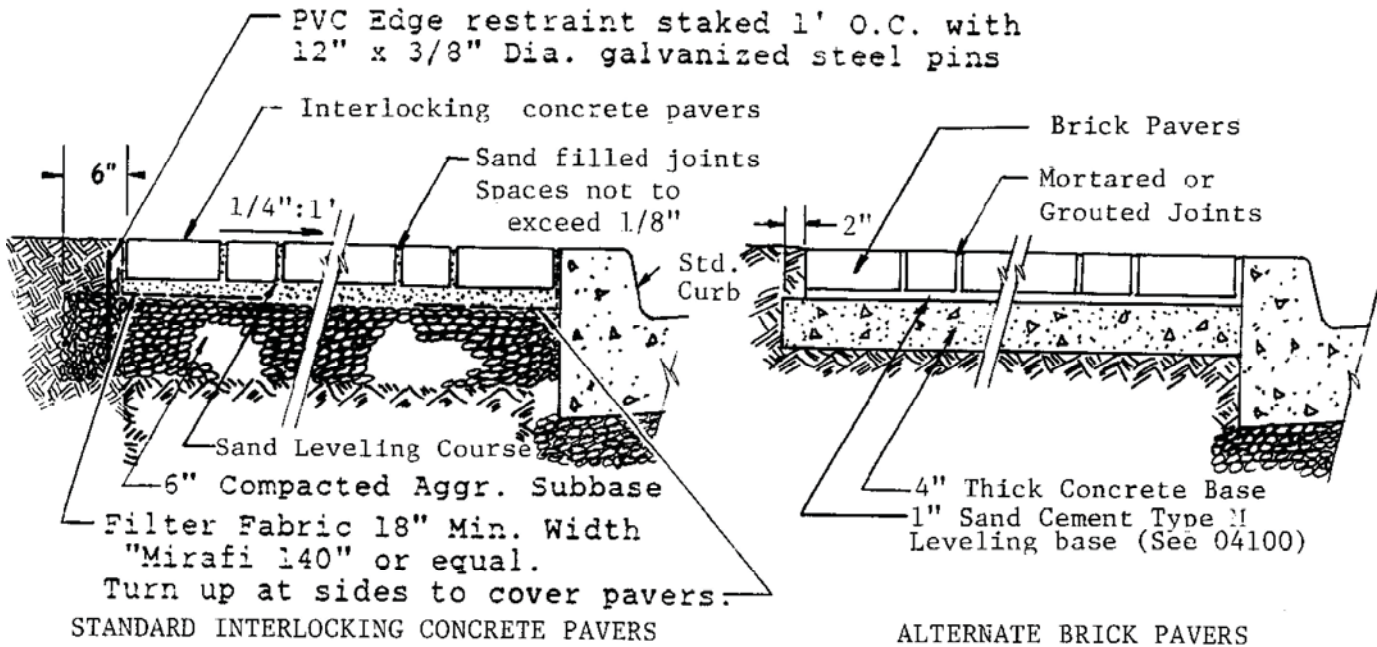
Rev. Sidewalk Dims 07/11/2013

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.0



NOTES

1. Refer to Section 2611 and Section 2612 for specifications for Interlocking Concrete Pavers and Brick Pavers and other related materials shown on sidewalk applications.
2. All brick shall meet ASTM Specification C-902-78.
3. For driveway application see Drawing R-2.4 and related specs.

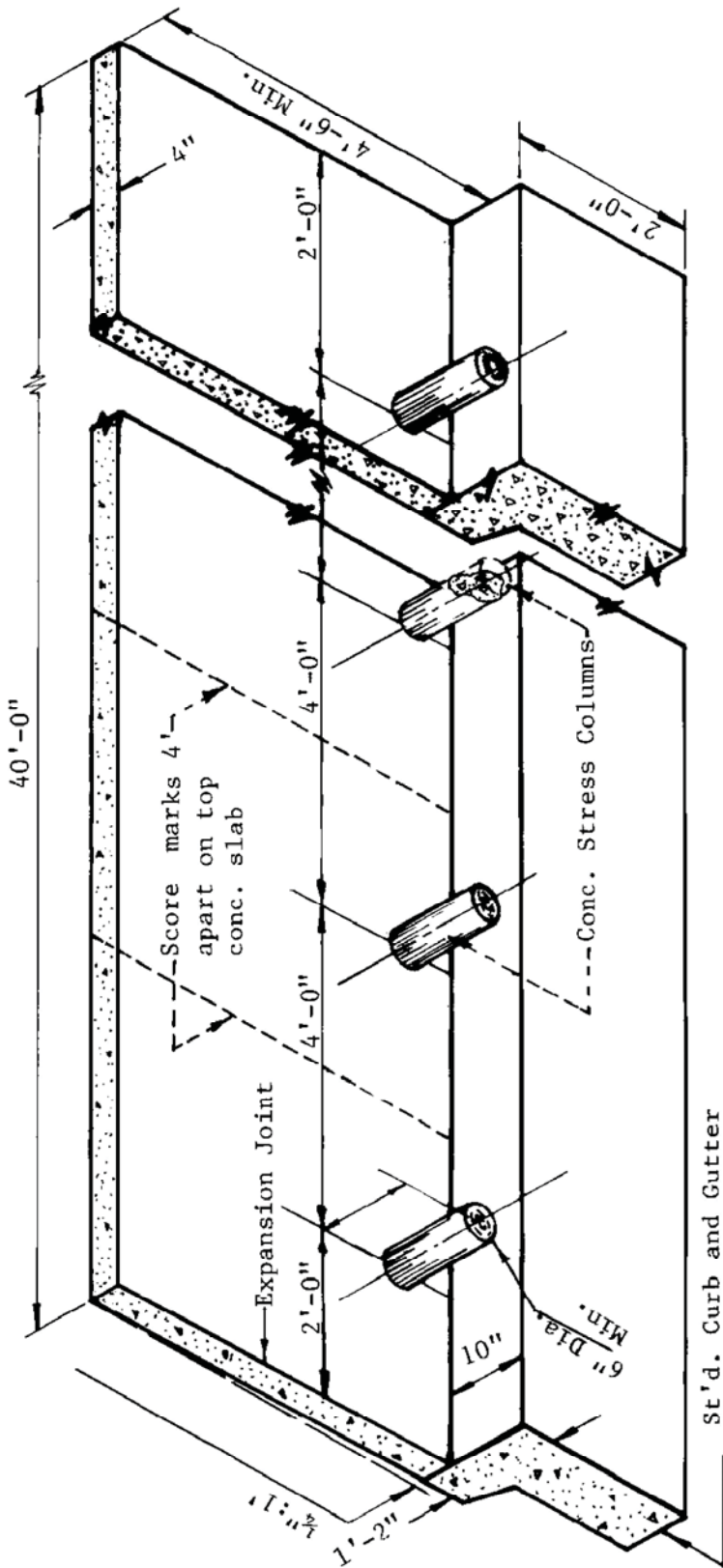
**INTERLOCKING CONCRETE AND BRICK PAVERS
FOR SIDEWALK APPLICATION**

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.1



DETAIL LOOKING UP FROM UNDERNEATH SIDEWALK

NOTES:

1. When sidewalk is adjacent to the back of curb, including curb returns, 6" dia. minimum concrete stress columns are to be built as shown.
2. The depth of stress columns shall be 12" unless otherwise specified by the Engineer.
3. These stress columns are to be placed between score marks and expansion joints and never under expansion joints.
4. Stress columns are to be poured with the sidewalk unless otherwise specified.
5. Minimum clearance between outside of column and back of curb is 6".

SIDEWALK STRESS COLUMNS

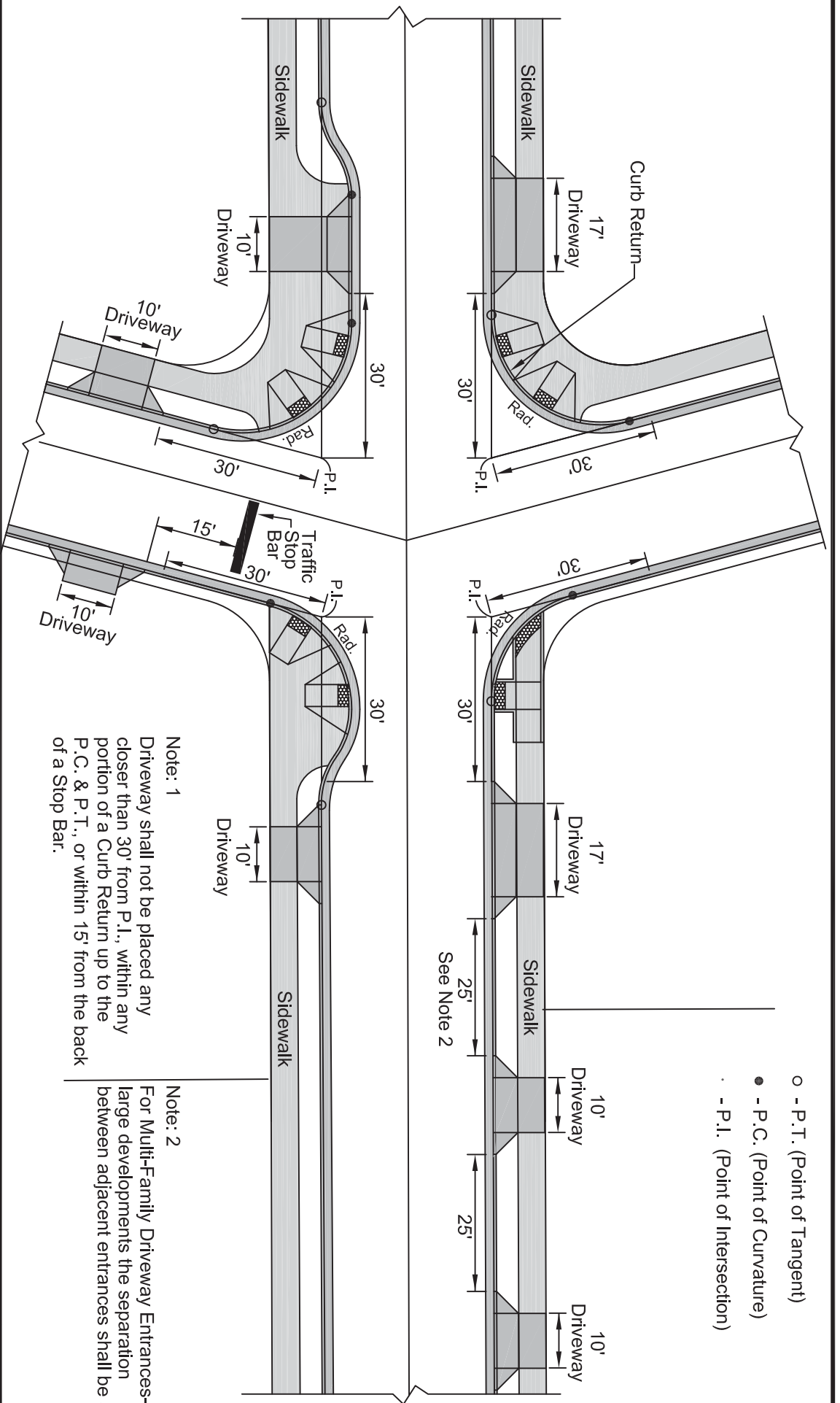
REVISION & DATE

DRAWING NO.
R-2.2



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

- - P.T. (Point of Tangent)
- - P.C. (Point of Curvature)
- - P.I. (Point of Intersection)



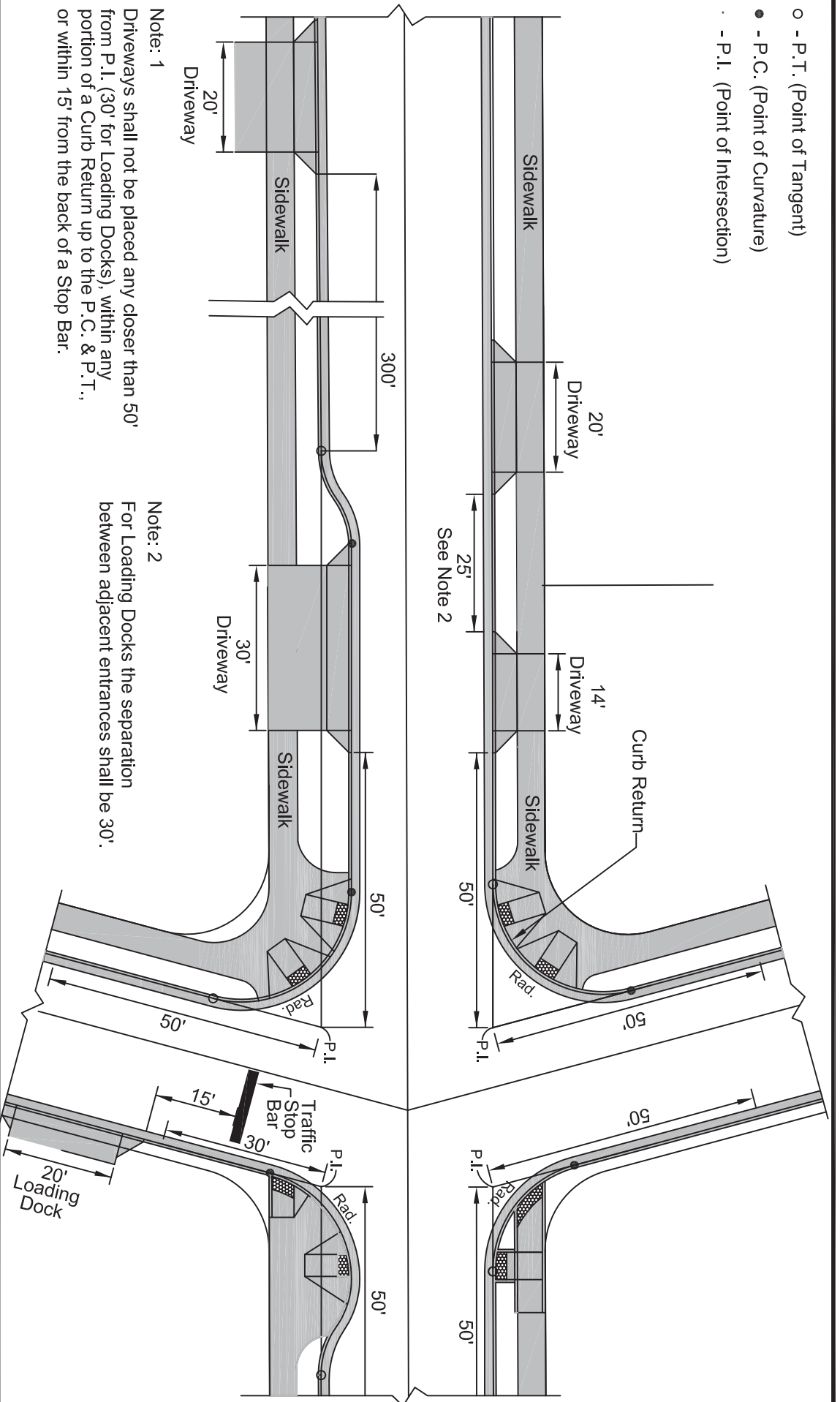
Note: 1
 Driveway shall not be placed any closer than 30' from P.I., within any portion of a Curb Return up to the P.C. & P.T., or within 15' from the back of a Stop Bar.

Note: 2
 For Multi-Family Driveway Entrances- large developments the separation between adjacent entrances shall be 30'.

DRIVEWAY ENTRANCE PLACEMENT (RESIDENTIAL)

04-10	
9/26/13	Naming
REVISION & DATE	

- - P.T. (Point of Tangent)
- - P.C. (Point of Curvature)
- - P.I. (Point of Intersection)



Note: 1

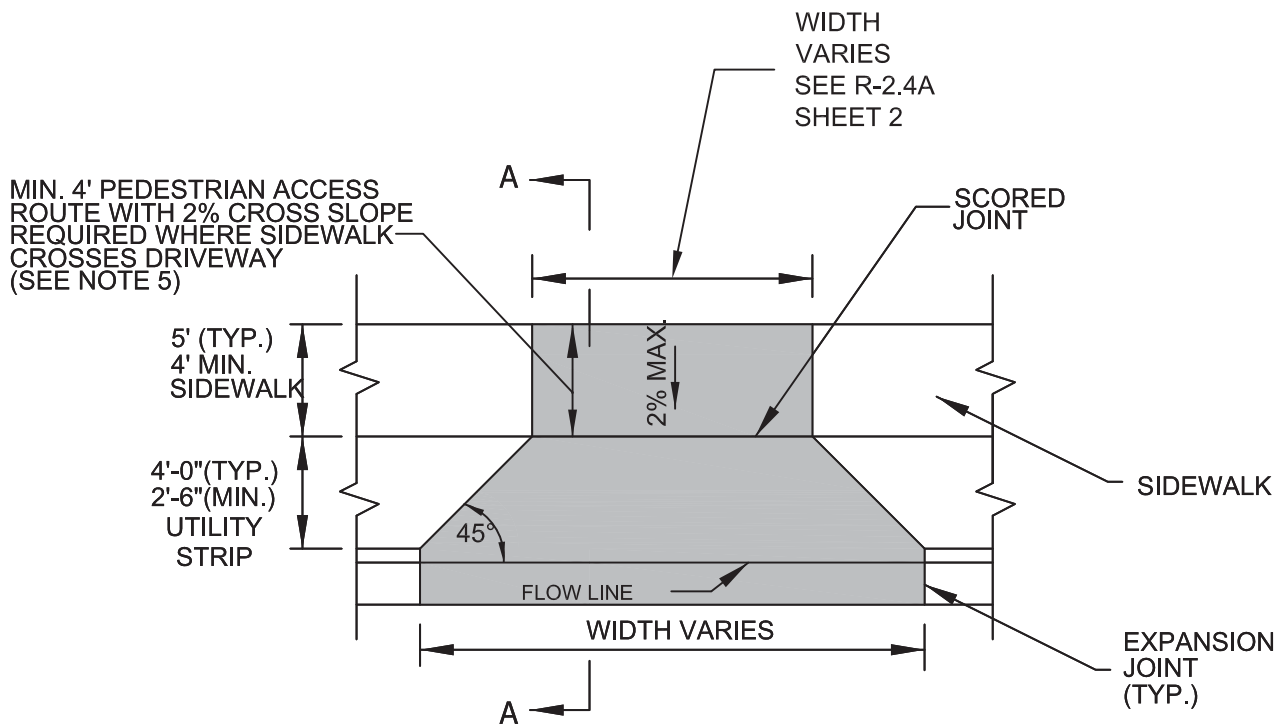
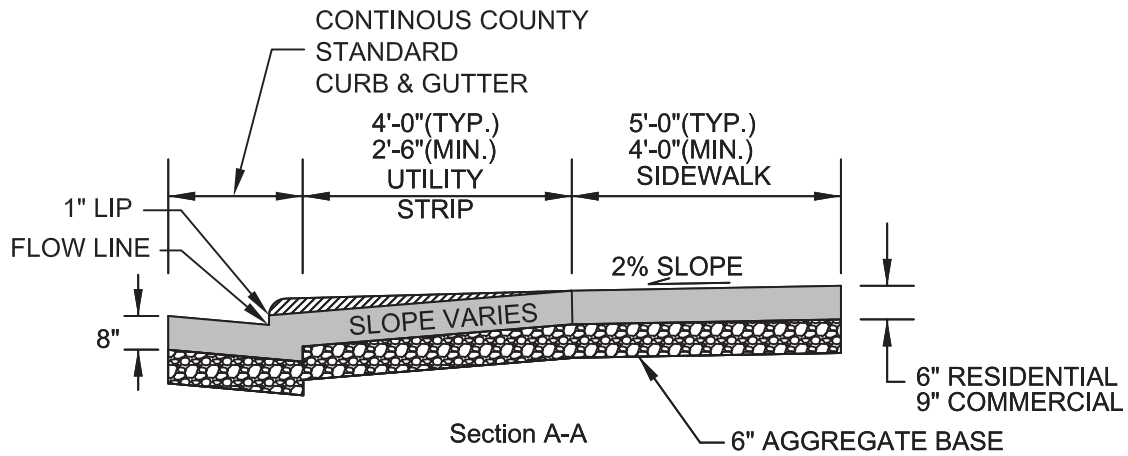
Driveways shall not be placed any closer than 50' from P.I. (30' for Loading Docks), within any portion of a Curb Return up to the P.C. & P.T., or within 15' from the back of a Stop Bar.

Note: 2

For Loading Docks the separation between adjacent entrances shall be 30'.

DRIVEWAY ENTRANCE PLACEMENT (COMMERCIAL, MULTI-FAMILY, MIXED USE, LOADING, ETC)

04-10	
9/26/13	Naming
REVISION & DATE	



CONCRETE DRIVEWAY ENTRANCE (STANDARD)

01-08	
04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4A
SHEET 1 OF 2

NOTES:

1. WHEN DRIVEWAY WIDTH EXCEEDS 16' A 3/4" MIN. DEPTH SCORED JOINT SHALL BE PLACED ON CENTERLINE OF DRIVEWAY ENTRANCE OR EVERY 10'.
2. CONCRETE DRIVEWAY ENTRANCE SHALL BE POURED MONOLITHICALLY.
3. FOR GRAVEL DRIVEWAY, 4' OF 4" THICK ASPHALT SHALL BE PLACED AT BACK OF THE CONCRETE APRON FOR THE WIDTH OF THE DRIVE.
4. PROVIDE 6" MINIMUM AGGREGATE BASE HAVING MINIMUM CBR-30 UNDER DRIVEWAY ENTRANCE.
5. OWNER SHALL DEDICATE ALL PERMANENT EASEMENTS NECESSARY TO PROVIDE ADA COMPLIANT DRIVEWAY ENTRANCE AND SIDEWALK IF EXISTING OR PROPOSED SIDEWALK INTERSECTS DRIVEWAY.

RESIDENTIAL AND MULTIFAMILY	DRIVEWAY WIDTHS	
	MINIMUM	MAXIMUM
SINGLE FAMILY - ONE ENTRANCE	N/A	17'
SINGLE FAMILY - TWO ENTRANCES	N/A	10'
MULTI FAMILY SMALL DEVELOPMENT	20'	30'
MULTI FAMILY LARGE DEVELOPMENT	20'	30'
COMMERCIAL		
COMMERCIAL / MIXED USE / HIGHRISE & OTHER DRIVEWAY ENTRANCES USED AS ONE-WAY ENTRANCE	14'	20'
COMMERCIAL / MIXED USE / HIGHRISE & OTHER DRIVEWAY ENTRANCES USED AS A TWO WAY ENTRANCE	20'	30'
COMMERCIAL / MIXED USE / HIGHRISE & OTHER - FIRE LANE SEPARATE FROM DRIVEWAY ENTRANCES OR ONE-WAY ENTRANCES	20'	20'
LOADING DOCK	N/A	20'

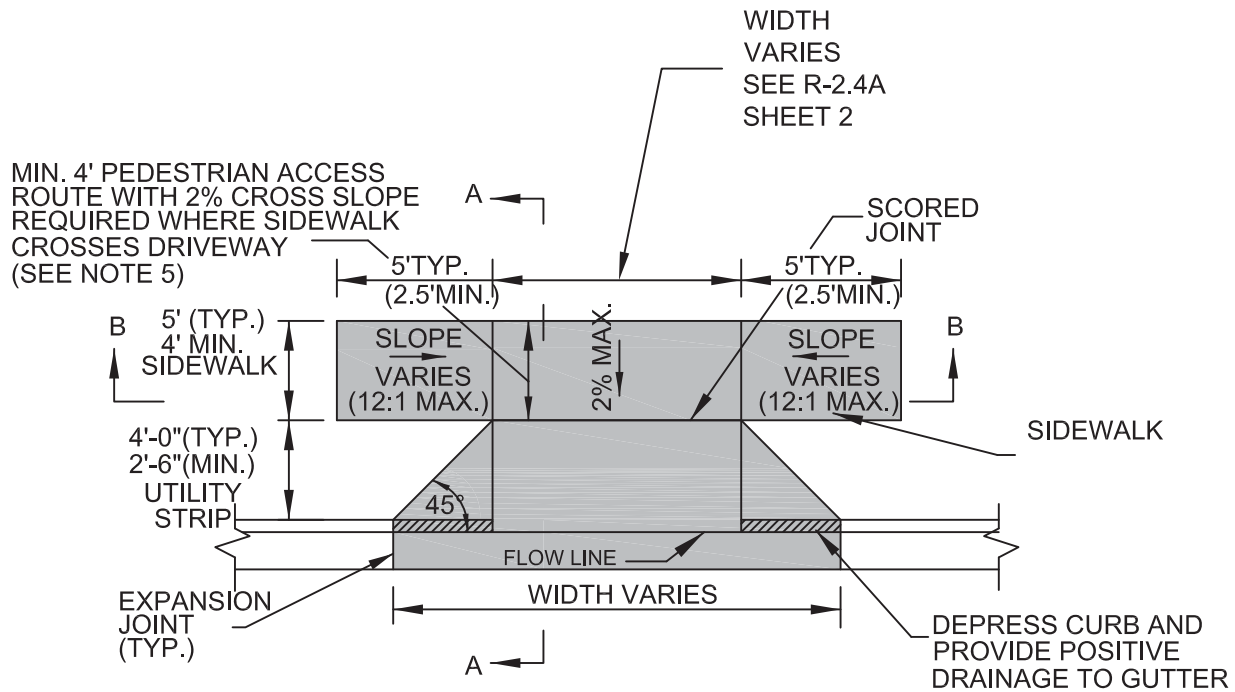
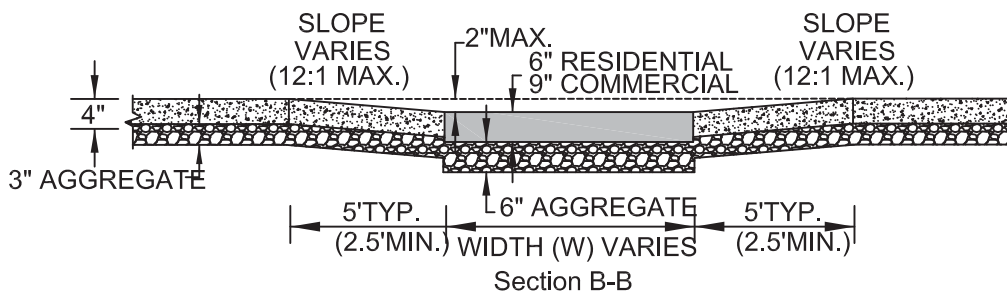
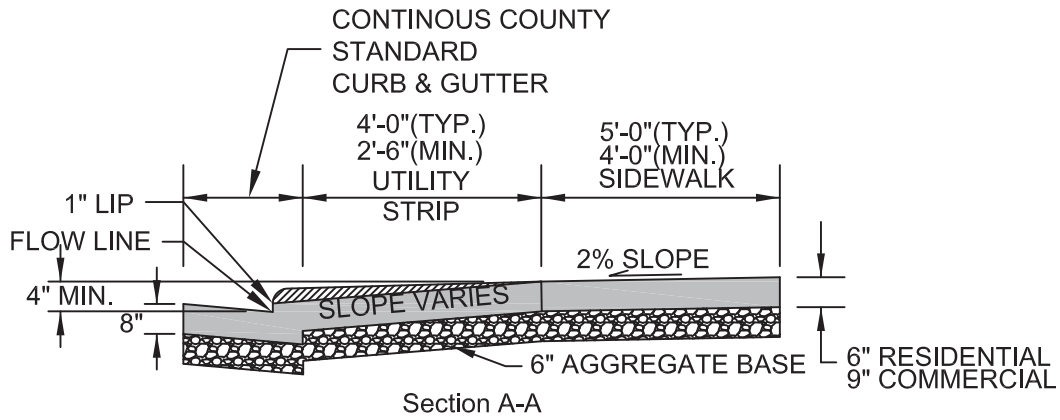
CONCRETE DRIVEWAY ENTRANCE

04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4A
 SHEET 2 OF 2



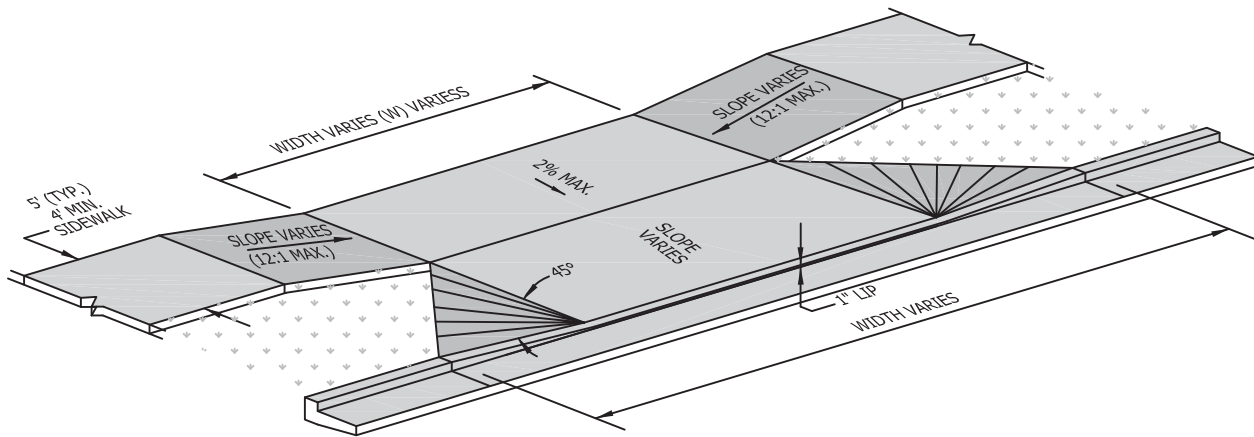
CONCRETE DRIVEWAY ENTRANCE (DEPRESSED)

07-08	
04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4B
Sheet 1 of 2



NOTES:

1. WHEN DRIVEWAY WIDTH EXCEEDS 16' A 3/4" MIN. DEPTH SCORED JOINT SHALL BE PLACED ON CENTERLINE OF DRIVEWAY ENTRANCE OR EVERY 10'.
2. CONCRETE DRIVEWAY ENTRANCE SHALL BE POURED MONOLITHICALLY.
3. FOR GRAVEL DRIVEWAY, 4' OF 4" THICK ASPHALT SHALL BE PLACED AT BACK OF THE CONCRETE APRON FOR THE WIDTH OF THE DRIVE.
4. PROVIDE 6" MINIMUM AGGREGATE BASE HAVING MINIMUM CBR-30 UNDER DRIVEWAY ENTRANCE.
5. OWNER SHALL DEDICATE ALL PERMANENT EASEMENTS NECESSARY TO PROVIDE ADA COMPLIANT DRIVEWAY ENTRANCE AND SIDEWALK IF EXISTING OR PROPOSED SIDEWALK INTERSECTS DRIVEWAY.
6. OWNER/DEVELOPER SHALL SUBMIT HYDRAULIC CALCULATIONS TO VERIFY THAT 10 YR. STORM RUNOFF WILL BE RETAINED WITHIN THE GUTTER AND WILL NOT OVERTOP DEPRESSED DRIVEWAY/PEDESTRIAN ACCESS ROUTE. OVERLAND RELIEF AWAY FROM STRUCTURES SHALL BE DEMONSTRATED FOR STORMS IN EXCESS OF 10 YRS.
7. DETAIL R-2.4B SHALL ONLY BE USED WHEN R-2.4A WOULD INHIBIT VEHICULAR USE OF THE DRIVEWAY.

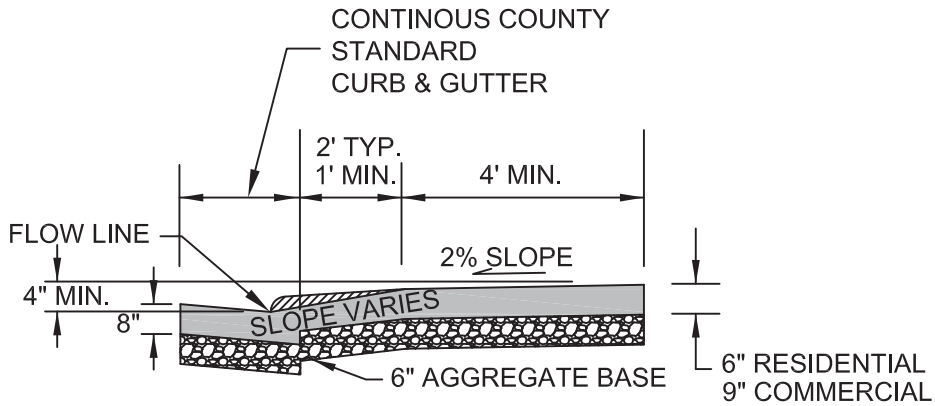
CONCRETE DRIVEWAY ENTRANCE

07-08	
04-10	
9/26/13	Naming
REVISION & DATE	

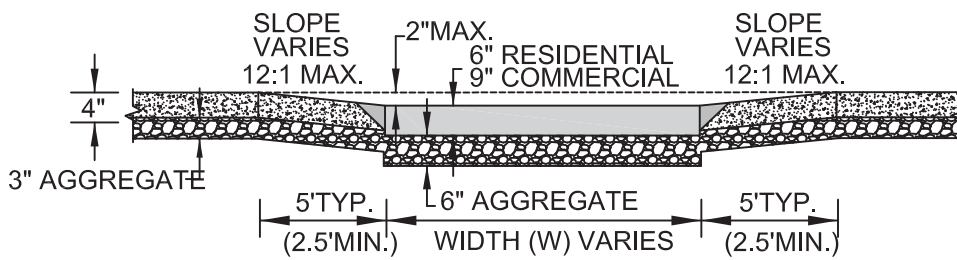


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

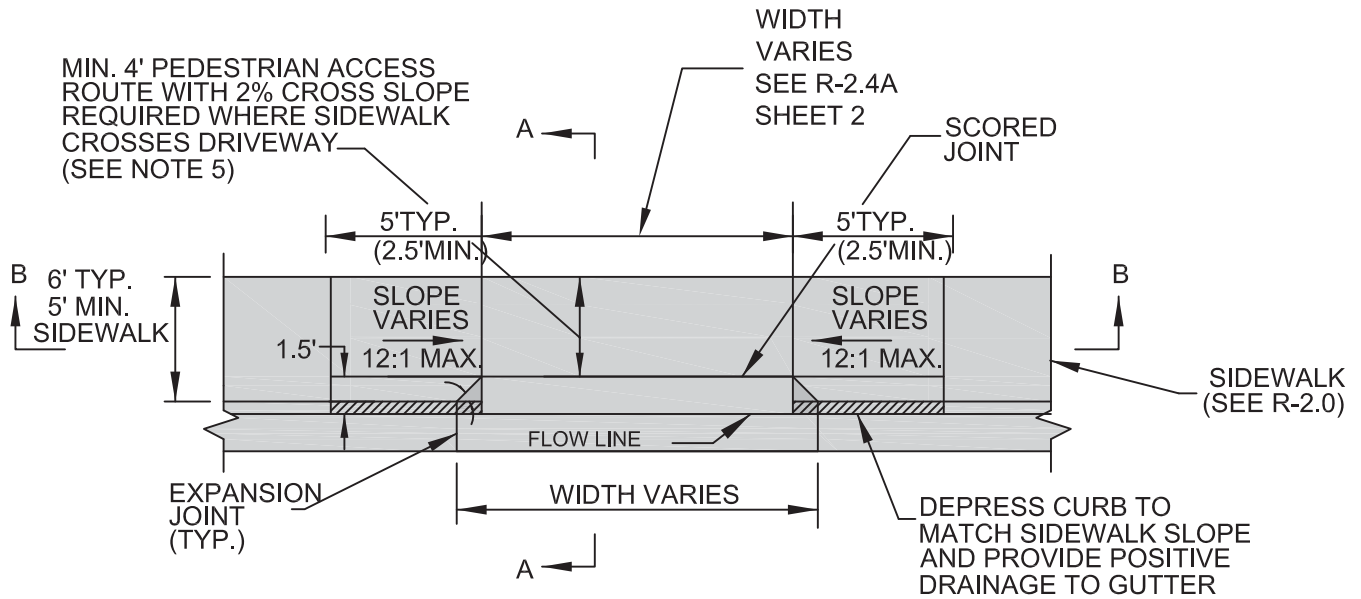
DRAWING NO.
R-2.4B
 Sheet 2 of 2



Section A-A



Section B-B



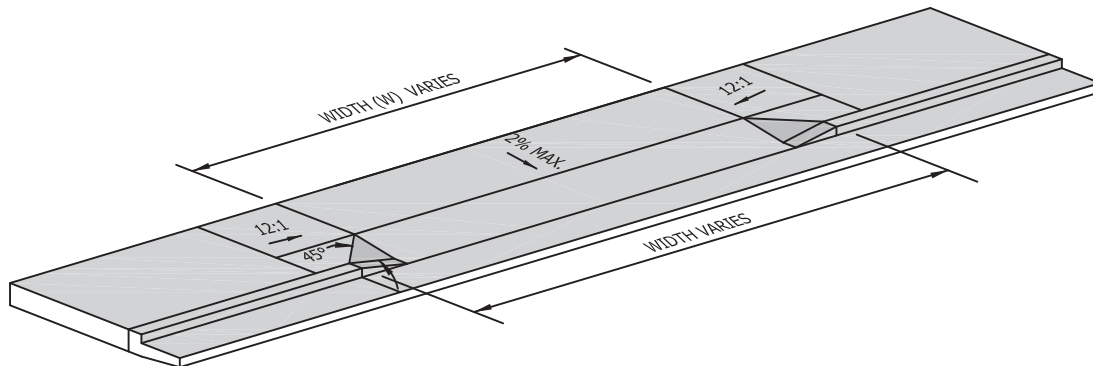
CONCRETE DRIVEWAY ENTRANCE (MOUNTABLE CURB)

07-08	
04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4C
Sheet 1 of 2



NOTES:

1. WHEN DRIVEWAY WIDTH EXCEEDS 16' A 3/4" MIN. DEPTH SCORED JOINT SHALL BE PLACED ON CENTERLINE OF DRIVEWAY ENTRANCE OR EVERY 10'.
2. CONCRETE DRIVEWAY ENTRANCE SHALL BE POURED MONOLITHICALLY.
3. FOR GRAVEL DRIVEWAY, 4' OF 4" THICK ASPHALT SHALL BE PLACED AT BACK OF THE CONCRETE APRON FOR THE WIDTH OF THE DRIVE.
4. PROVIDE 6" MINIMUM AGGREGATE BASE HAVING MINIMUM CBR-30 UNDER DRIVEWAY ENTRANCE.
5. OWNER SHALL DEDICATE ALL PERMANENT EASEMENTS NECESSARY TO PROVIDE ADA COMPLIANT DRIVEWAY ENTRANCE AND SIDEWALK IF EXISTING OR PROPOSED SIDEWALK INTERSECTS DRIVEWAY.
6. OWNER/DEVELOPER SHALL SUBMIT HYDRAULIC CALCULATIONS TO VERIFY THAT 10 YR. STORM RUNOFF WILL BE RETAINED WITHIN THE GUTTER AND WILL NOT OVERTOP DEPRESSED DRIVEWAY/PEDESTRIAN ACCESS ROUTE. OVERLAND RELIEF AWAY FROM STRUCTURES SHALL BE DEMONSTRATED FOR STORMS IN EXCESS OF 10 YRS.
7. DETAIL R-2.4C SHALL ONLY BE USED WHEN R-2.4A OR R-2.4B WOULD INHIBIT VEHICULAR USE OF THE DRIVEWAY.

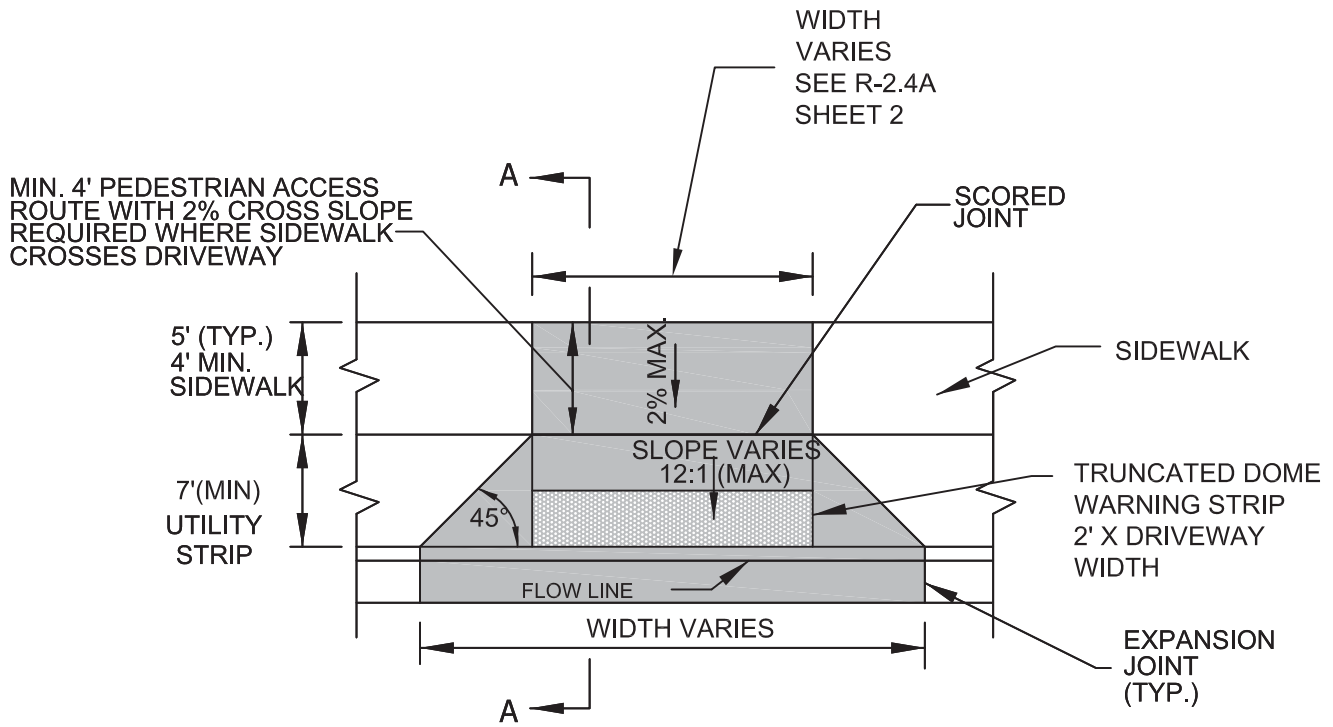
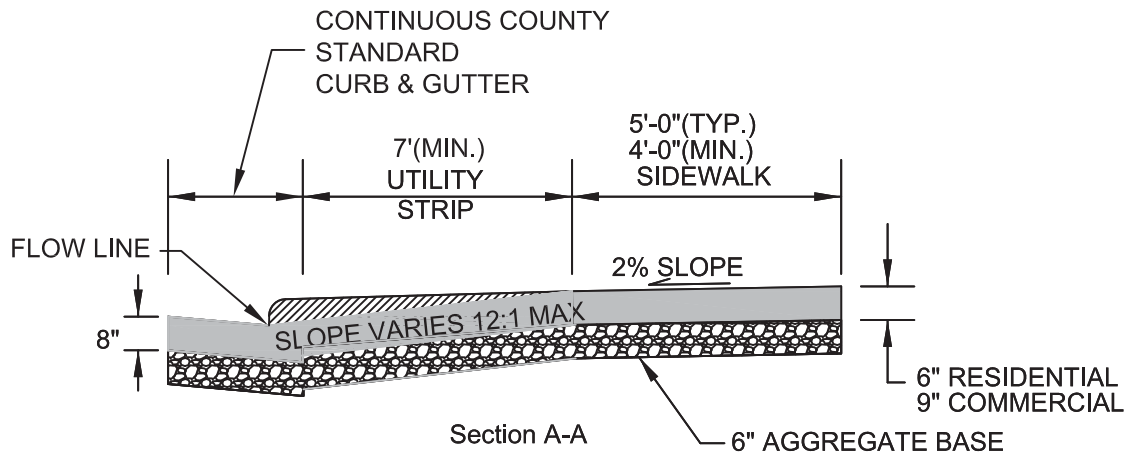
CONCRETE DRIVEWAY ENTRANCE (MOUNTABLE CURB)

07-08	
04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4C
 Sheet 2 of 2



NOTES:

1. FOR ADDITIONAL DRIVEWAY DETAILS SEE DRAWING R-2.4A, B, C
2. NO LIP SHALL BE CONSTRUCTED AT FOOT OF DRIVEWAY/RAMP
3. ONLY TO BE USED ON NEIGHBORHOOD MINOR (RESIDENTIAL) STREETS PENDING APPROVAL BY TE&O

COMBINATION DRIVEWAY ENTRANCE/CURB RAMP

04-10	
9/26/13	Naming
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.4D

**REFER TO VDOT
STANDARD CG-12 (DETAIL
No. 203.09) FOR CURB CUT
RAMP SPECIFICATIONS.**

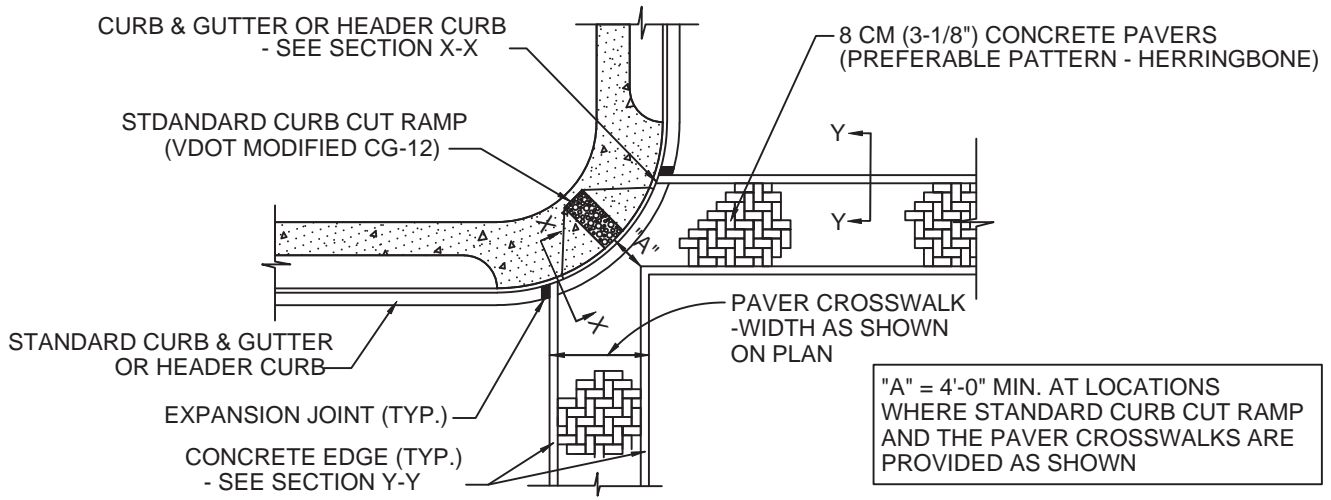
CURB CUT RAMP

REVISION & DATE	

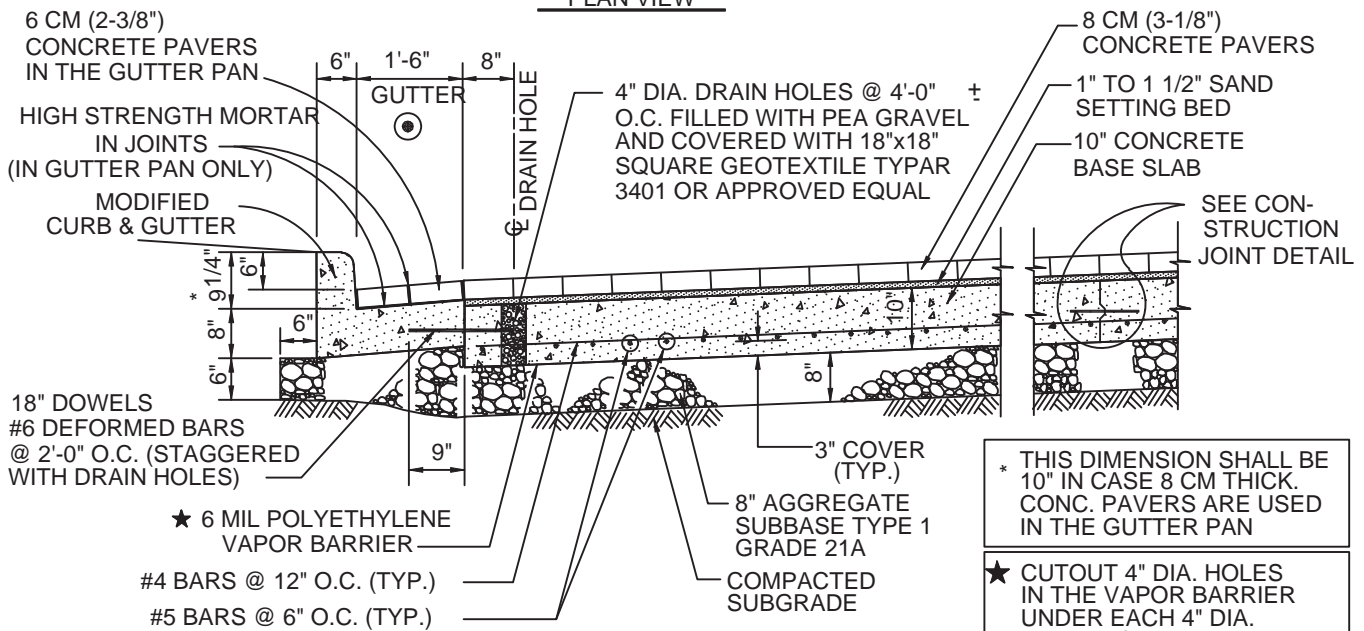


**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
R-2.5**



PLAN VIEW



SECTION X-X

(MODIFIED CONCRETE CURB & GUTTER WITH PAVERS IN THE GUTTER PAN)

"OPTION 1"

- * THIS DIMENSION SHALL BE 10" IN CASE 8 CM THICK. CONC. PAVERS ARE USED IN THE GUTTER PAN
- ★ CUTOUT 4" DIA. HOLES IN THE VAPOR BARRIER UNDER EACH 4" DIA. DRAIN HOLE
- ⊙ GUTTER WIDTH SHALL BE 2'-0" FOR THE STATE PRIMARY ROADS (TYP.)

NOTES :

1. FOR CROSSWALKS 30 FEET AND LONGER, PROVIDE ONE EXPANSION JOINT LOCATED ALONG THE TRAFFIC LANE EDGE, CLOSEST AND PARALLEL TO THE STREET CENTERLINE.
2. THE BOTTOM AND THE TOP OF THE 10" CONCRETE BASE SLAB SHALL FOLLOW THE SAME LONGITUDINAL AND CROSS SLOPES AS REQUIRED FOR THE PAVEMENT SURFACE ON THE TOP.
3. THE TOP OF THE 10" CONCRETE BASE SLAB SHALL BE FINISHED SMOOTH WITH STRICT ELEVATION CONTROL TO ACHIEVE A UNIFORM THICKNESS OF THE SAND BED UNDER THE PROPOSED CONCRETE PAVERS AND ALSO FOR THE PROPER SUB-SURFACE FLOW THROUGH THE SAND BED TOWARD THE 4" DIA. DRAIN HOLES.
4. TO PROVIDE A SMOOTH RIDE, MILL AND PAVE STREET 20 FEET FROM THE CONCRETE EDGE OF THE CROSSWALK. IN ADDITION, AT AN INTERSECTION WHERE PAVER CROSSWALKS ARE PROVIDED ACROSS ALL APPROACHES, MILL AND PAVE THE ENTIRE ENCLOSED AREA IN BETWEEN THESE CROSSWALKS.

PAVER CROSSWALK

REVISION & DATE

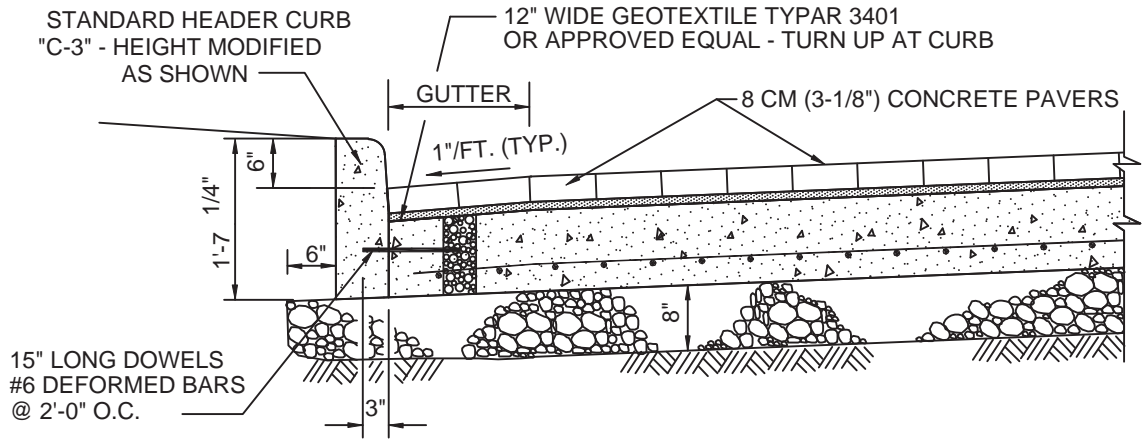


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.

R-2.6

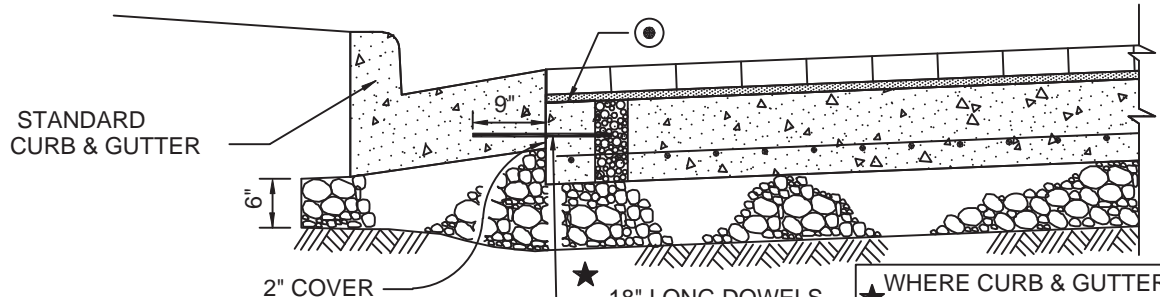
(1 OF 3)



SECTION X-X

(MODIFIED CONCRETE HEADER CURB WITH PAVERS IN THE GUTTER PAN)

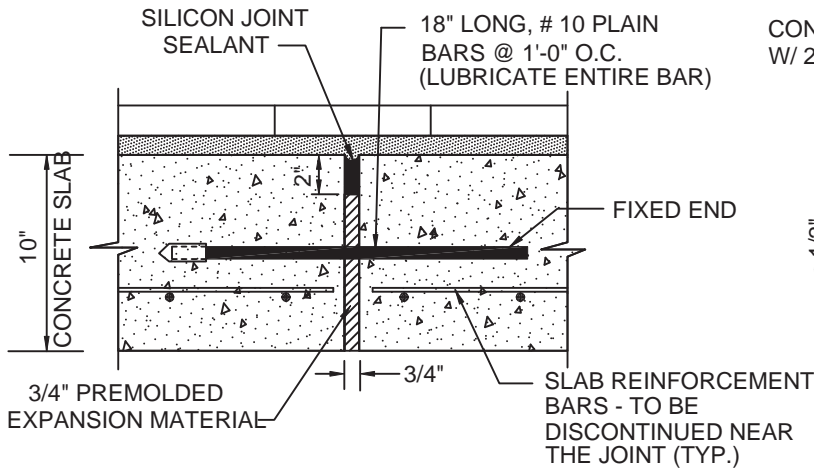
"OPTION 2"



SECTION X-X

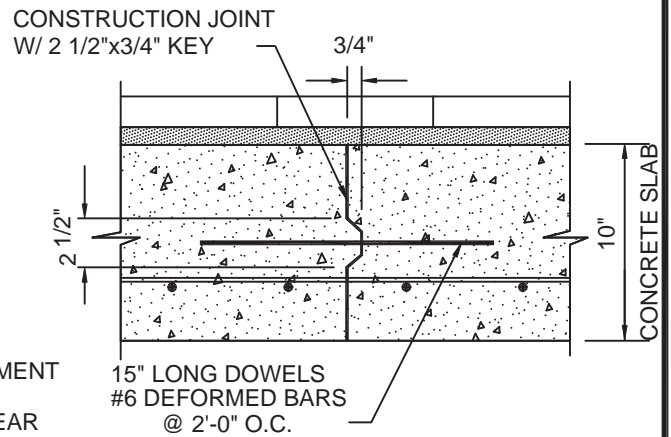
(STANDARD CONCRETE CURB & GUTTER)

"OPTION 3"



EXPANSION JOINT DETAIL

(TYP.)



CONSTRUCTION JOINT DETAIL

(TYP.)

NOTES:

1. FOR ALL OTHER DETAILS, SEE SECTION X-X "OPTION 1".
2. JOINTS SHALL NOT BE CONTINUED THROUGH PAVERS.

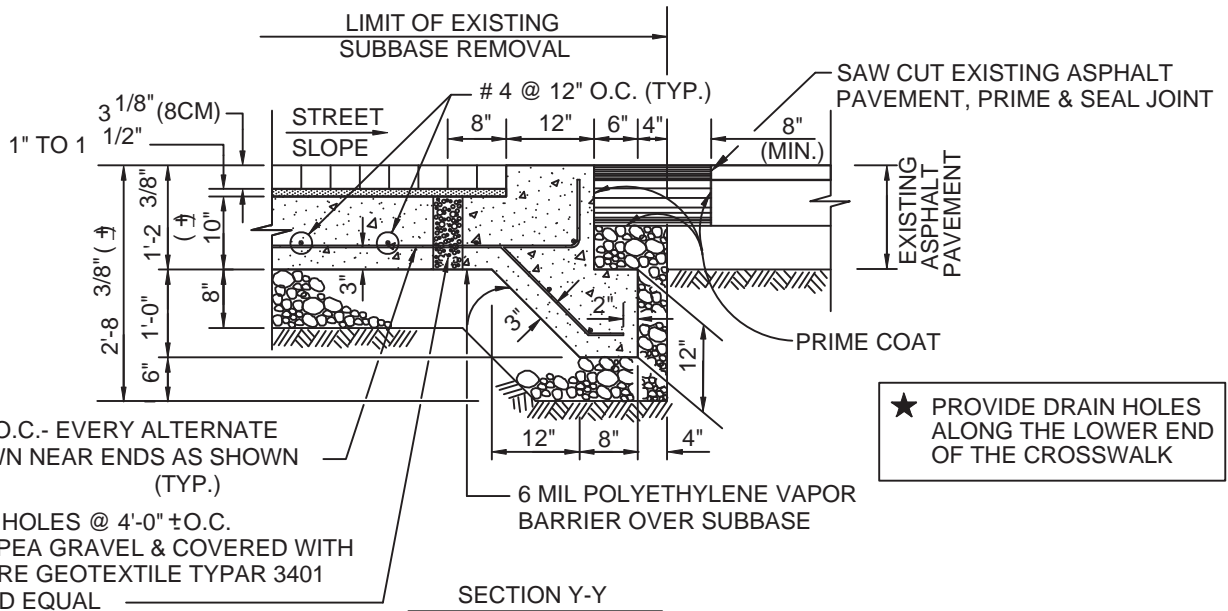
PAVER CROSSWALK

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.6
(2 OF 3)

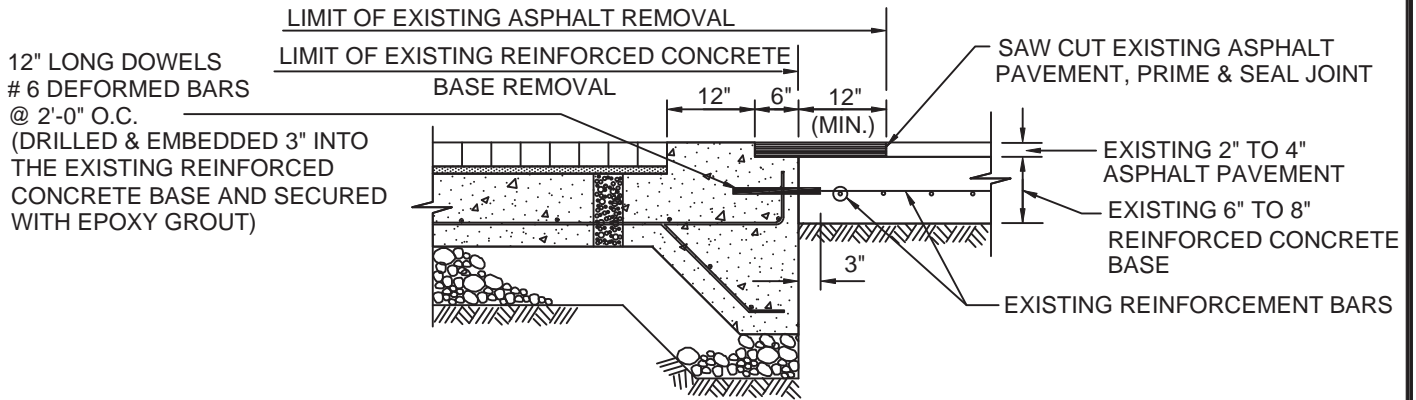


5 BARS @ 6" O.C. - EVERY ALTERNATE BAR BENT DOWN NEAR ENDS AS SHOWN (TYP.)

★ 4" DIA. DRAIN HOLES @ 4'-0" ± O.C. FILLED WITH PEA GRAVEL & COVERED WITH 18"x18" SQUARE GEOTEXTILE TYPAR 3401 OR APPROVED EQUAL

★ PROVIDE DRAIN HOLES ALONG THE LOWER END OF THE CROSSWALK

SECTION Y-Y
(CASE 1-EXISTING ASPHALT PAVEMENT WITH AGGREGATE SUBBASE)

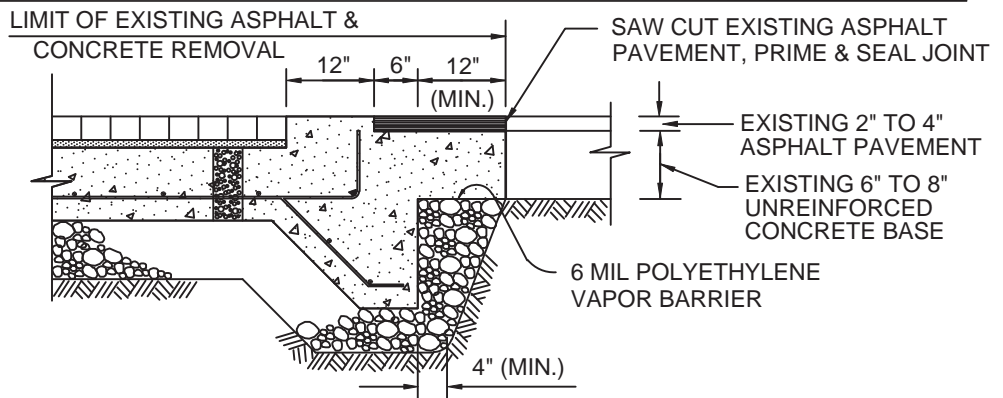


12" LONG DOWELS # 6 DEFORMED BARS @ 2'-0" O.C. (DRILLED & EMBEDDED 3" INTO THE EXISTING REINFORCED CONCRETE BASE AND SECURED WITH EPOXY GROUT)

NOTE : FOR ALL OTHER DETAILS SEE SECTION Y-Y (CASE 1).

SECTION Y-Y

(CASE 2- EXISTING ASPHALT PAVEMENT OVER REINFORCED CONCRETE BASE)



NOTE : FOR ALL OTHER DETAILS SEE SECTION Y-Y (CASE 1).

SECTION Y-Y

(CASE 3- EXISTING ASPHALT PAVEMENT OVER UNREINFORCED CONCRETE BASE)

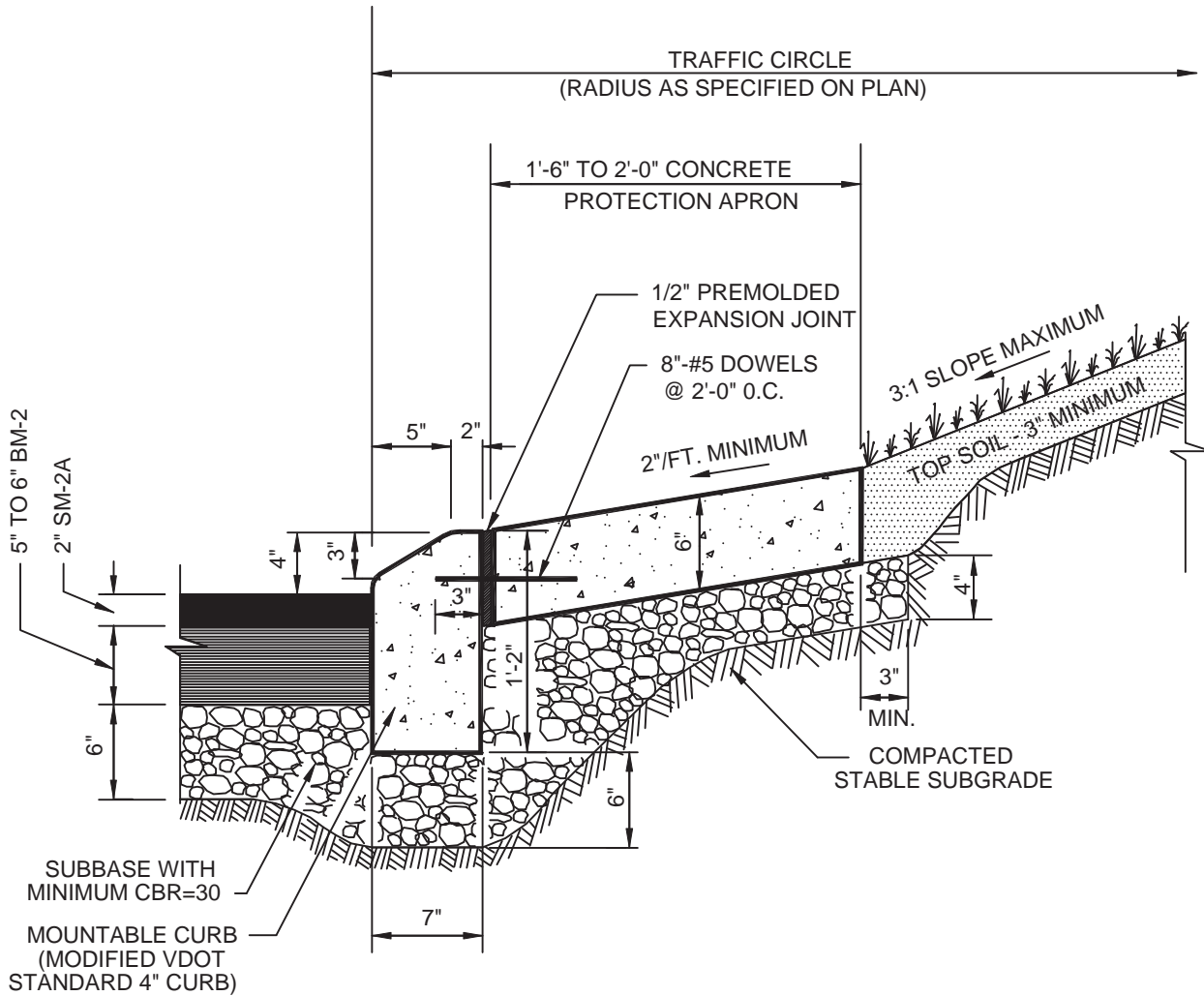
PAVER CROSSWALK

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.6
(3 OF 3)



NOTES :

1. WHERE EXISTING PAVEMENT IS REMOVED TO INSTALL THE PROPOSED TRAFFIC CIRCLE, THE ENTIRE AREA UNDER THE CIRCLE SHALL BE EXCAVATED AT LEAST 6" INTO THE ORIGINAL SOIL, REPLACED WITH ACCEPTABLE BACKFILL MATERIAL TO THE DESIRED DEPTH, AND COMPACTED TO PROVIDE STABLE SUBGRADE.
2. THE PAVEMENT AROUND THE PROPOSED TRAFFIC CIRCLE SHALL BE REGRADED, IF REQUIRED, TO DRAIN AWAY FROM THE CURB.
3. LOW GROWING BUSHES AND GRASS MAY BE PLANTED INSIDE THE PROPOSED CIRCLE. NO TREE SHALL BE PLANTED INSIDE THE PROPOSED CIRCLE WHERE UTILITIES ARE PASSING UNDER.

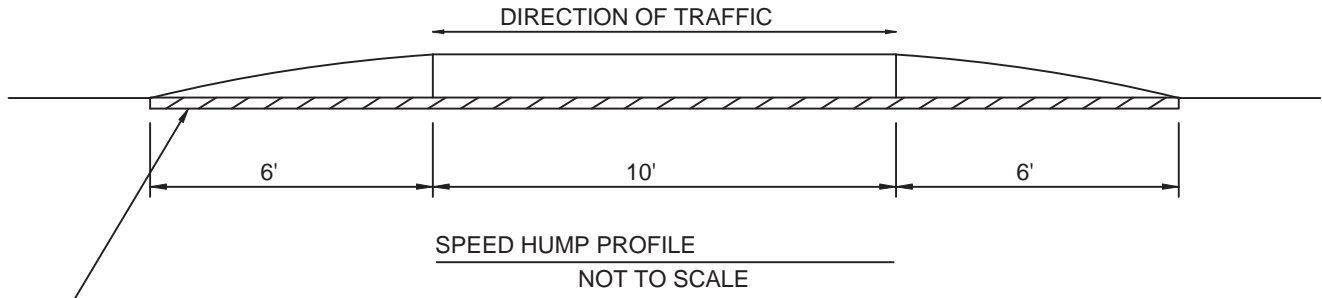
**MOUNTABLE CURB DETAIL
AT TRAFFIC CIRCLE**

REVISION & DATE

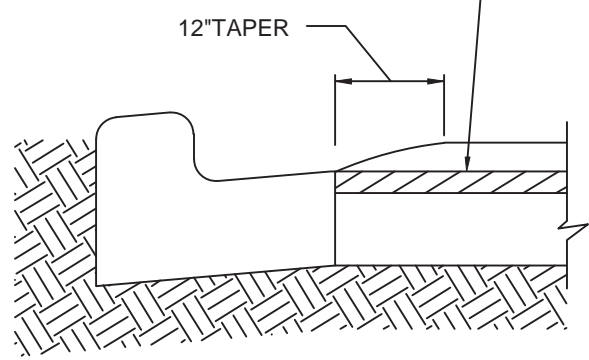


**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

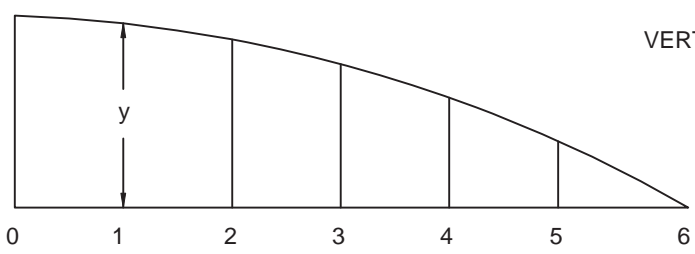
**DRAWING NO.
R-2.7**



MILL & REMOVE PAVEMENT
2" MIN. PRIOR TO INSTALLING
HUMP



x(ft.)	y(ft.) - inches
0	0.25 - 3.0
1	0.243 - 2.92
2	0.222 - 2.92
3	0.188 - 2.25
4	0.139 - 1.67
5	0.077 - 0.92
6	0.0 - 0.0



VERTICAL DIMENSION CHART

APPROACH ARC DETAIL
SEE VERTICAL DIMENSION CHART
NOT TO SCALE

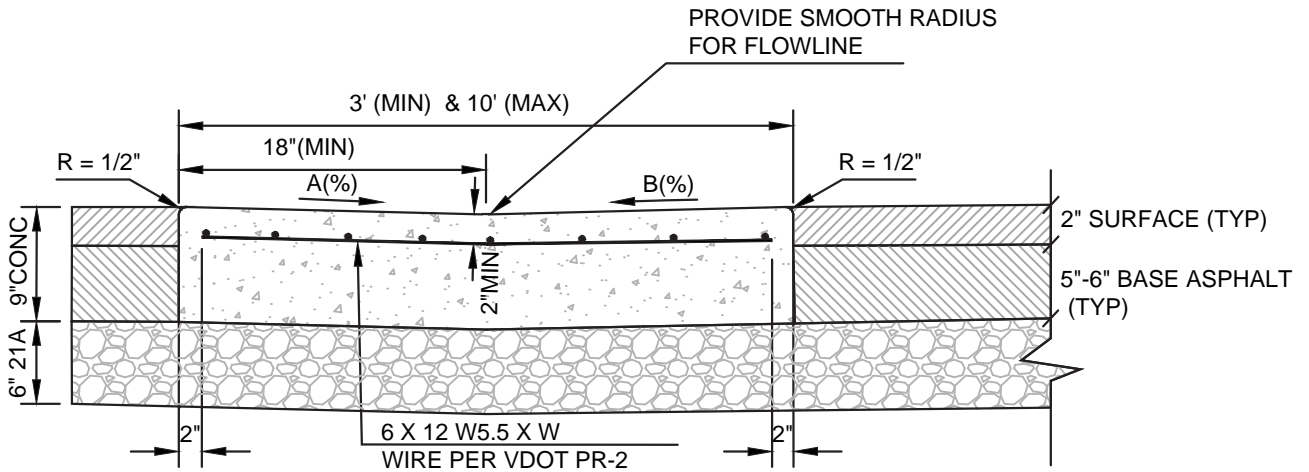
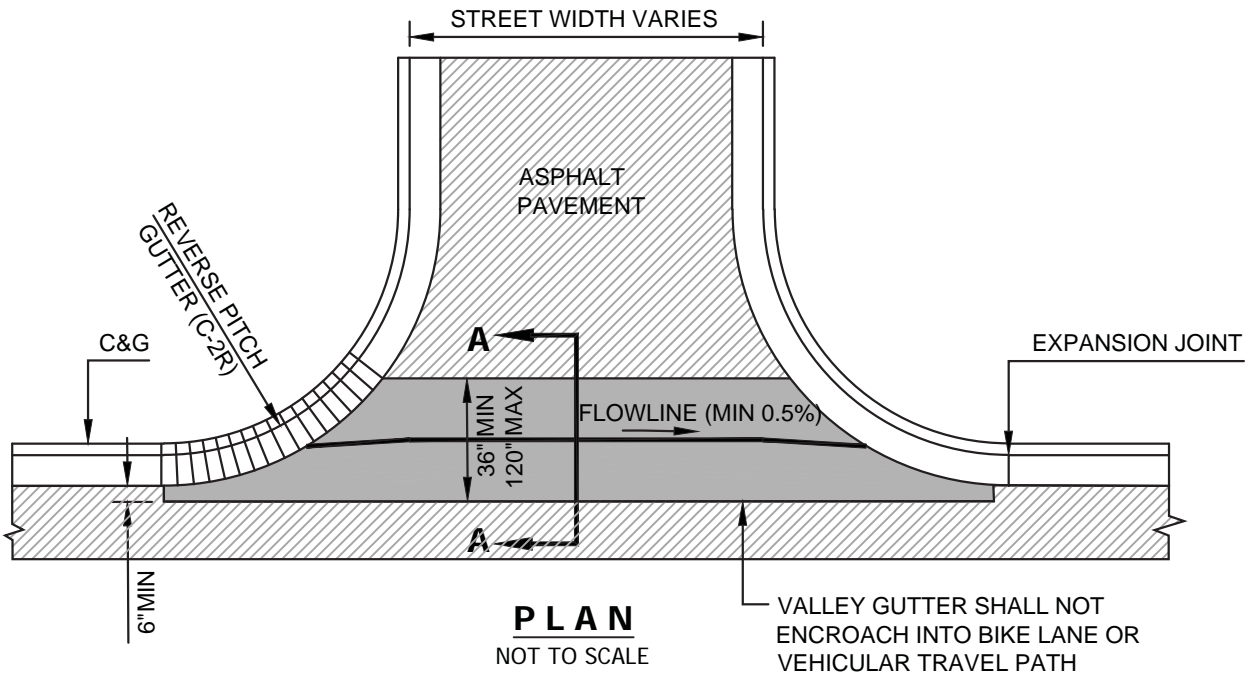
FLAT TOP PROFILE SPEED HUMP

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.8



SECTION AA
NOT TO SCALE

NOTES:

1. PLACE PREMOLDED FILLER AGAINST VERTICAL FACE WHERE VALLEY GUTTER ABUTS CONCRETE.
2. GRADE BREAK SHALL NOT EXCEED 12% ($|A| + |B| \leq 12\%$).
3. DESIGNER SHALL ENSURE THAT ANY PORTION OF VALLEY GUTTER WITHIN A MARKED OR UNMARKED CROSSWALK COMPLIES WITH RELEVANT ADA STANDARDS.

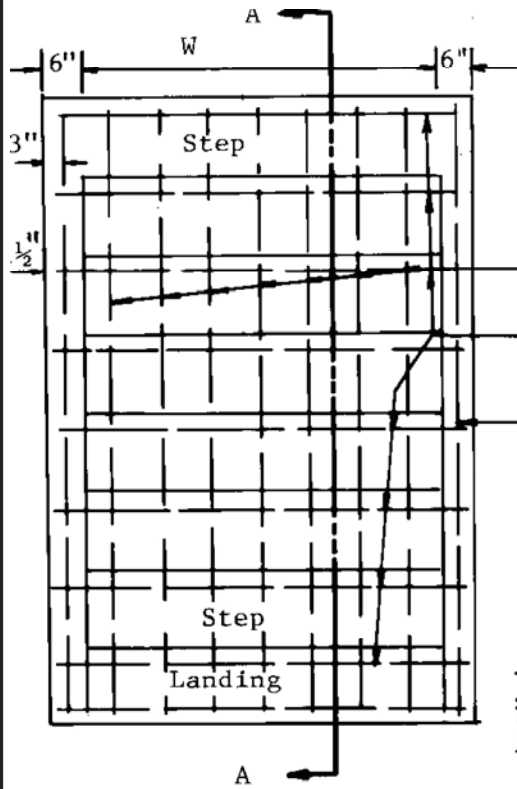
CONCRETE VALLEY GUTTER

REVISION & DATE



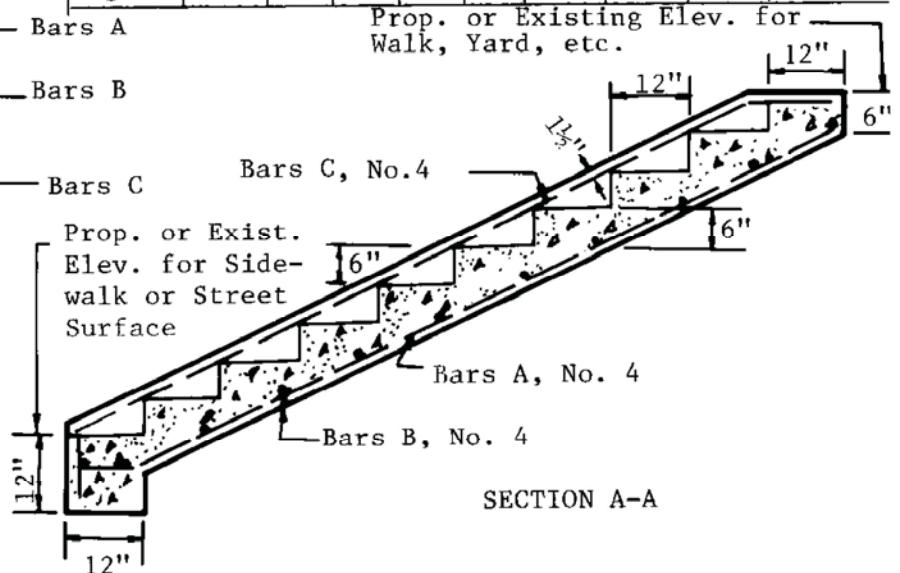
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.9

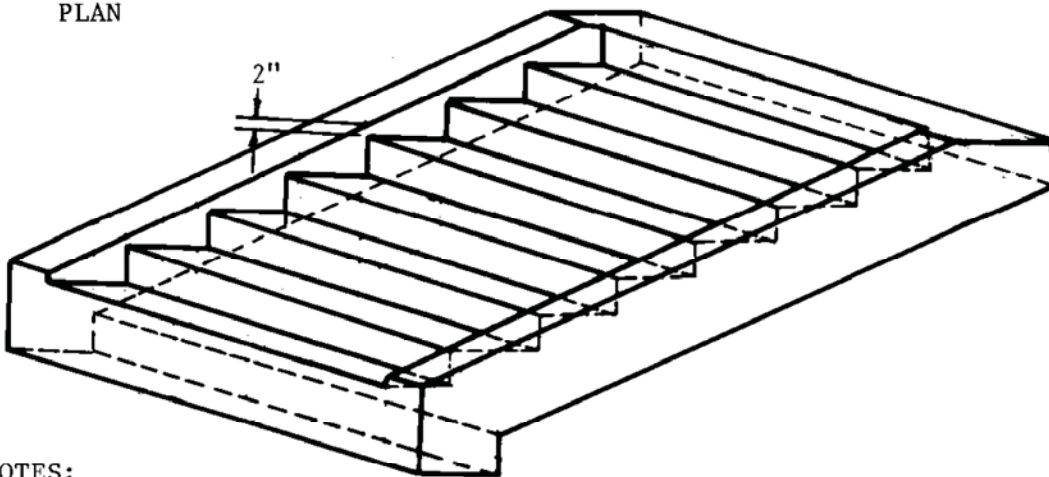


PLAN

		NUMBER OF BARS A								
W (Ft.)		N=1-5	N=6	N=7	N=8	N=9	N=10	N=11	N=12	N=13-25
3	No Steel		4	5	5	6	6	7	7	8
4			5	6	7	7	8	8	9	10
5			6	7	8	9	9	10	11	12



SECTION A-A



NOTES:

1. Handrails are required with construction of three or more steps.
2. These steps shall be used only in cuts or against undisturbed earth.
3. Reinforcing bars shall be used in installation of 6 or more steps.
4. W-indicates clear width of steps in feet between sidewalls.
5. N-indicates number of steps in installation exclusive of landing.
6. LA-indicates length of Bars A, in inches. $LA = 13.416N + 8''$.
7. LB-indicates length of Bars B, in inches. $LB = 12W + 9''$.
8. LC-indicates length of Bars C, in inches. $LC = 13.038N + 18''$.
9. Spacing of Bars A, in inches = $80/N$ where N is the number of steps.
10. Spacing of Bars B-one under each step and two under landing as shown.
11. Details of steps to be placed on slopes other than 2:1 will be as shown on Eng. Pla

CONCRETE STEPS ON 2:1 SLOPE

REVISION & DATE

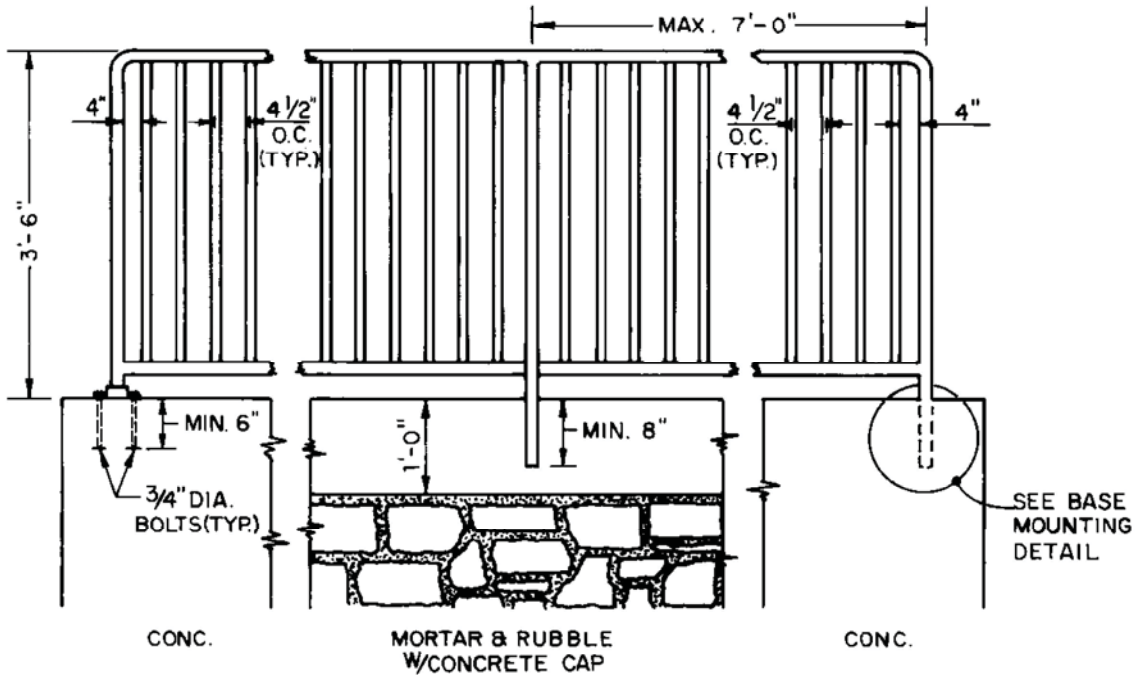
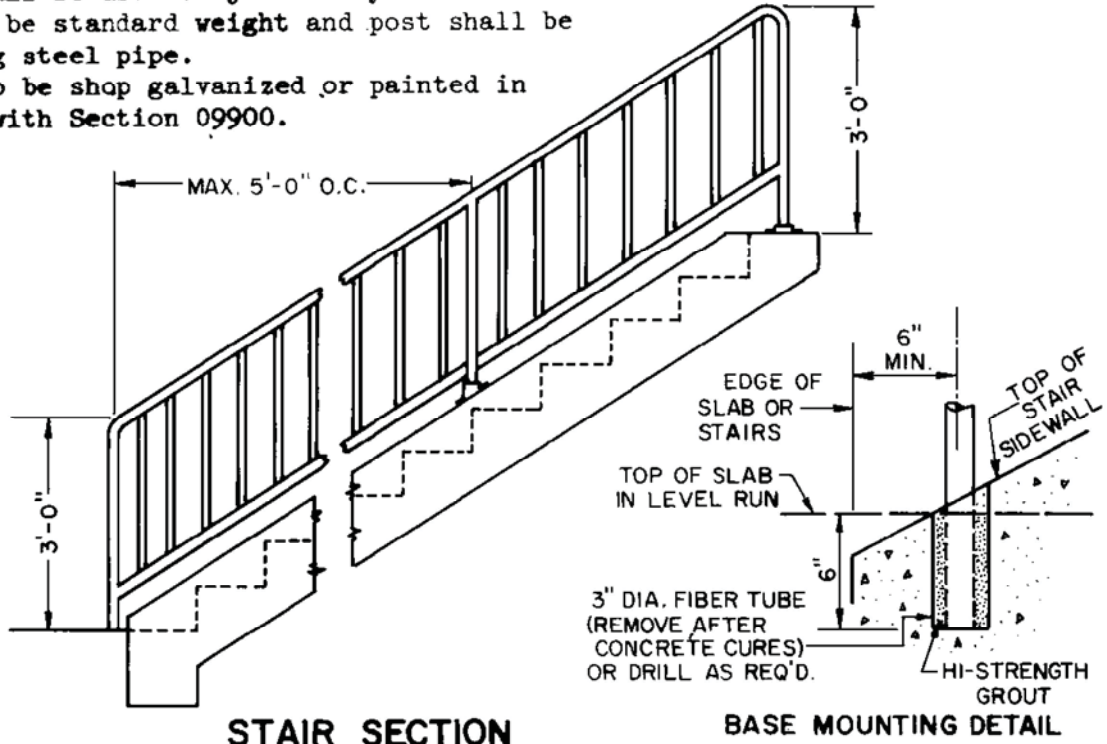


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-3.0

Notes:

1. Refer to Section 05500 for Handrail Specifications.
2. Fittings shall be used or joints may be welded.
3. Rails shall be standard weight and post shall be extra strong steel pipe.
4. Handrails to be shop galvanized or painted in accordance with Section 09900.



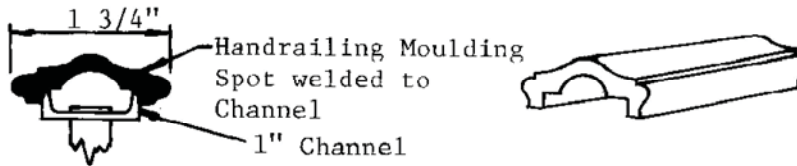
PIPE HANDRAIL

REVISION & DATE

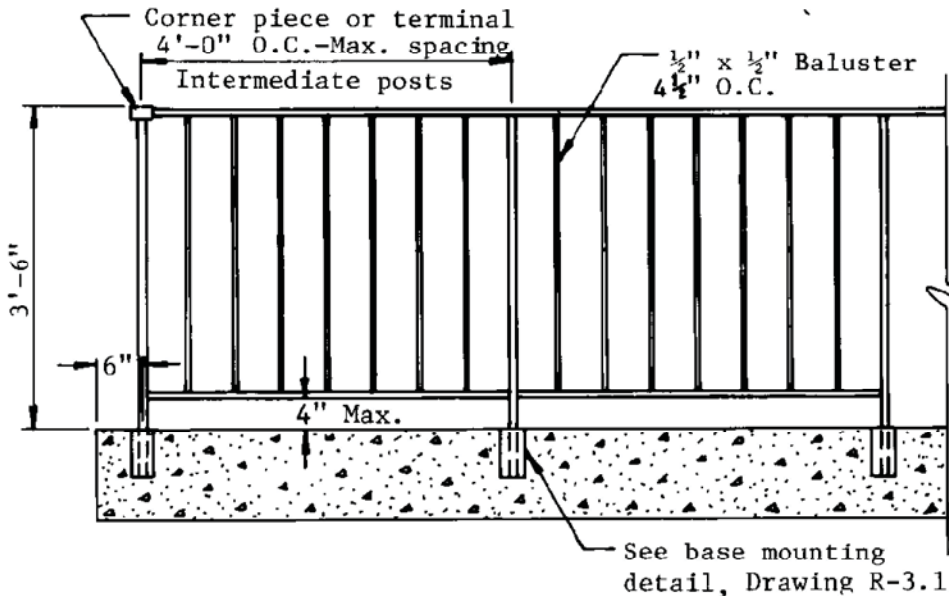
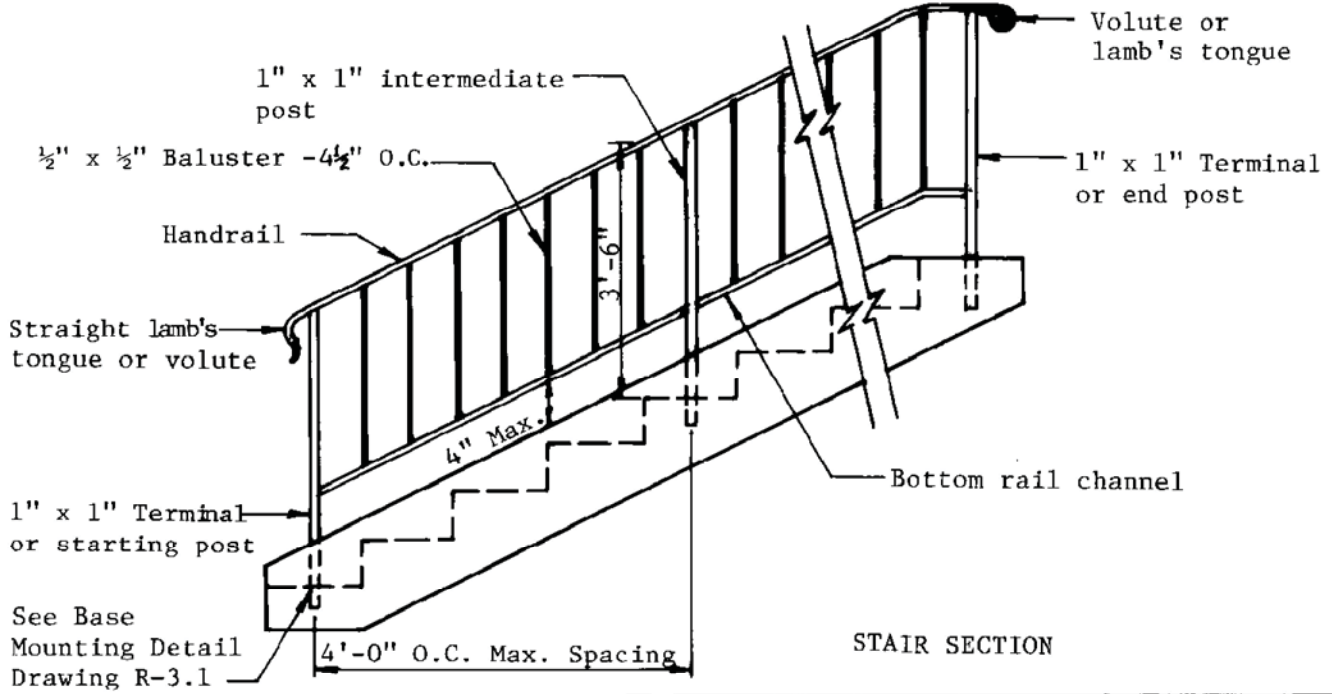


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-3.1



HANDRAIL MOULDING



SLAB OR LANDING SECTION

Handrails to be painted black in accordance with Spec. Section 09900.

ORNAMENTAL HANDRAIL

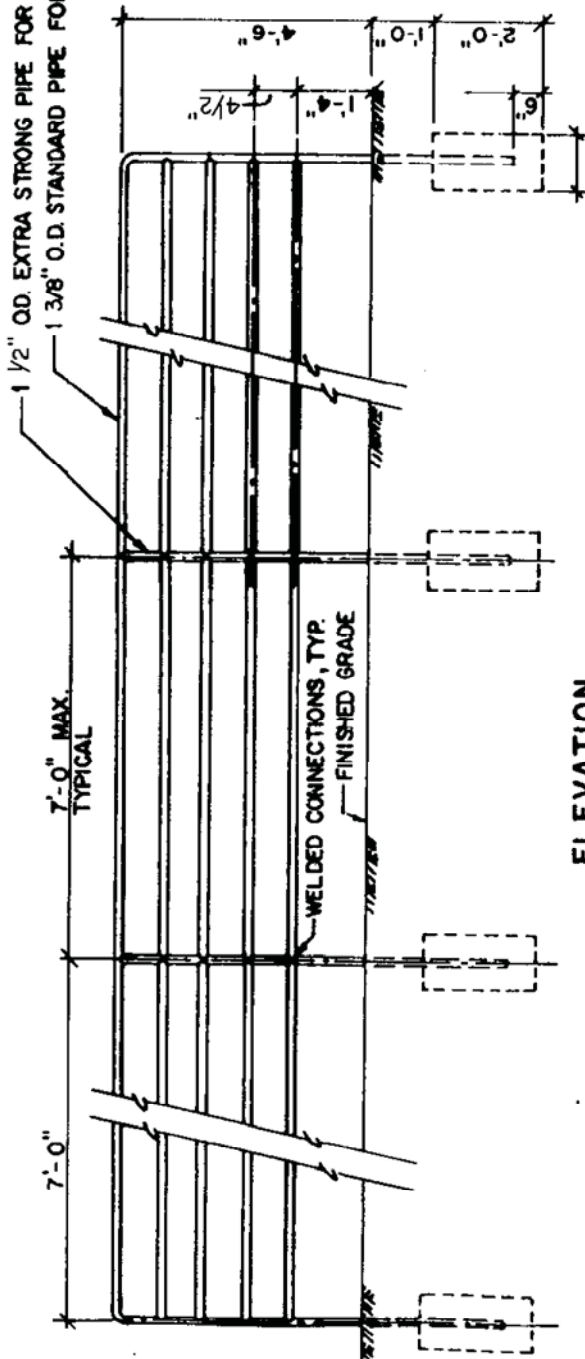
REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

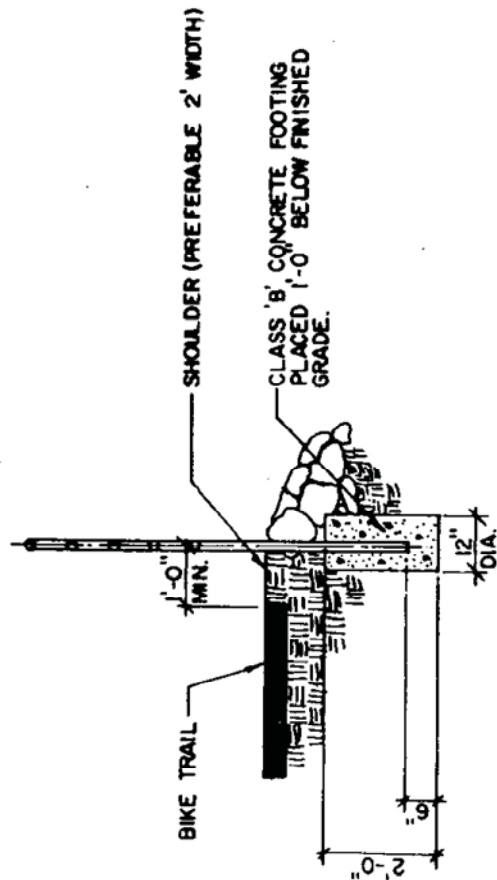
DRAWING NO.
R-3.2

1 1/2" O.D. EXTRA STRONG PIPE FOR POSTS
 1 3/8" O.D. STANDARD PIPE FOR RAILS



ELEVATION

ALL PIPES USED FOR RAILING SHALL BE PAINTED BLACK STEEL. PIPE SHALL BE WASHED WITH PAINT THINNER PRIOR TO PAINTING THE COATED WITH PRIMER EQUAL TO #1214 SILATHANE AS MFG. BY BRUNING AND FINISHED WITH BROWN GLOSS EQUAL TO #1230 SPILATHANE AS MFG. BY BRUNING. RAILING SHALL BE PAINTED PRIOR TO INSTALLATION.



TRAIL RAILING

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

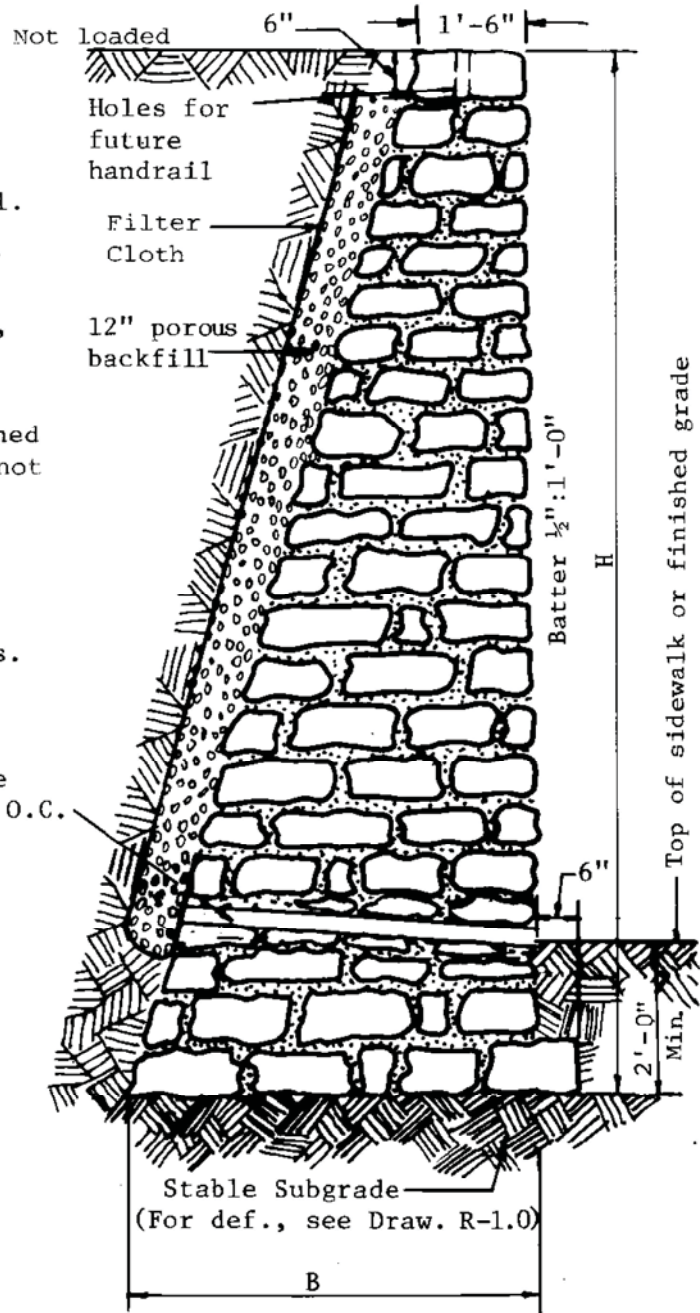
DRAWING NO.
R-3.3

NOTES:

- Holes are to be left in the top of the wall, 15" deep for future handrail. Maximum spacing for holes is 10' on centers. (6' on centers for walls constructed on a radius.) Where handrails are not installed with wall, holes are to be filled with sand and covered with 1" of cement mortar.
- Depth of wall in ground to be determined by existing field conditions. Depth not to be less than 2'-0".
- Stone to be laid in Portland Cement mortar.
- Broken concrete rubble may be used as backup material for stone rubble walls.
- Source of stone shall be as approved by the engineer.
- Filter cloth shall be Miraf 140 or equal.

4" drain pipe placed 8'-0" O.C.

Height of Wall "H" in ft.	Thickness at base "B" = .4H	Area of Section (sq. ft.)
2	1'-6"	3.50
3	1'-6"	5.00
4	1'-7½"	6.70
5	2'-0"	9.25
6	2'-4 ¾"	12.20
7	2'-9½"	15.55
8	3'-2½"	19.30
9	3'-7½"	23.45
10	4'-0"	28.00
11	4'-4 ¾"	32.95
12	4'-9½"	38.30
13	5'-2½"	44.05
14	5'-7½"	50.20
15	6'-0"	55.75



H = Height in feet
 Base = 0.4H (Min. 1'-6")
 Wt. Cu. Ft. earth = 100 lbs.
 Rubble = 150 lbs. per cu. ft.
 Angle of repose = 1½:1

**MORTAR RUBBLE RETAINING WALL
 LEVEL BACKFILL**

REVISION & DATE

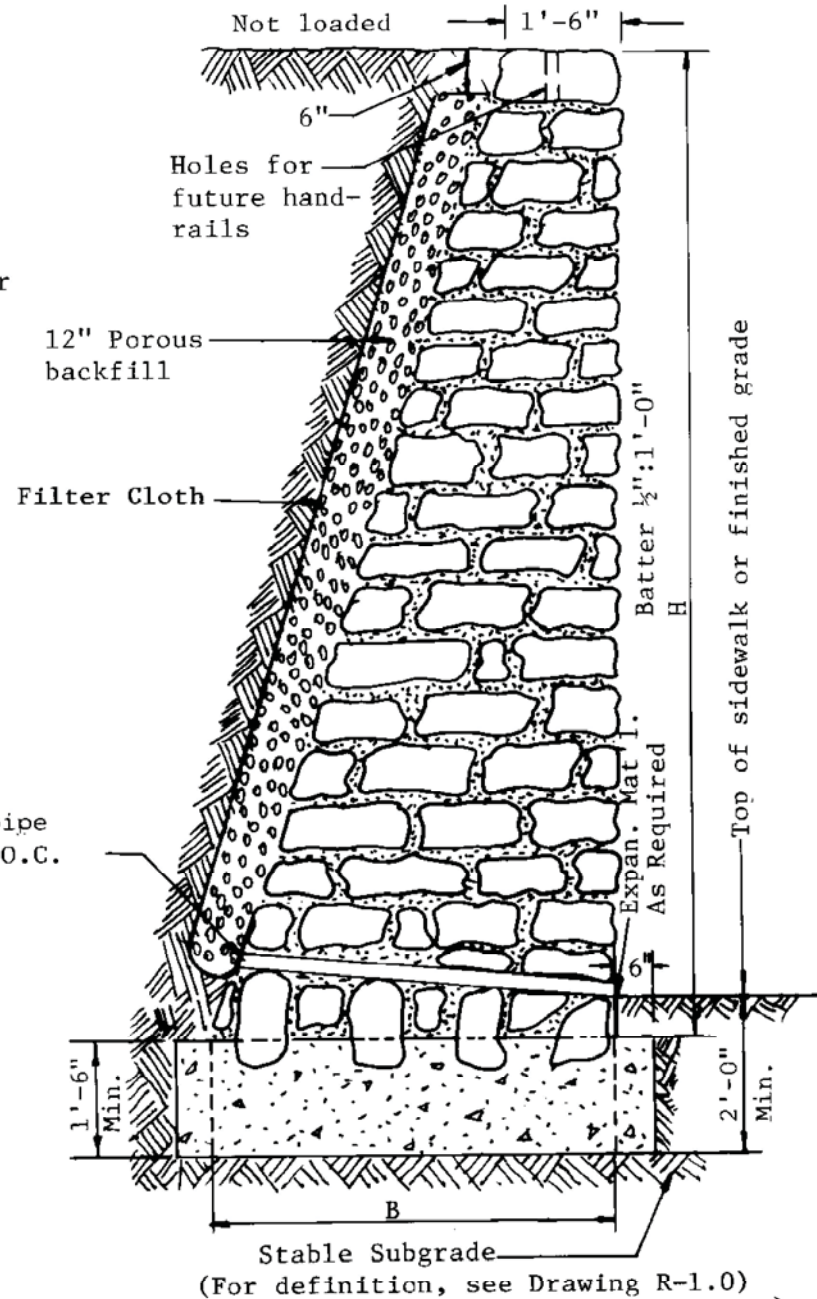


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
 R-4.0

NOTES:

1. Base may be Class B concrete.
2. Bottom course of stones shall be keyed into concrete base or tie bars, placed as directed by the engineer.
3. For additional notes and dimensions, see Drawing R-4.0.
4. Filter cloth shall be Miraf 140 or equal.



(For definition, see Drawing R-1.0)

H = Height in feet
 Base = 0.4H (Min. 1'-6")
 Wt. Cu. Ft. earth = 100 lbs.
 Rubble = 150 lbs. per cu. ft.
 Angle of Repose = 1 1/2:1

* Excluding concrete base

Height of wall "H" in ft.	Thickness at base "B" = .4H	Area of Section (sq. ft) *
2	1'-6"	3.00
3	1'-6"	4.50
4	1'-7 1/4"	6.20
5	2'-0"	8.75
6	2'-4 3/4"	11.70
7	2'-9 1/2"	15.05
8	3'-2 1/2"	18.80
9	3'-7 1/4"	22.95
10	4'-0"	27.50
11	4'-4 3/4"	32.45
12	4'-9 1/2"	37.80
13	5'-2 1/2"	43.55
14	5'-7 1/4"	49.70
15	6'-0"	55.25

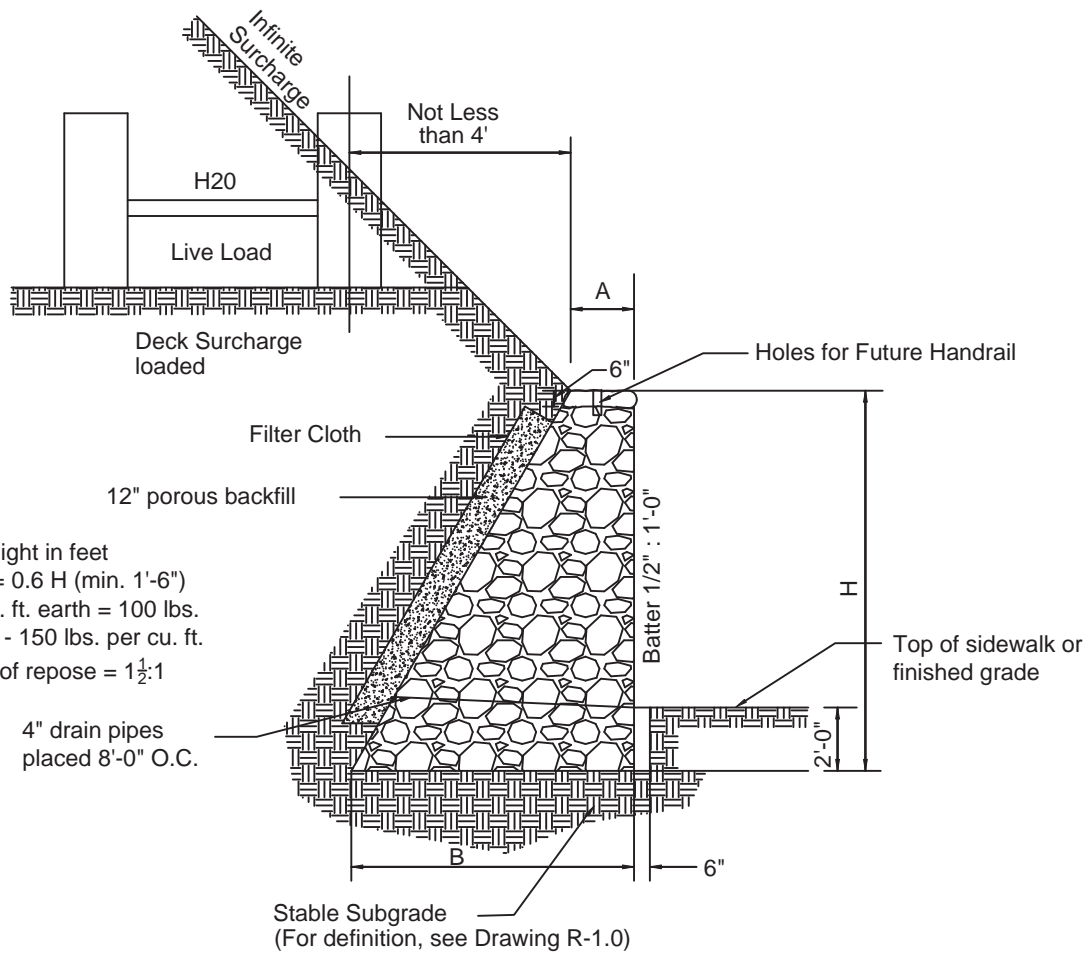
**MORTAR RUBBLE RETAINING WALL
 WITH CONCRETE BASE, LEVEL BACKFILL**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-4.1



Height of wall "H" in	Thickness at top "A" in feet	Thickness at base "B" in feet	Area of section sq. ft.
3	1' - 6"	1' - 9 5/8"	5.45
4	1' - 6"	2' - 4 7/8"	8.30
5	1' - 6"	3' - 0"	11.75
6	1' - 8"	3' - 7 1/4"	16.30
7	1' - 8"	4' - 2 3/8"	21.04
8	1' - 9"	4' - 9 5/8"	26.70
9	1' - 9"	5' - 4 7/8"	32.68
10	1' - 10"	6' - 0"	39.67
11	1' - 10"	6' - 7 1/4"	46.89
12	1' - 11"	7' - 2 3/8"	55.21
13	1' - 11"	7' - 9 5/8"	63.67
14	2' - 0"	8' - 4 7/8"	73.30
15	2' - 0"	9' - 0"	83.00

1. Filter cloth shall be Miraf 140 or equal.

For additional notes and dimensions, see Drawing R-4.0

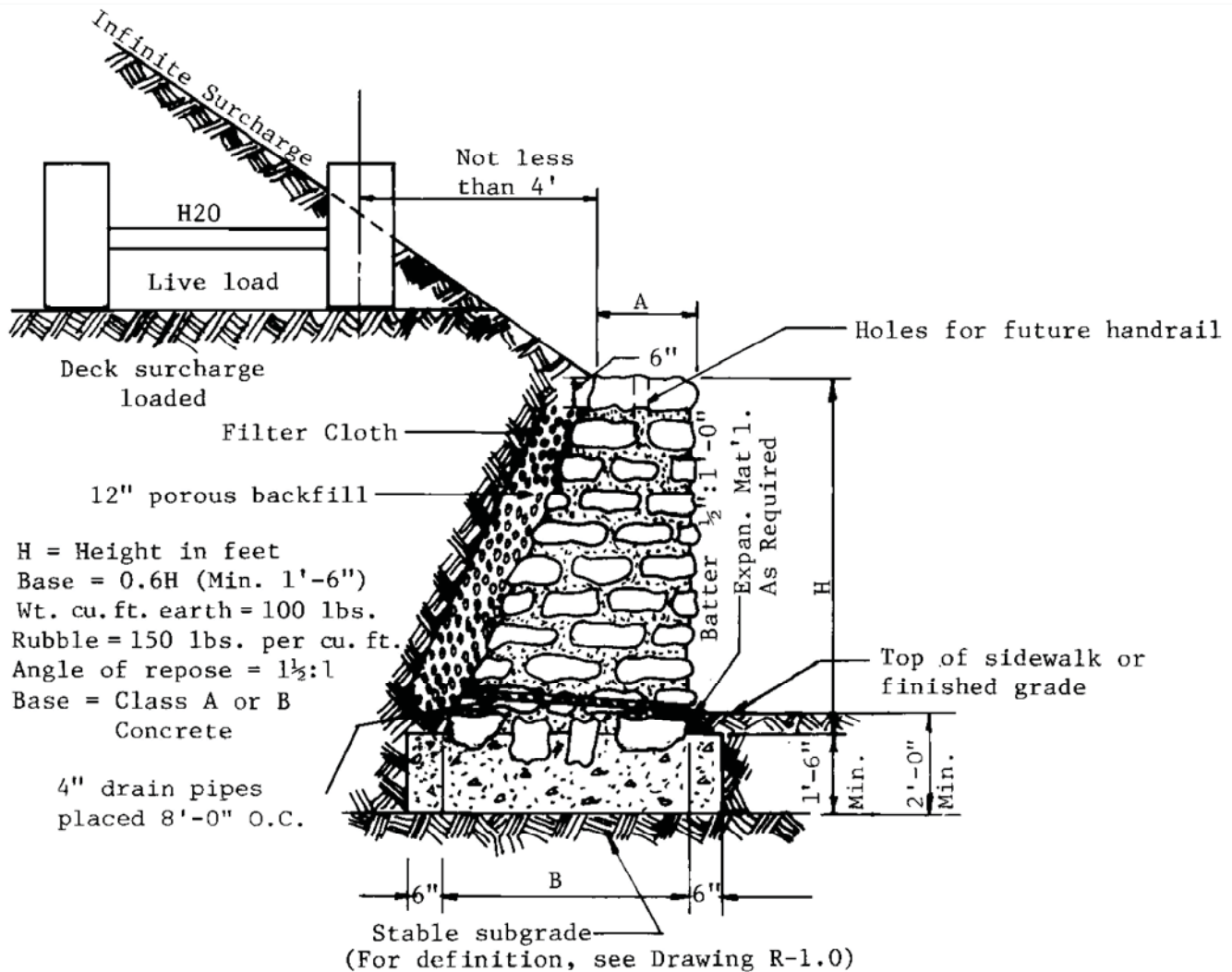
**MORTAR RUBBLE RETAINING WALL
 WITH INFINITE SURCHARGE OR DECK SURCHARGE**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
 R-4.2**



Height of wall "H" in ft.	Thickness at Top "A" in feet	Thickness at base "B" = .6H	Area of Section (sq. ft.) *
3	1'-6"	1'-9 5/8"	5.45
4	1'-6"	2'-4 7/8"	8.30
5	1'-6"	3'-0"	11.75
6	1'-8"	3'-7 1/4"	16.30
7	1'-8"	4'-2 3/8"	21.04
8	1'-9"	4'-9 5/8"	26.70
9	1'-9"	5'-4 7/8"	32.68
10	1'-10"	6'-0"	39.67
11	1'-10"	6'-7 1/4"	46.89
12	1'-11"	7'-2 3/8"	55.21
13	1'-11"	7'-9 5/8"	63.67
14	2'-0"	8'-4 7/8"	73.30
15	2'-0"	9'-0"	83.00

*Excluding concrete Base

NOTES:

1. Bottom course of stones shall be keyed into concrete base or tie bars, placed as directed by the engineer.
2. For additional notes and dimensions, see Drawing R-4.1.
3. Filter cloth shall be Miraf 140 or equal.

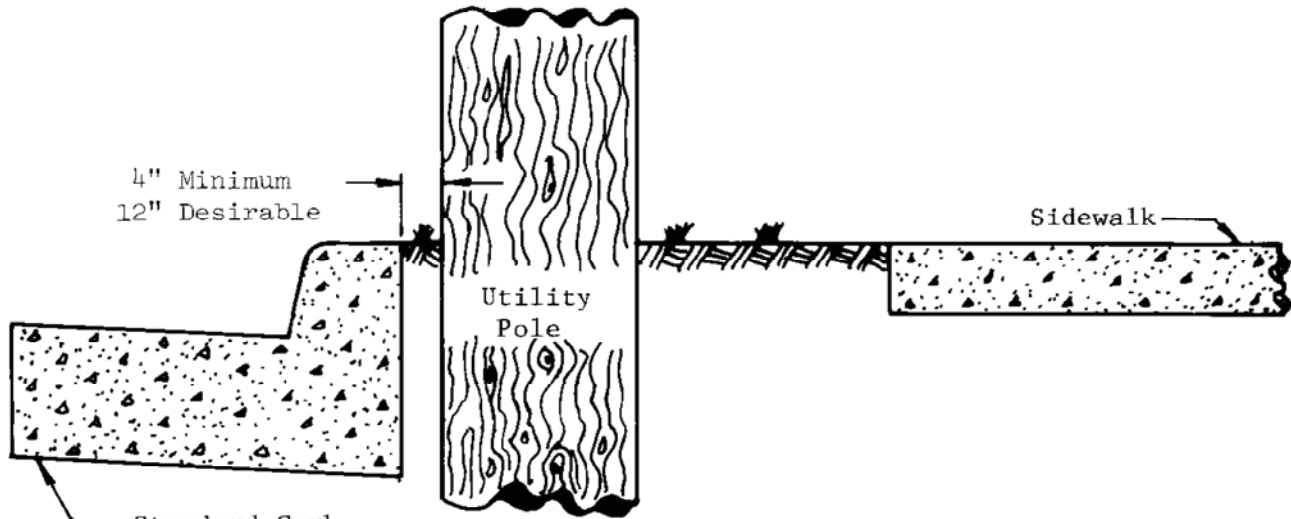
**MORTAR RUBBLE RETAINING WALL
 WITH CONCRTE BASE
 AND INFINIT SURCHARGE OR DECK SURCHARGE**

REVISION & DATE

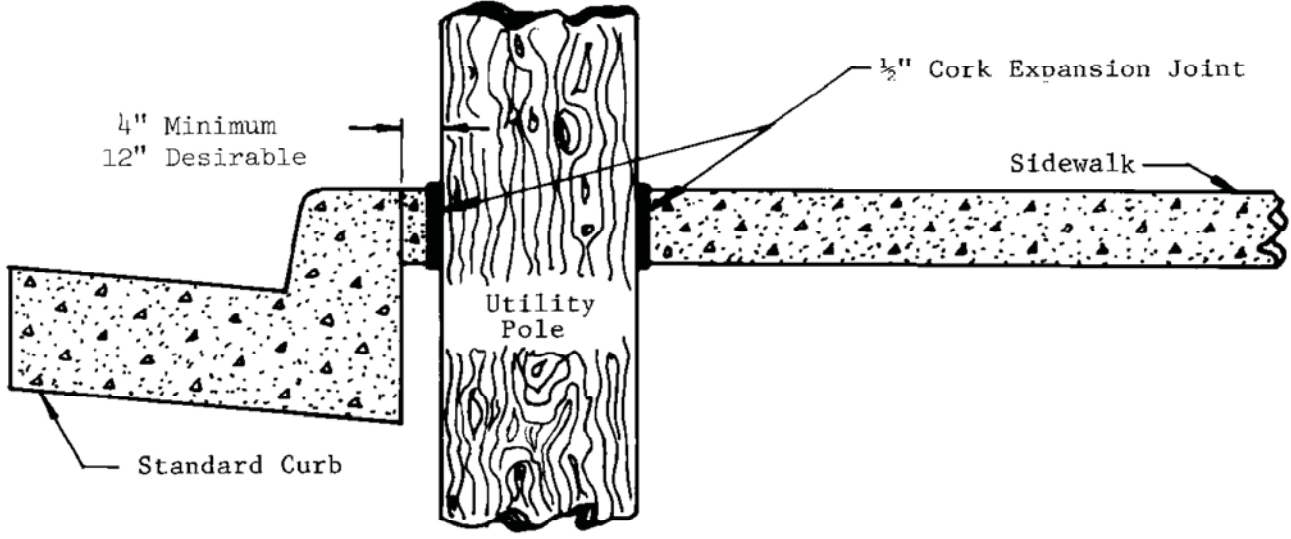


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-4.3




DETAIL
(UTILITY STRIP)



DETAIL
(NO UTILITY STRIP)

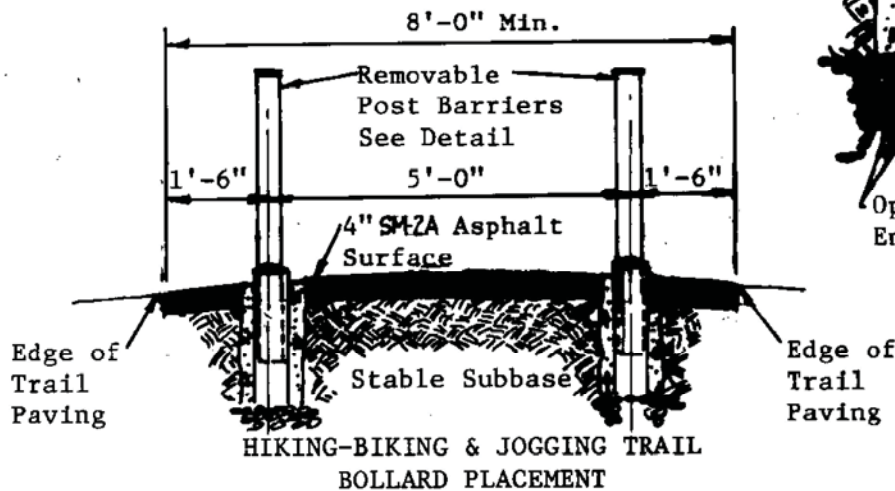
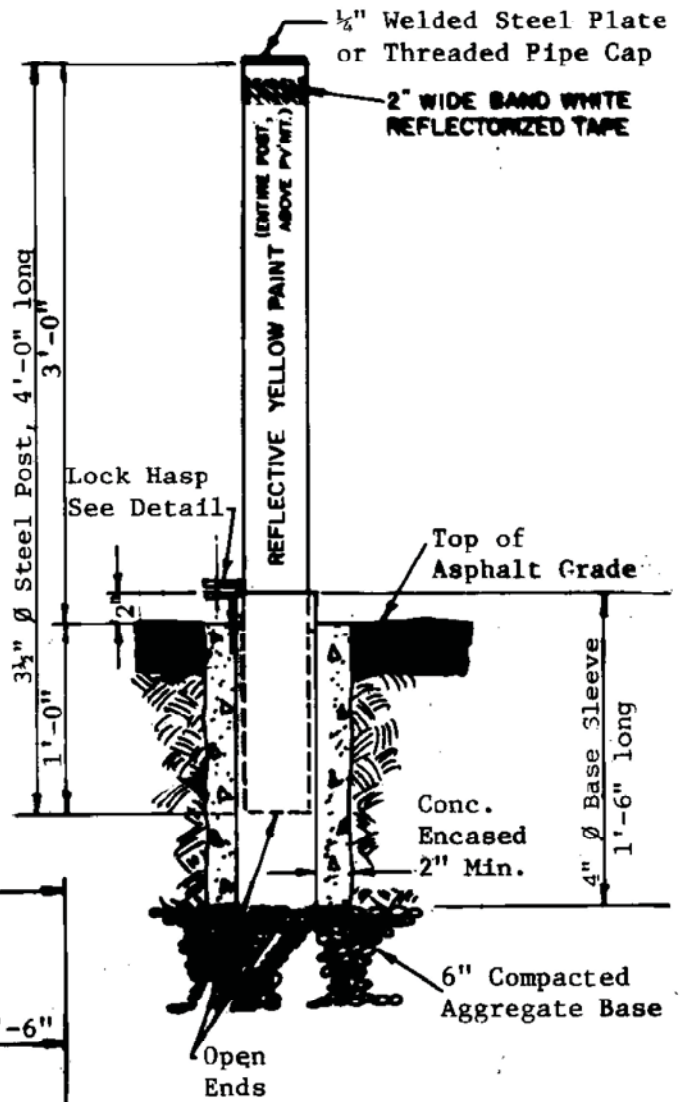
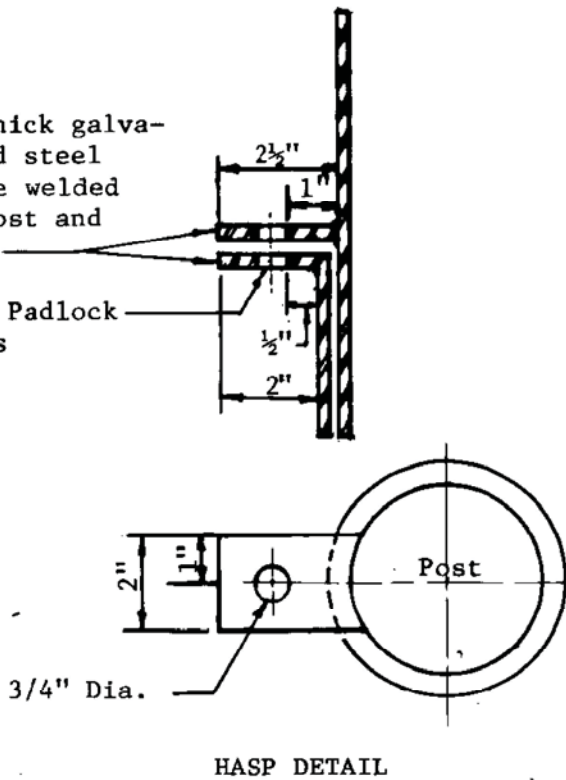
NOTES:

- 1. When pole is to be located in sidewalk adjacent to curb, the sidewalk shall be a minimum of 4'-6" wide.
- 2. When concrete sidewalk is poured around guy wire, the guy wire shall be sleeved through sidewalk.

UTILITY POLE LOCATION		
		REVISION & DATE
	ARLINGTON COUNTY, VIRGINIA DEPARTMENT OF ENVIRONMENTAL SERVICES	
	DRAWING NO. R-5.0	

1/2" Thick galvanized steel plate welded to post and base

3/4" Padlock Holes



NOTES:

1. Post and base sleeve shall be galvanized steel conduit schedule 40.
2. Lock hasp shall be oriented uptrail or downtrail but not right or left.
3. All welds and burrs shall be ground as necessary to eliminate any sharp edges.
4. Clean and paint outside surfaces with paint that is approved for Galvanized surfaces. Paint Dark Green with top 18" White.
5. Pavement thickness may be reduced to 2" of SM-2A when a minimum of 6" of compacted aggregate base is provided. Aggregate base shall be required when unsuitable subbase is encountered or when subgrade drainage is a problem.

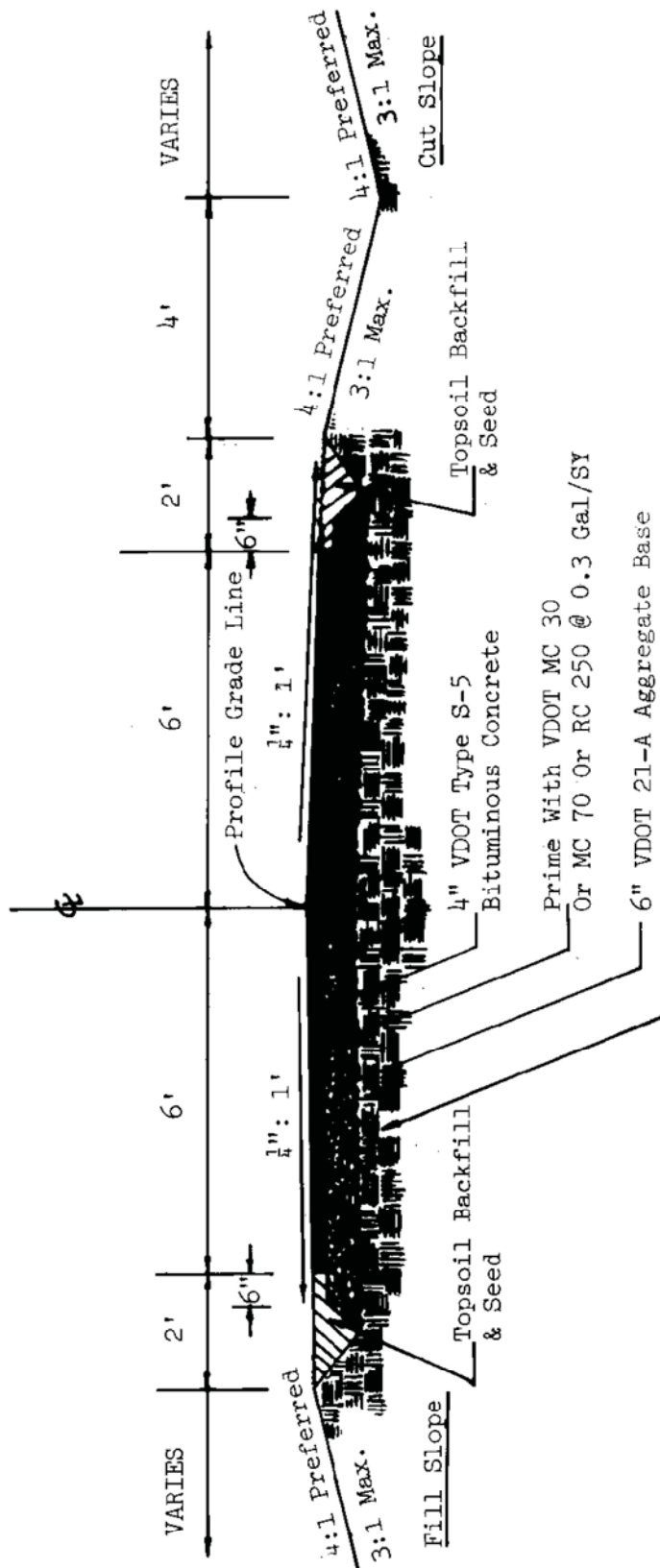
**HIKING - BIKING - JOGGING TRAIL DETAILS
REMOVABLE POST BARRIER**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-6.0



Subgrade Note:
 Thoroughly Compact The Subgrade To
 95% Maximum Density Per AASHTO T-99

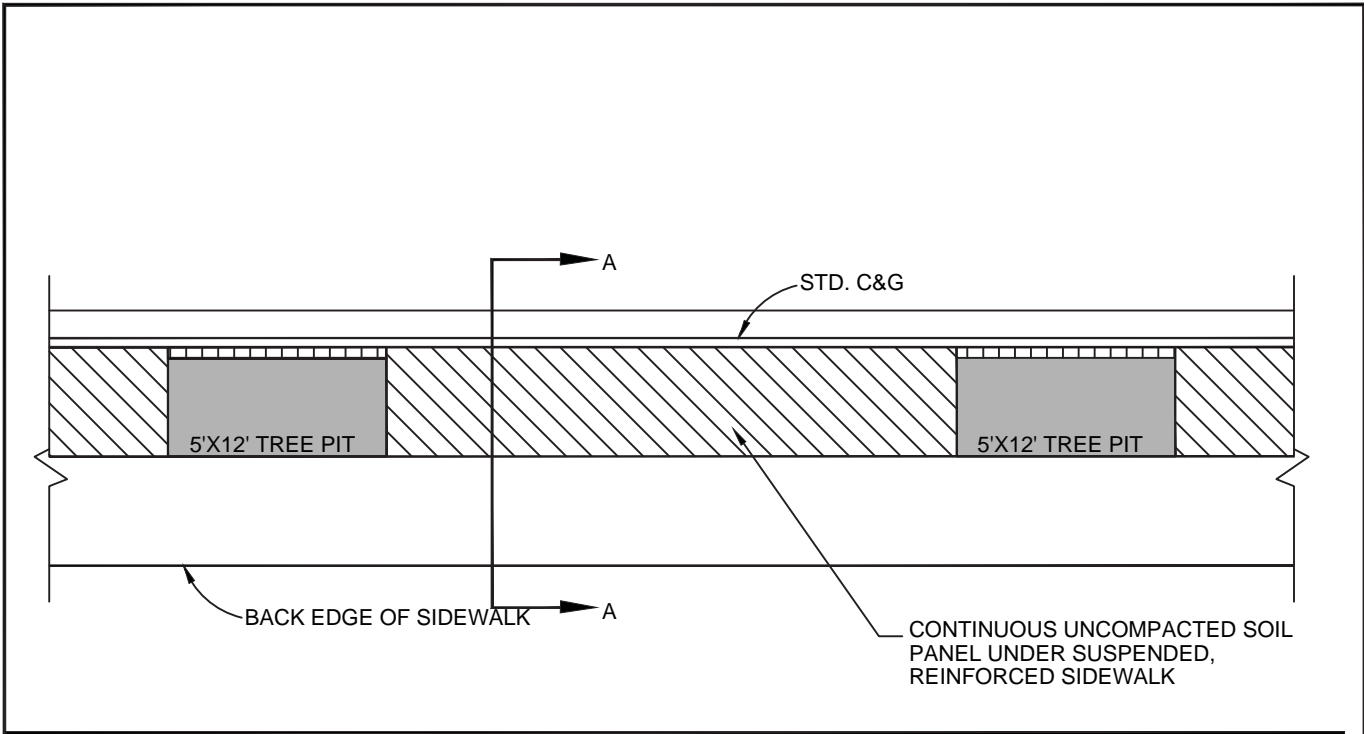
**TYPICAL SECTION
 HIKING - BIKING - JOGGING TRAIL**

REVISION & DATE	

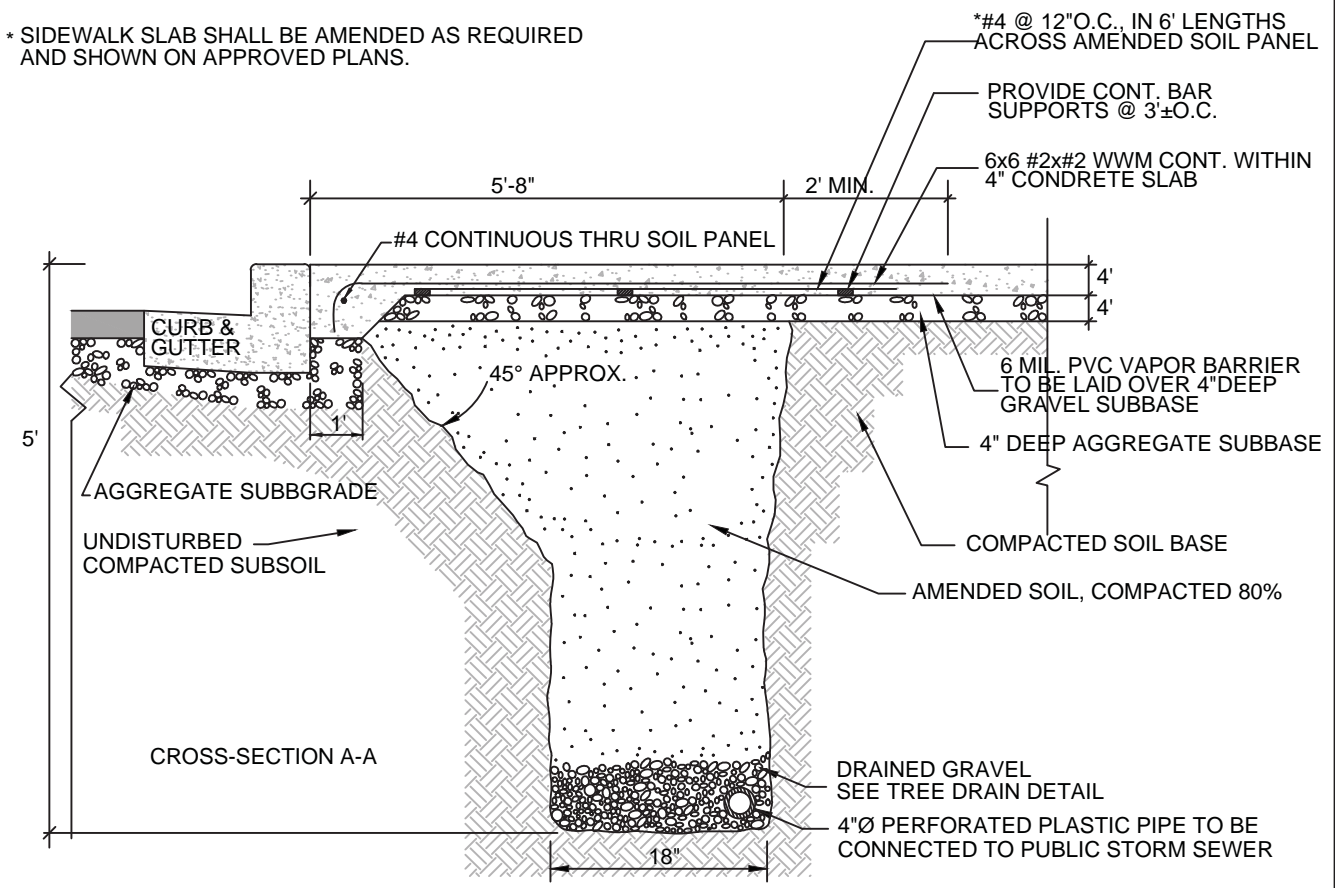


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-6.1



* SIDEWALK SLAB SHALL BE AMENDED AS REQUIRED AND SHOWN ON APPROVED PLANS.



CONTINUOUS SOIL PANEL

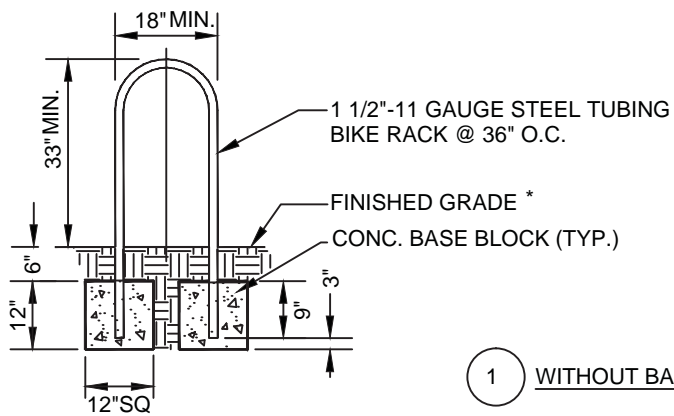
Dwg. No. 07/11/2013

REVISION & DATE



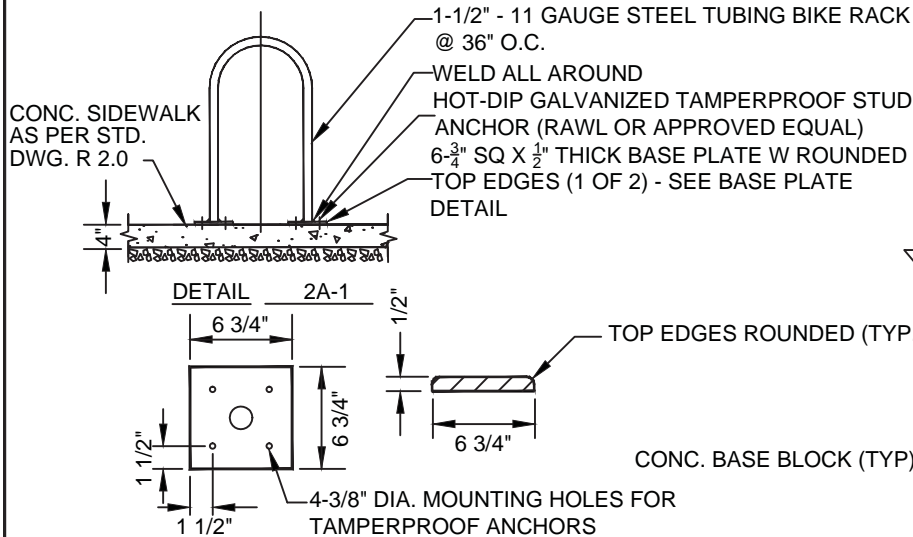
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-7.0



1 WITHOUT BASE PLATE

- * FINISHED GRADE SHALL BE:
- a.) INTERLOCKING CONC. OR BRICK PAVERS AS PER STD. DWG. R-2.1, OR
 - b.) CONC. SIDEWALK AS PER STD. DWG. R-2.0, OR
 - c.) ASPHALT PAVEMENT/SIDEWALK, OR
 - d.) FINISHED GRAVEL, OR
 - e.) UNPAVED GRADE/GRASS STRIP

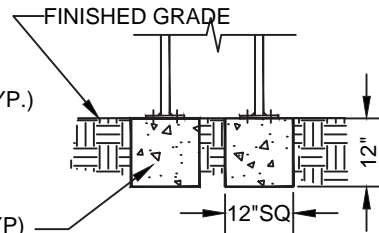


BASE PLATE DETAIL

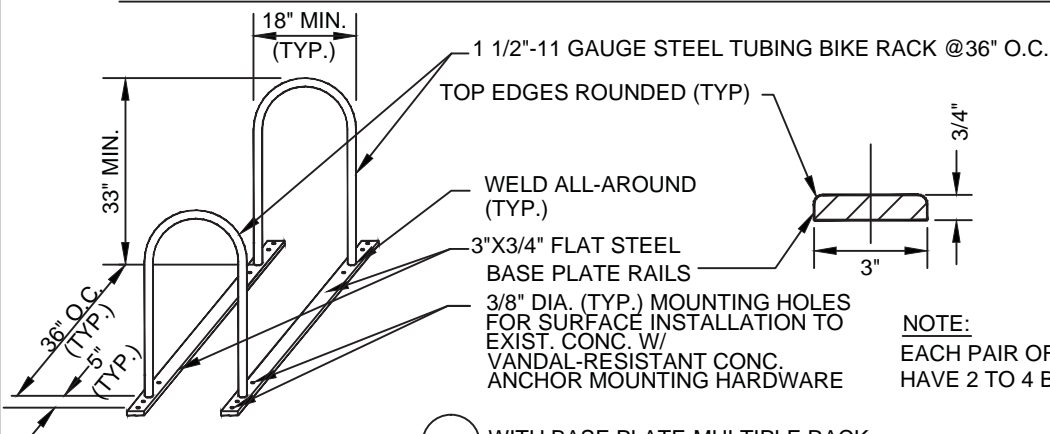
2A WITH BASE PLATE-INDIVIDUAL RACK (FOR OTHER DETAILS SEE 1 ABOVE)



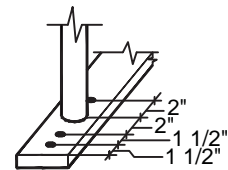
TAMPERPROOF RAWL STUD



DETAIL 2A-2



2B WITH BASE PLATE-MULTIPLE RACK



MOUNTING HOLES DETAIL

NOTE:
EACH PAIR OF BASE PLATE RAILS MAY HAVE 2 TO 4 BIKE RACKS

- NOTES:
1. ALL CONC. SHALL BE TYPE A-3 (V.D.O.T.)
 2. ALL RACKS & BASE PLATES SHALL BE HOT-DIP GALVANIZED OR FINISHED WITH GLOSS BLACK POLYESTER POWDER COAT BEFORE MOUNTING IN PLACE

BIKE RACK

Rack spacing 07/11/2013

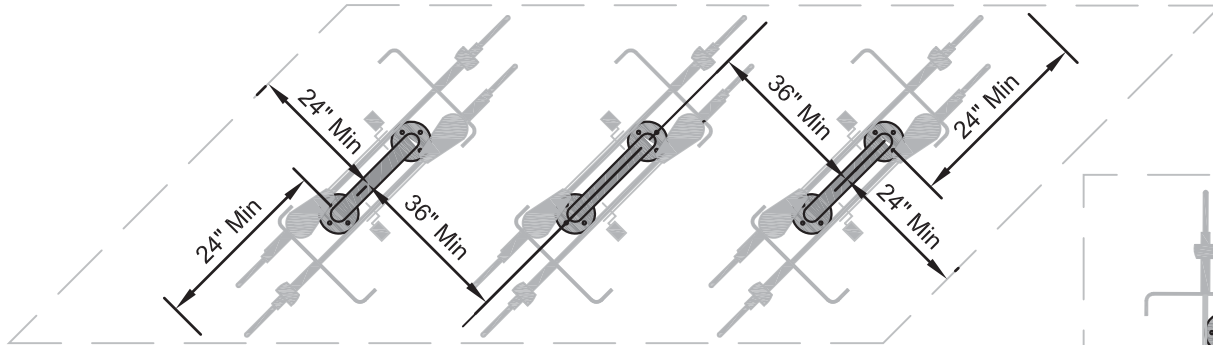
REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

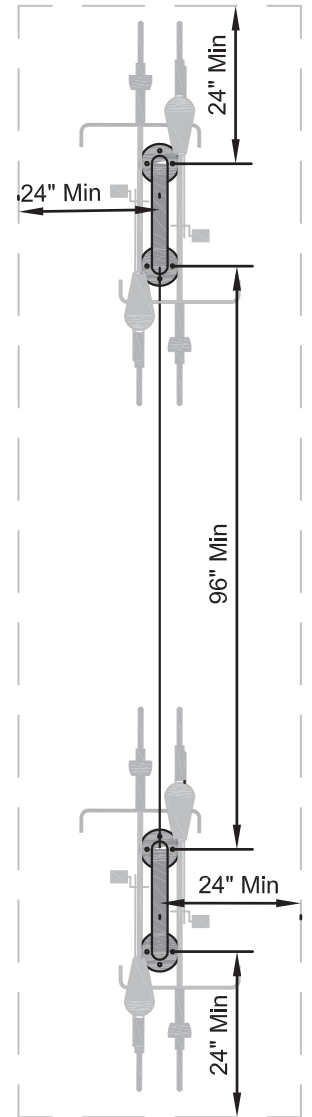
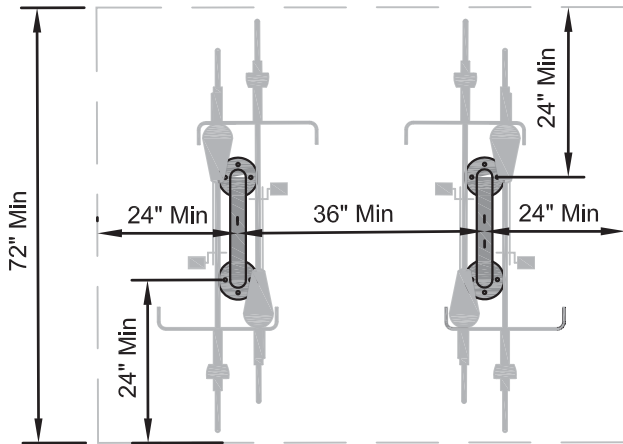
DRAWING NO.
R-8.0

ANGLED



Minimum Bike Rack Clear Zone: free of any obstruction, and outside pedestrian or vehicle pathways.

SIDE-BY-SIDE



END-TO-END

BIKE RACK LAYOUT

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-8.1

1. All cast-in-place concrete shall be VDOT Class "A3", or VDOT "A4" if precast.
2. Catch basins and Manholes deeper than 4 feet shall have manhole steps placed 1'-4" apart. See Drawing M-2.0.
3. The concrete gutter for the full width shall be considered as being part of the catch basin. This includes length between outside wall faces.
4. For catch basins less than 6' deep, 6" concrete blocks may be used. For depths from 6' to 12' the wall shall be 8" thick and for depths more than 12' the wall thickness shall be 12". See Drawing D-2.0.
5. Invert to be paved to the shape of the pipe and to the spring line except where inlet and outlet pipe make an angle with each other in which case paving shall be to the crown of the outlet pipe. Then from the spring line or the crown, whichever is the case, the paving is to be extended upward at a 45° angle to meet the structure wall. See Drawing D-2.1.
- △ 6. Place three 3" drain pipe weep holes in all low points and in other locations as required by the Engineer. All drain pipes shall be placed within 2' below top of curb.
- △ 7. 6" x 4" x 3/8" angle iron shall extend the full length of each catch basin. Angle to be anchored by 12" - #4 deformed hook bars, welded to angle at maximum 3' spacing on centers. See detail on Drawing D-1.2.
8. Angle iron and standard frame and cover to be painted with black asphaltic paint.
9. Special design may be required for pipe sizes greater than 36".
10. Support bars for extended throats are to be #8 bar 12 3/4" long, welded to angle iron and 3" x 3" x 1/4" base plate, detailed and placed as shown on Dwg. D-1.3 & 1.4.
11. 2 - #4 bars - 6' long shall be placed in each end of throat. See detail on Drawing D-1.2. These bars shall extend a minimum of 3' beyond the edge of the catch basin and 3' into the throat. Bend as required.
12. When possible, manhole covers shall be positioned over the outgoing pipe.
13. A construction joint shall be provided in the gutter at each end of each catch basin.
14. When masonry construction is used, catch basins and manholes shall be pargeted on the inside using portland cement mortar. Parget to be 1/2" thick.
15. Precast manholes and catch basins shall be placed on a 6" minimum gravel bedding, extending 6" all around outside of the structured footprint and resting on undisturbed earth. Cast-in-place concrete bases may be poured directly onto undisturbed soil if it has been thoroughly compacted and determined to be adequate subgrade by the Engineer.

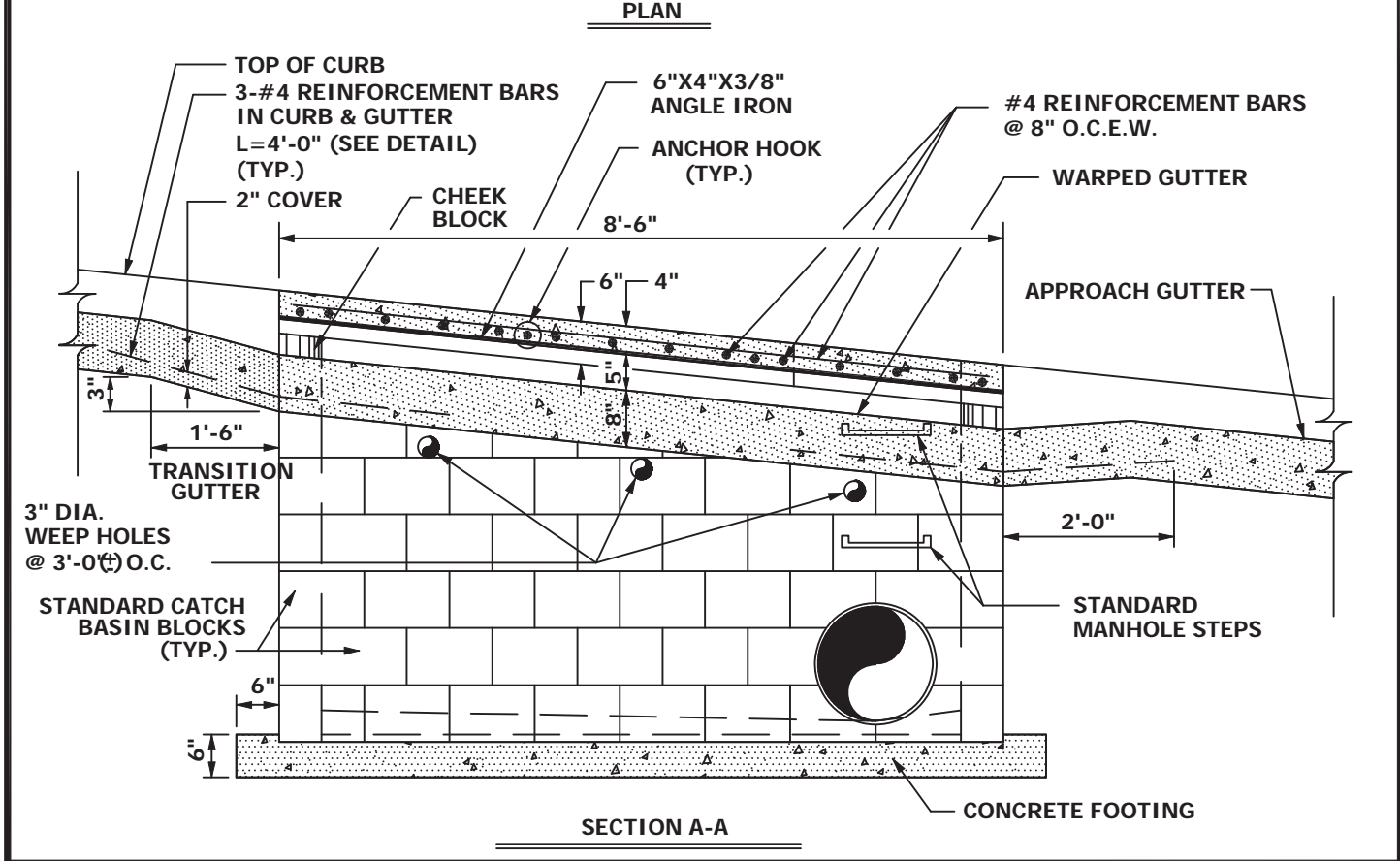
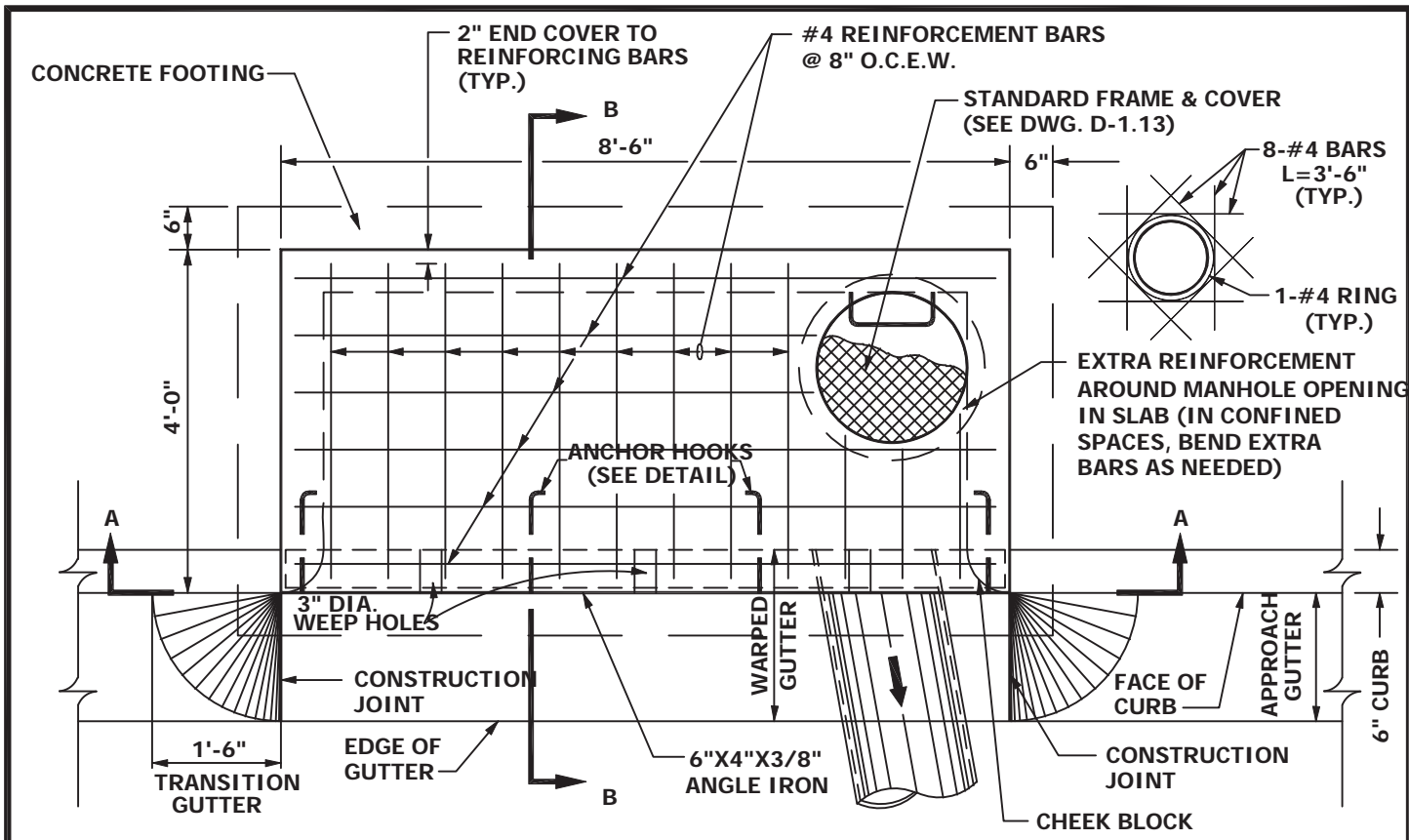
GENERAL NOTES FOR CATCH BASINS

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.1



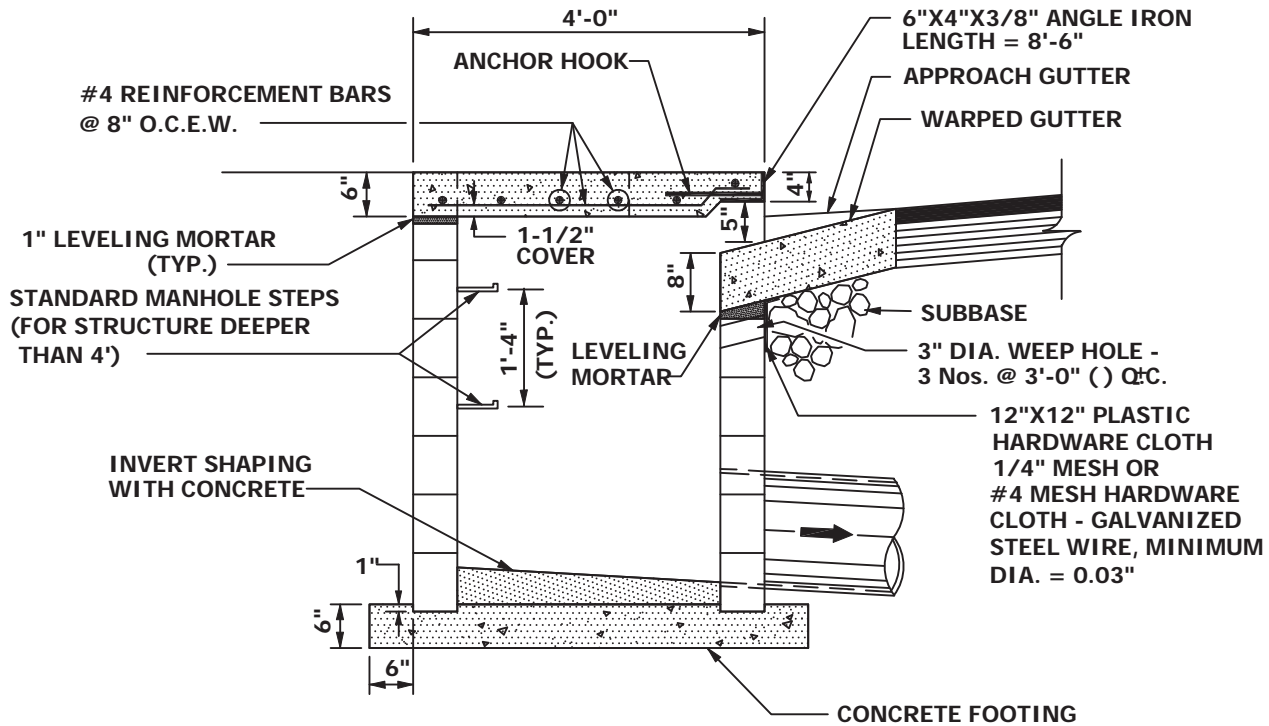
STANDARD CATCH BASIN, CB-2

REVISION & DATE	

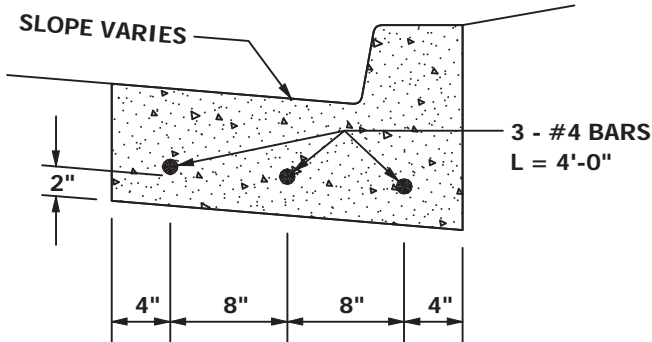


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

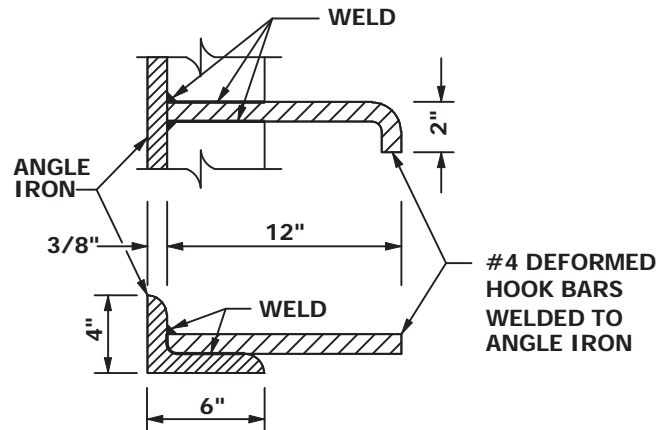
DRAWING NO.
D-1.2
(1 OF 2)



SECTION B-B



DETAIL OF REINFORCEMENT BARS IN CURB & GUTTER



DETAIL OF ANCHOR HOOK

NOTES :

1. THE CROSS SLOPE ON THE TOP SLAB SHALL MATCH SLOPE ON THE ADJOINING EXISTING OR PROPOSED SIDEWALK.
2. ENSURE THE PROVISION OF AN EXPANSION JOINT THROUGH THE CURB & GUTTER AND SIDEWALK WITHIN 5'-0" MINIMUM TO 10'-0" MAXIMUM FROM THE OUTER FACE OF THE CATCH BASIN, ONE ON EACH SIDE (TOTAL 2 JOINTS).
3. FOR GENERAL NOTES RELATED TO STANDARD CATCH BASINS, SEE DRAWING NO. D-1.1.

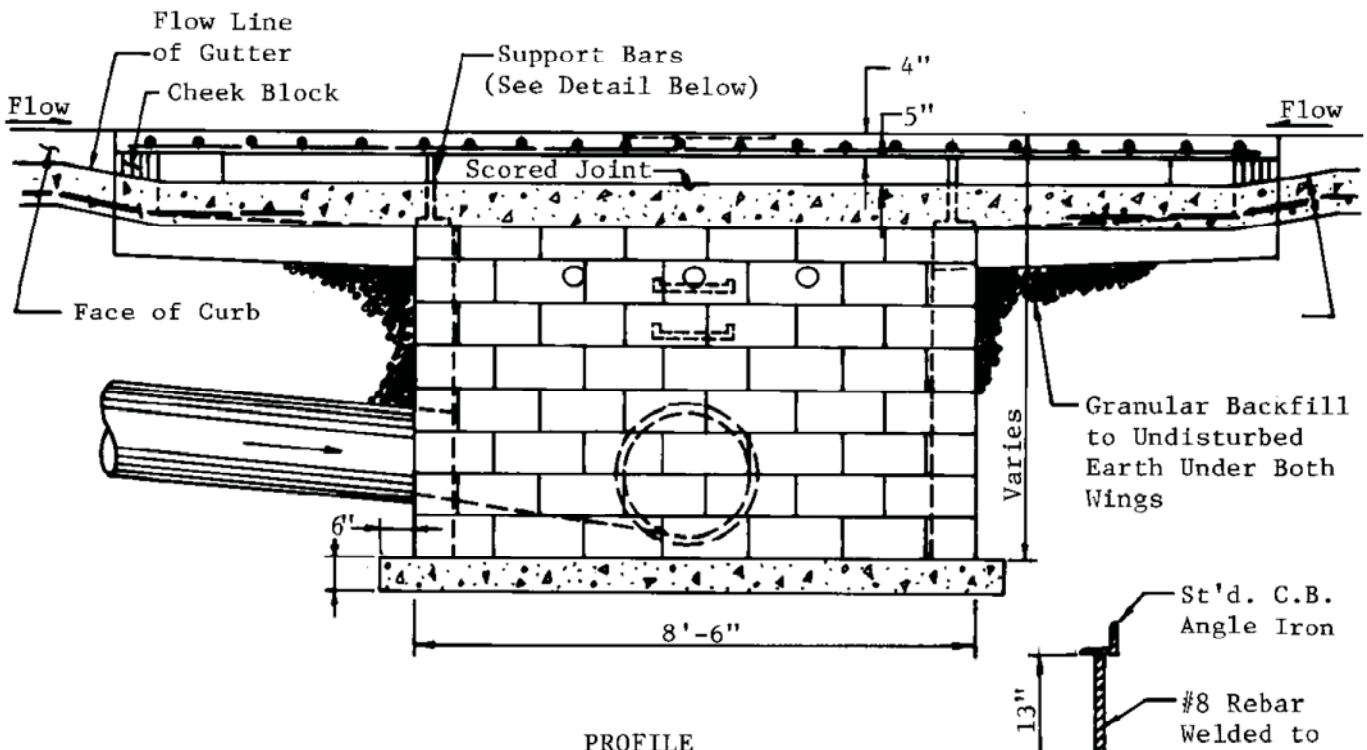
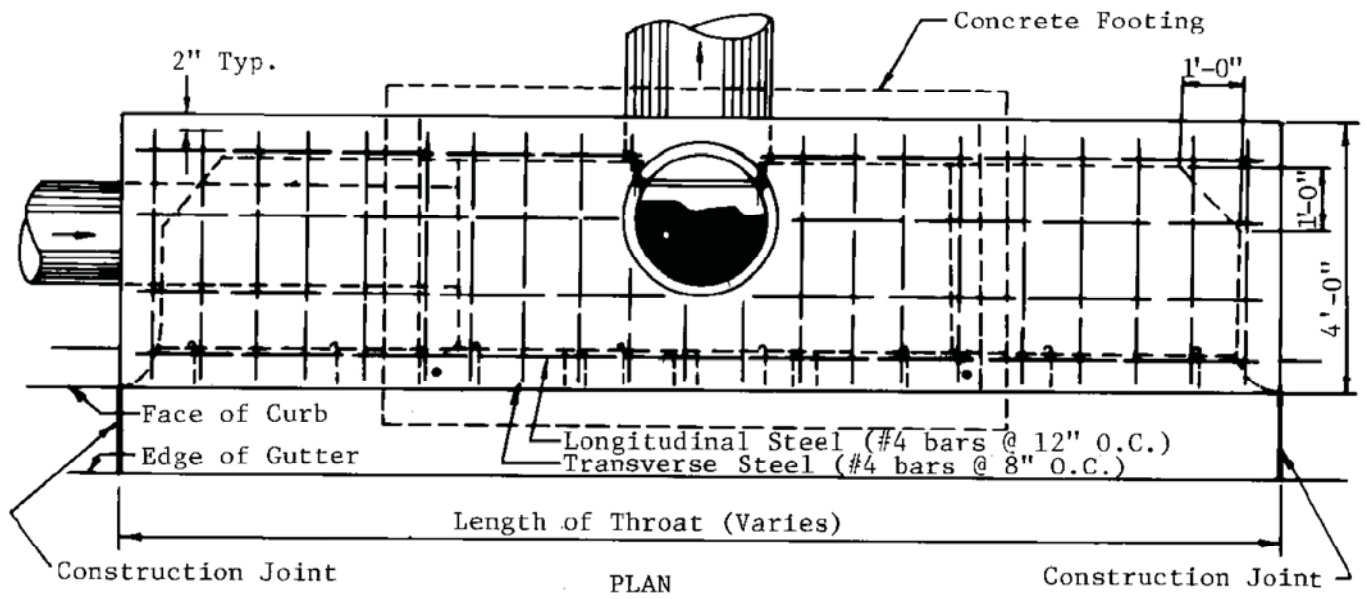
STANDARD CATCH BASIN, CB-2

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.2
(2 OF 2)



NOTES:

1. Length of throat varies, as shown on approved plans, from 8'-6" to 16'-0".
2. For additional notes and details, see Drawings D-1.1 and D-1.2.
3. Provide 2% minimum slope on shelf inside each extended throat (see Drawing D-1.4 for throat shelf detail).

DETAIL FOR SUPPORT BARS

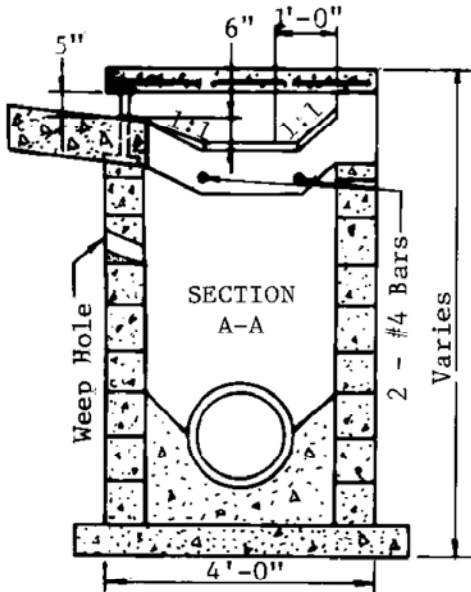
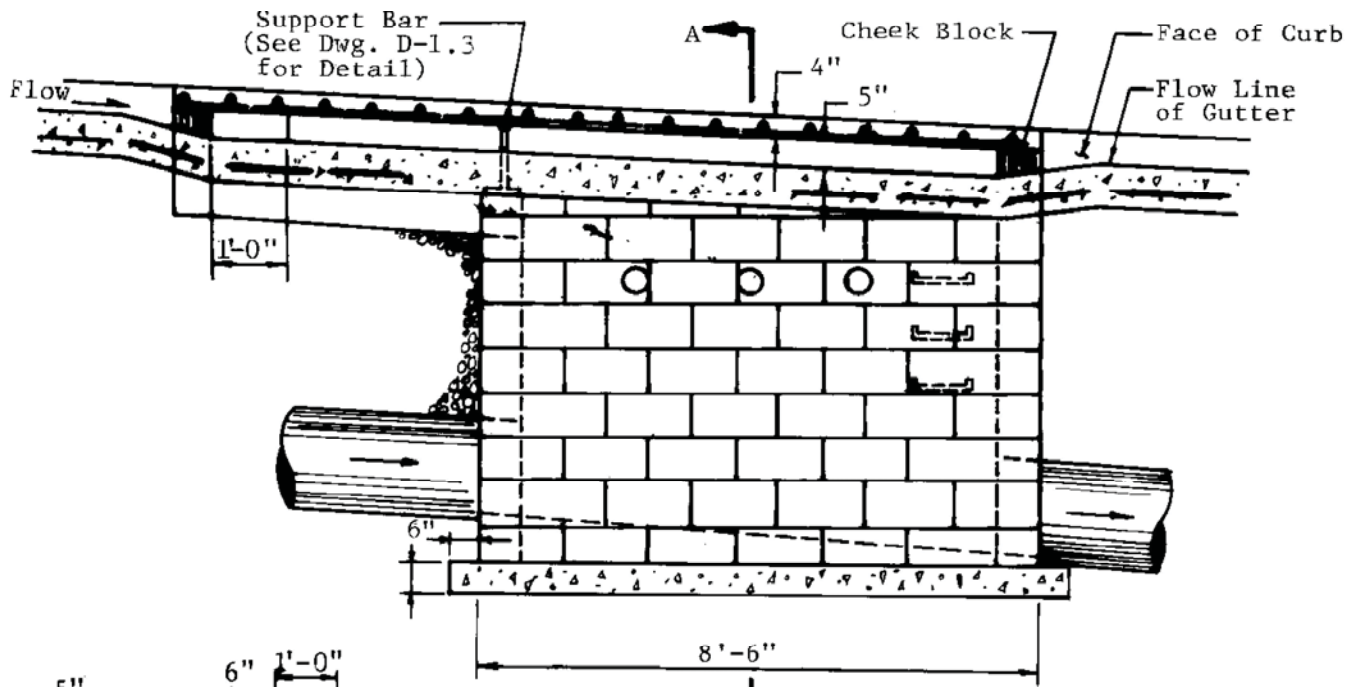
**CATCH BASIN WITH EXTENDED THROATS
FOR SAGS, CB-2A**

REVISION & DATE	



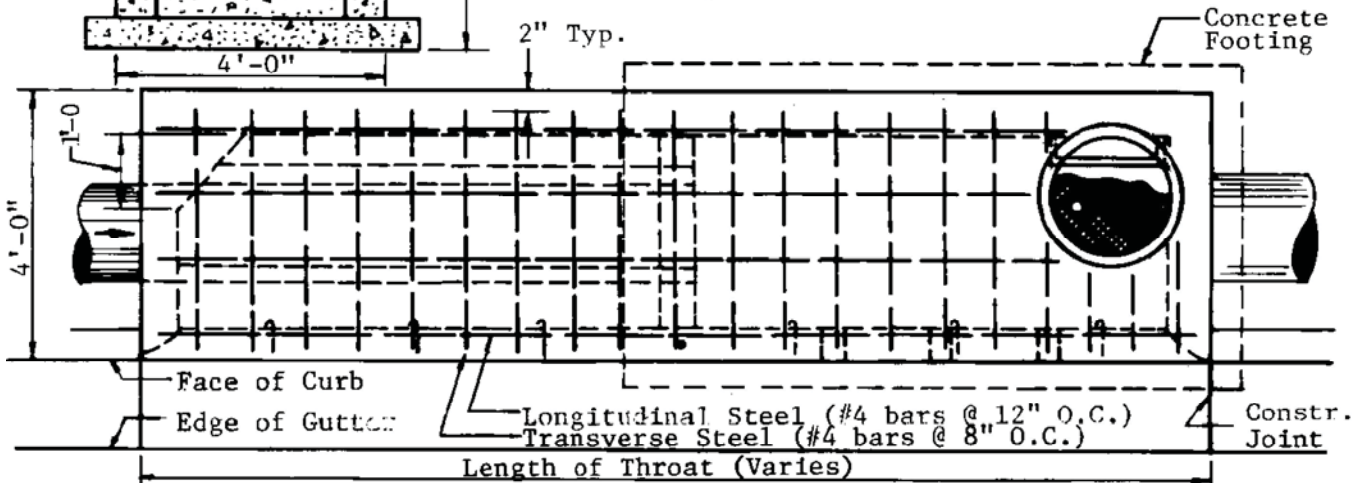
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.3



NOTES:

1. Catch basin is to be oriented so that the extended throat is located uphill. Provide 2% minimum slope on shelf inside extended throat.
2. Length of throat varies as shown on approved plans from 8'-6" to 16'-0".
3. For additional notes and details, see Dwg. D-1.1, D-1.2 and D-1.3.



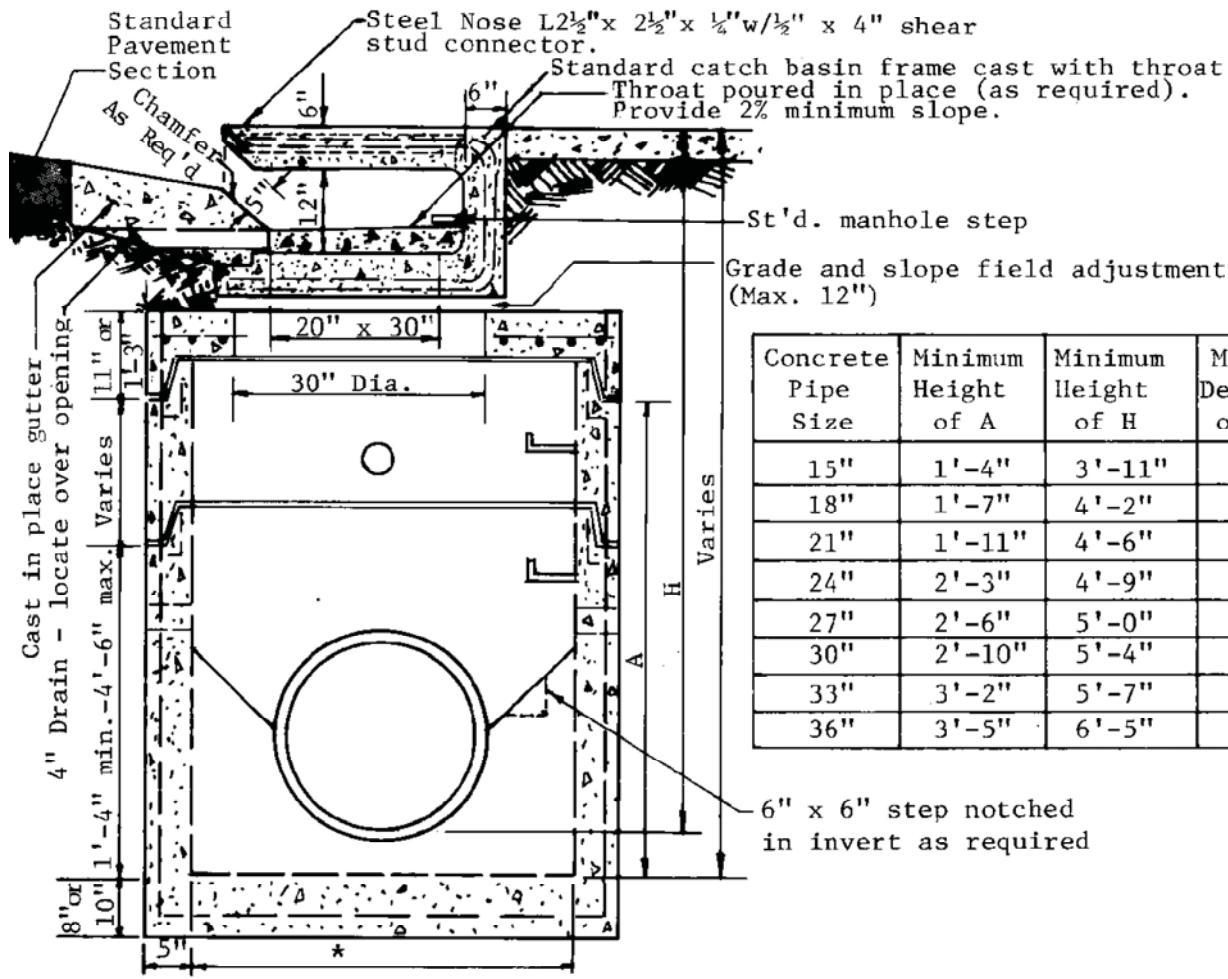
**CATCH BASIN WITH EXTENDED THROATS
FOR SLOPES, CB-2B**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.4



Concrete Pipe Size	Minimum Height of A	Minimum Height of H	Maximum Deflection of Pipe
15"	1'-4"	3'-11"	120°
18"	1'-7"	4'-2"	115°
21"	1'-11"	4'-6"	105°
24"	2'-3"	4'-9"	90°
27"	2'-6"	5'-0"	80°
30"	2'-10"	5'-4"	70°
33"	3'-2"	5'-7"	60°
36"	3'-5"	6'-5"	50°

* 4'-0" dia. for 15" to 24" pipe
 5'-0" dia. for 27" to 30" pipe
 6'-0" dia. for 33" to 36" pipe

CROSS SECTION

NOTES:

1. Precast catch basins shall meet all requirements of ASTM C-478 or AASHTO M199.
2. Reinforcing shall meet ASTM A-615 for bars and A-497 for welded wire fabric.
3. Two lift holes for handling purposes to be provided 180° apart or approved equal for each unit.
4. Flattop section may be specified with circular hole when major adjustment is necessary in alignment. See Drawing D-1.6.
5. Pipe opening shall include 4" minimum clearance and 8" maximum clearance.
6. Precast base sections shall be 48" diameter for pipe sizes through 36".
7. Concrete to be Class "A4". Joints to be tongue and groove and/or O-ring.
8. For catch basins on slopes the extended throat shall be to the uphill side on a minimum slope of 2%, and for sags the throat is to be extended equally to both sides with basin situated in the middle. Length of throat, L, varies from 8'-6" to 20'-0" as specified.
9. Dimensions shown are minimum. Actual dimensions may vary with manufacturer.
10. Step for handhold to be provided in back of throat directly over access opening.
11. See drawing D-1.7 and D-1.8 for additional notes and details.

PRECAST CATCH BASIN, PCB-2

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
 D-1.5

Direction of Flow

L 2½" x 2½" x ¼"
with ½" hooks

St'd. catch basin frame

2% Minimum slope in throat

Field adjustment

Gravel backfill to undisturbed earth under wing when applicable.

30" Dia.

Flattop Slab

Manhole steps

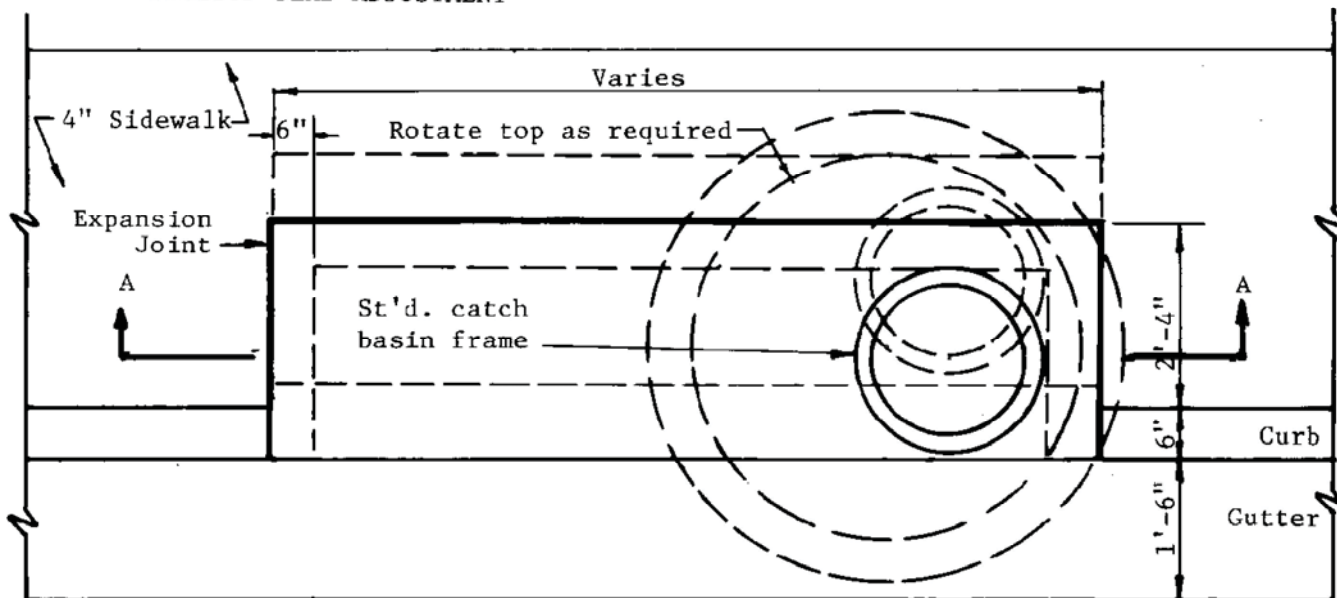
Rotate for adjustment

15"

Invert poured in field

SECTION A-A

FLATTOP SLAB ADJUSTMENT



NOTES:

PLAN

1. This precast catch basin is for use on slopes only. When a precast catch basin is to be used in sags, the throat shall be extended equally to the left and right with the sump located in the middle. For additional notes, see Dwg. D-1.5.

DETAILS FOR PRECAST CATCH BASIN, PCB-2

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.6

REFER TO VDOT STD DI-1

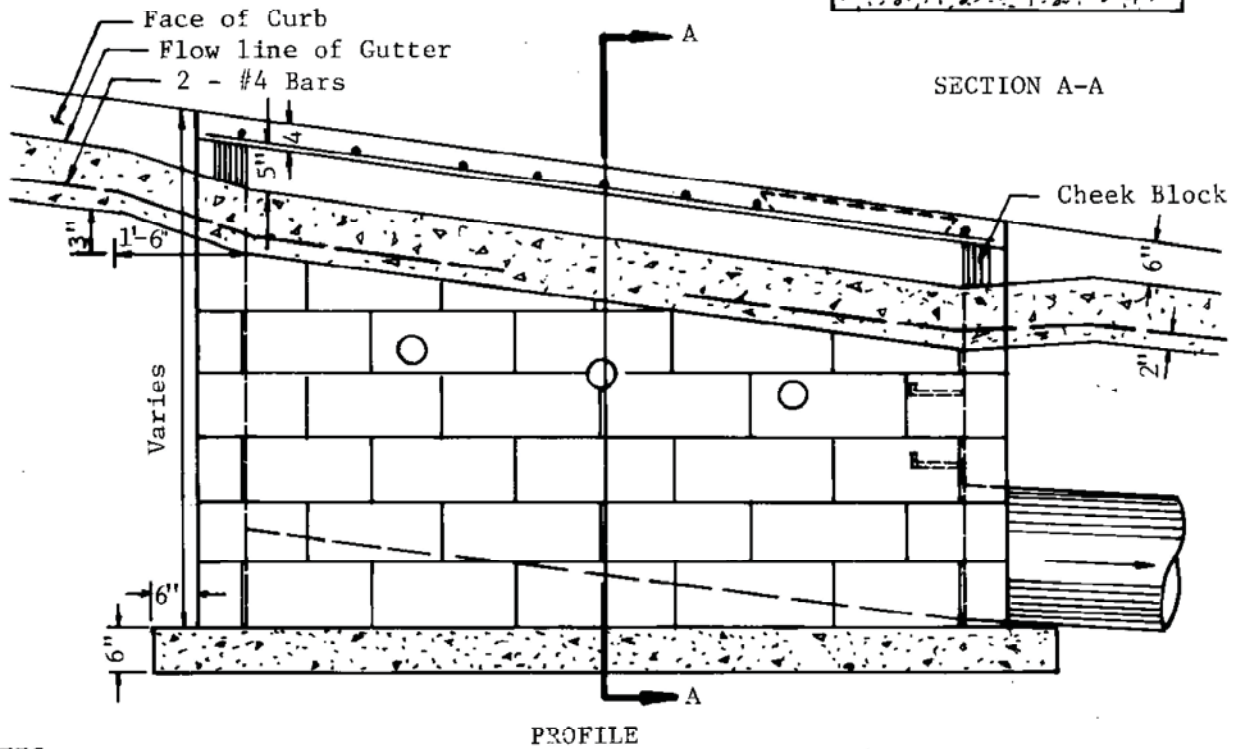
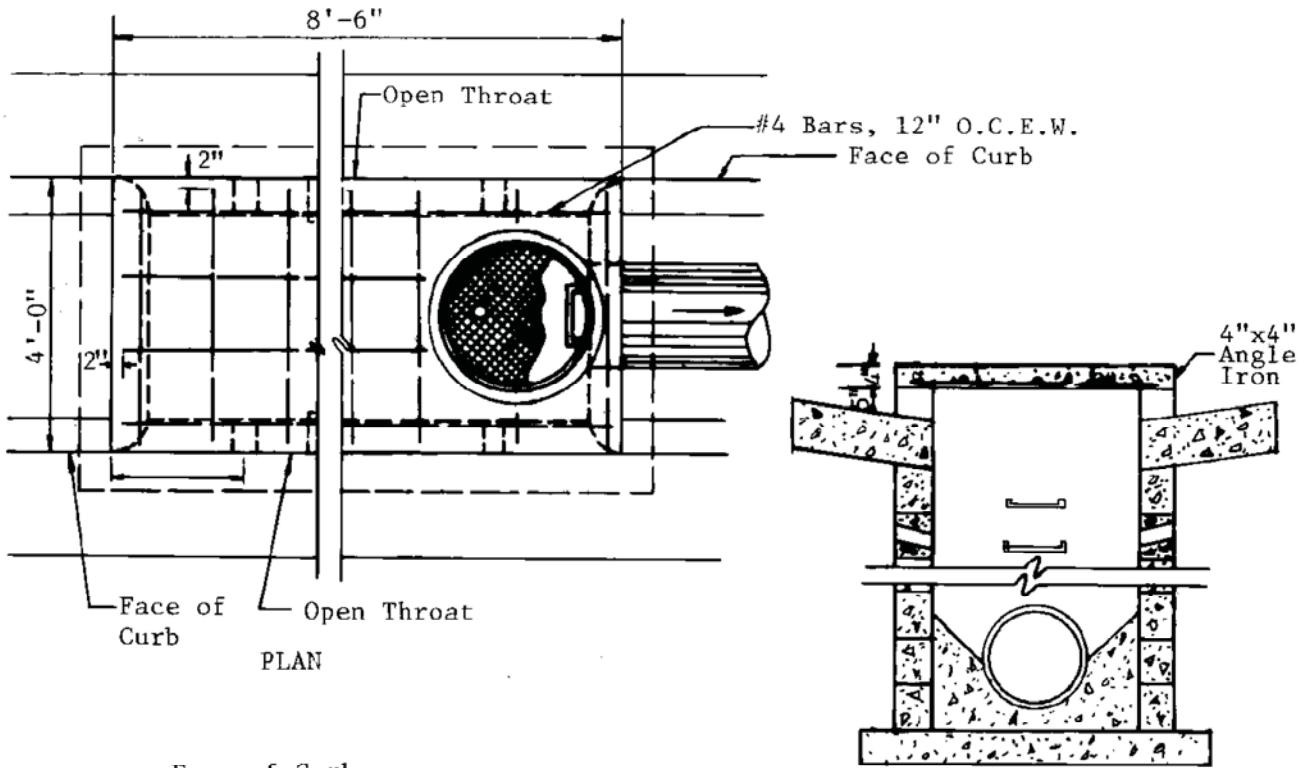
CATCH BASIN WITH GRATE TOP, CB-3

Deleted	8/1/2013
REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.7



- NOTES:
1. This standard may be used with the approval of the Engineer when shown on approved plans.
 2. For additional notes, see Drawings D-1.1 and D-1.2.

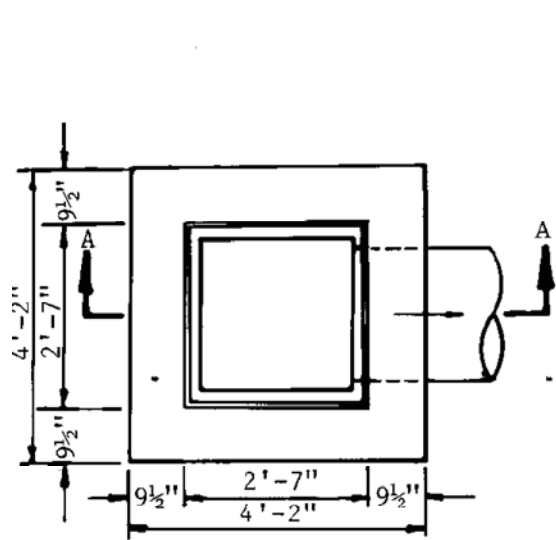
CATCH BASIN WITH DOUBLE THROAT, CB-4

REVISION & DATE

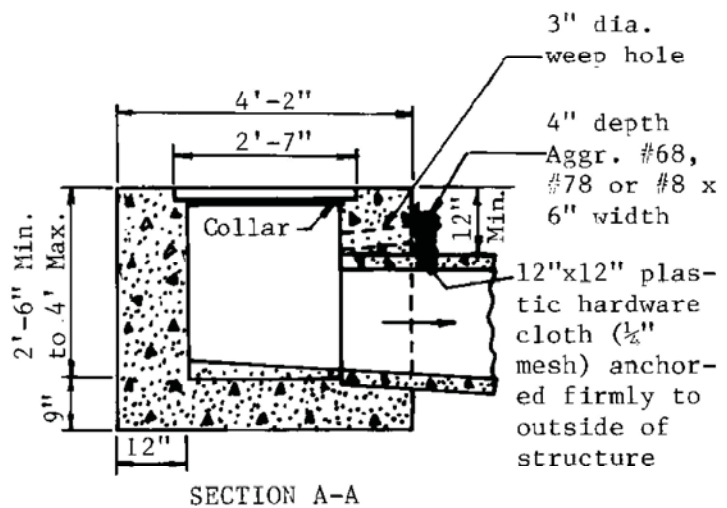


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

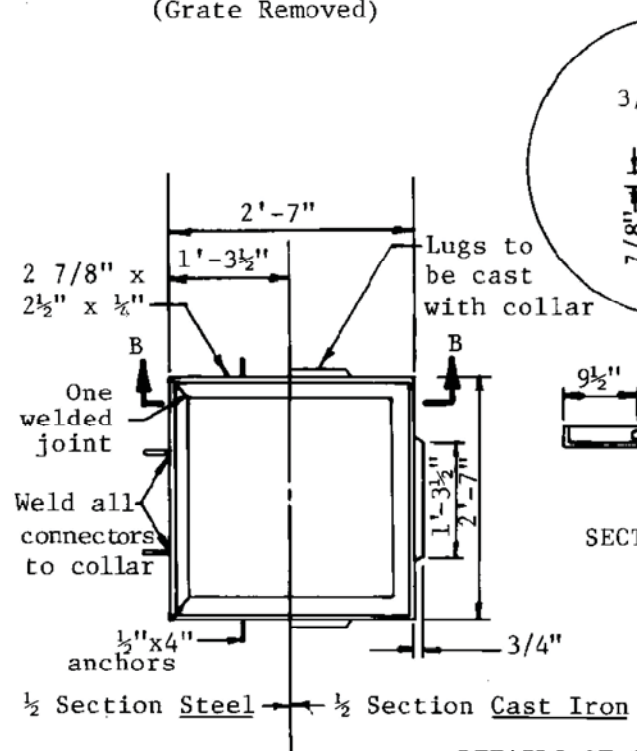
DRAWING NO.
D-1.8



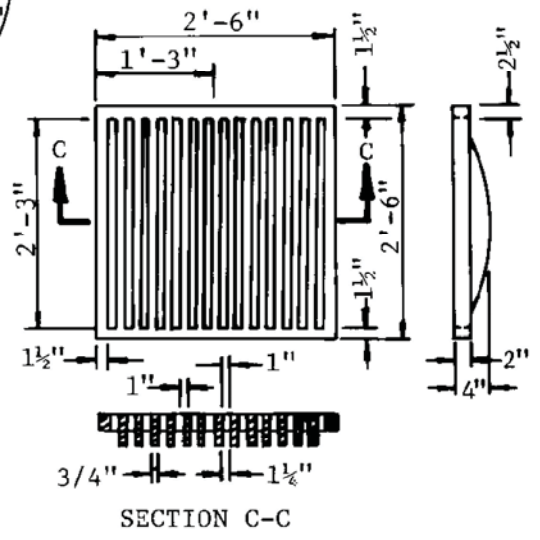
PLAN
(Grate Removed)



SECTION A-A



DETAILS OF COLLAR AND GRATE



SECTION C-C

- NOTES:
1. Invert of inlet to be as shown on plans.
 2. This item may be precast or cast in place.
 3. Grate available as Pattern #3215 by Dewey Bros. or equal.
 4. When this grate can not be oriented so as to preclude bicycle traffic from crossing grate at an angle parallel to the direction of the vanes then 1/8" x 1" metal slats shall be welded transverse to the vanes at a spacing of 9".

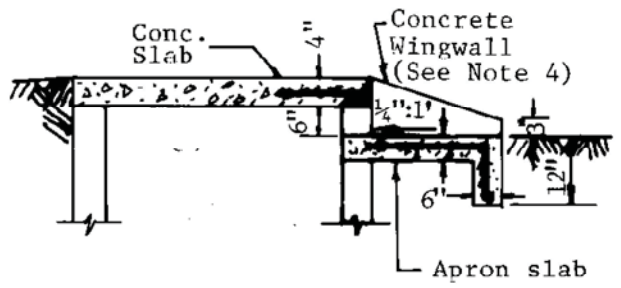
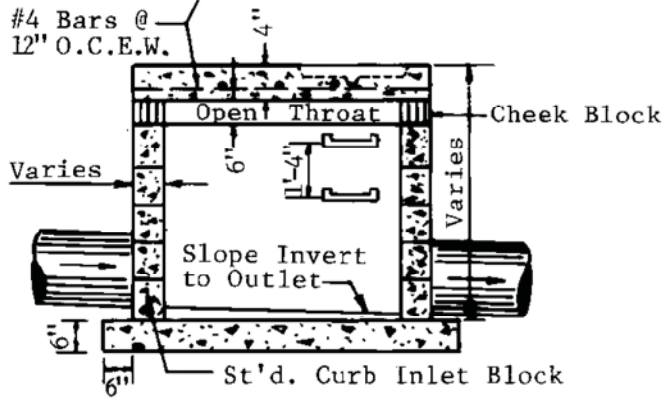
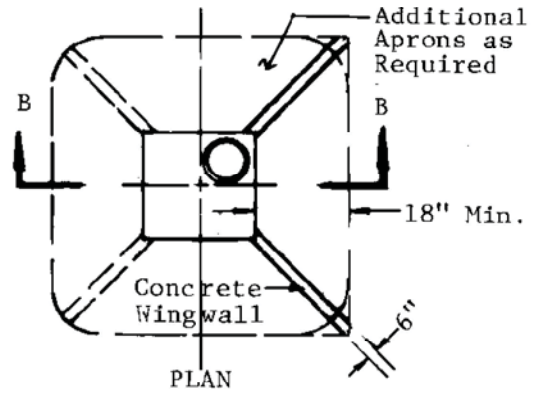
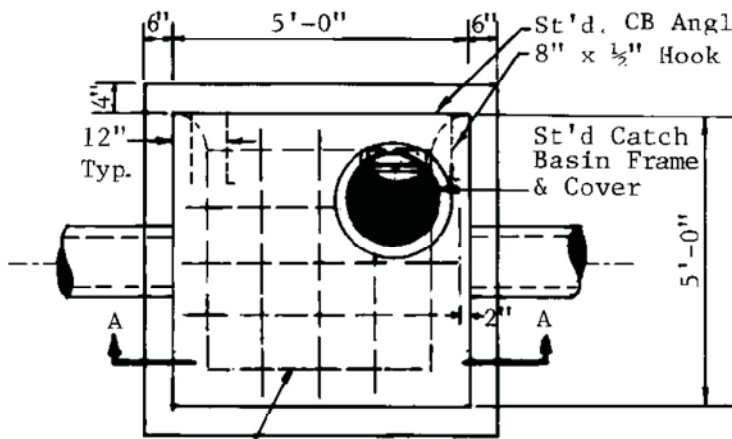
NONROADWAY SHALLOW GRATE INLET
15" TO 24" PIPE MAXIMUM

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.9



SECTION A-A

TYPICAL APRON DETAIL SECTION B-B

NOTES:

1. Concrete aprons to be built on all yard inlets.
2. Reinforcing for aprons shall be 6" x 6" No. 6 welded fabric.
3. Length of apron may be increased to 3'-0" if warranted by field conditions and shown on approved plans.
4. Concrete wing walls as shown above shall be required to retain cut slopes along the edge of each apron or combination of aprons as required. When aprons are on adjacent sides of inlet the corners of the apron shall have 1'-6" radii and the wingwall at that corner shall be omitted.
5. Yard inlets deeper than 4' shall have steps placed as shown.
6. Dimensions of yard inlets shown are for pipe sizes up to and including 33" pipe, while providing a minimum of 6" clearance when possible from inside wall of structure to O.D. of pipe. Inlets for pipes greater than 33" shall require a special design.
7. Symmetrical channels shall be formed in the invert of the box from the inlet pipe to the outlet pipe per Drawing D-2.1 for paving of invert. See note 5, Drawing 1.1.
8. Provide Standard 4" x 4" x 3/8" angle iron for full length of throat.
9. The inside walls, as they are laid, shall be pargeted with mortar a minimum of 1/2" thick.

YARD INLET

REVISION & DATE

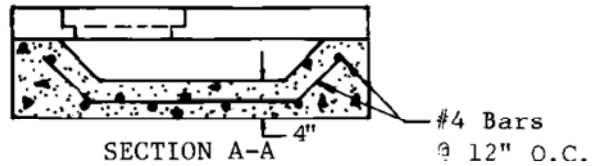
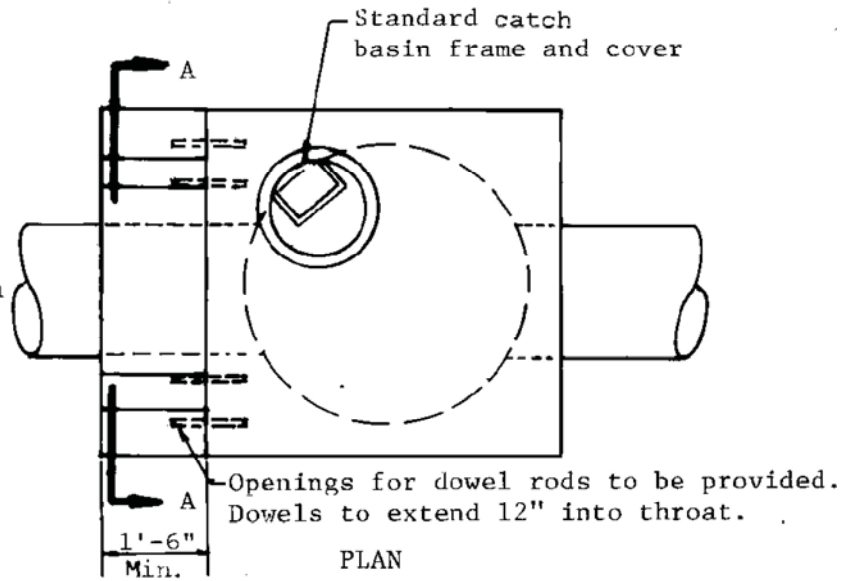


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.10

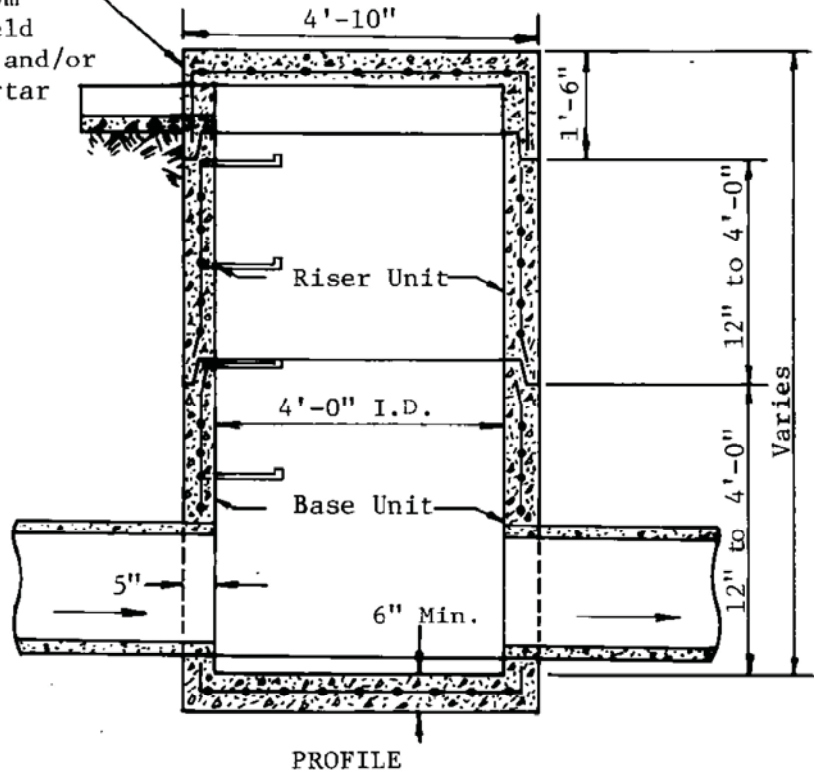
NOTES:

1. Design shall be in accordance with ASTM-C478.
2. Precast concrete to be Class "A4".
3. Reinforcing steel shall be in accordance with ASTM-A497 (wire fabric) and ASTM-A615 (Reinforcing Bars).
4. Joints shall be tongue and groove and/or O-ring.
5. Steps shall be provided unless otherwise specified for depths over 4'-0" at 1'-4" O.C.



Grade and slope adjustment completed in field using mortar and/or brick and mortar

6. Two lift holes for handling purposes shall be provided for each unit 180° apart or an approved alternate method.
7. Inlet inverts shall be constructed in the field as required.
8. Pipe openings shall be provided as required.
9. The apron shown above is typical. Four inch concrete Class A3, or asphalt aprons shall be required (min. 1'-6") in front of all throat openings.



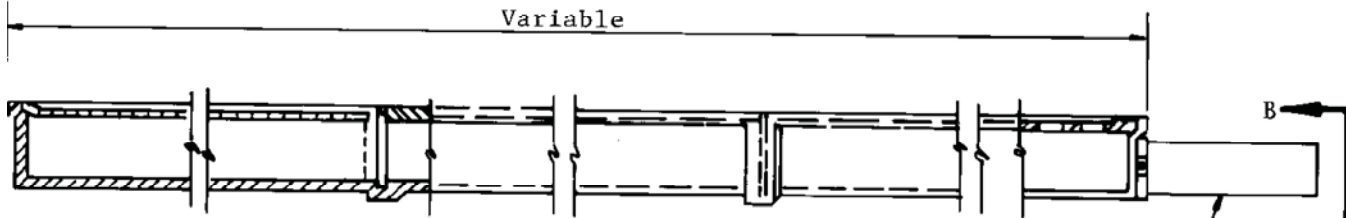
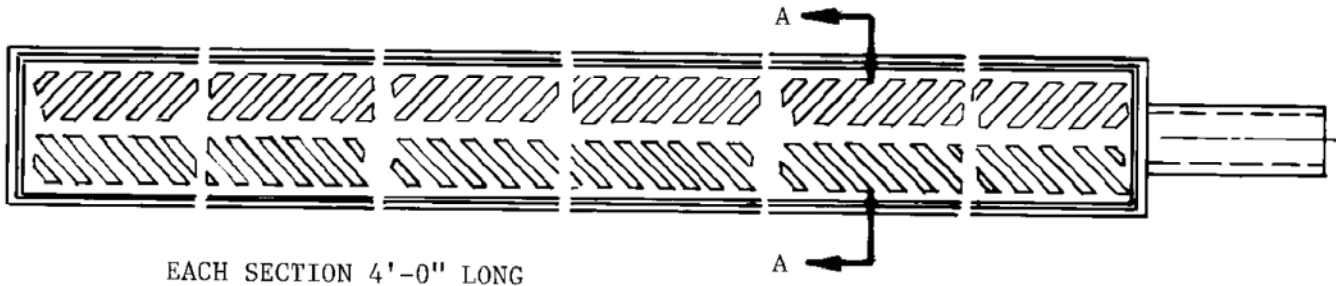
PRECAST YARD INLET

REVISION & DATE

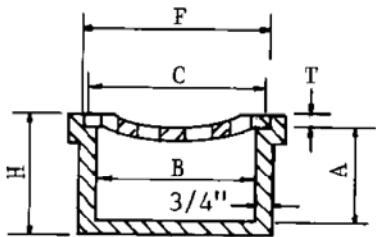


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

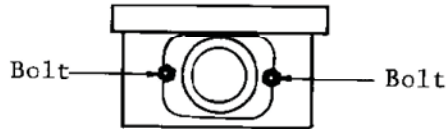
DRAWING NO.
D-1.11



Pipe connection and flange may be cast separately and bolted to trench frame.



SECTION A-A



SECTION B-B

NOTES:

1. Outlet can be furnished on either side or bottom.

AVAILABLE AS DEWEY BROS. PATTERN # (OR EQUAL)	DIMENSION IN INCHES					
	A	B	C	F	H	T
5801	4 3/4	16	17 1/2	18	6 1/2	1 or 1 1/4
5802	7	9 1/4	10 3/4	11 1/2	8 3/4	1 or 1 1/4
5803	6 or 6 1/4	10	11 1/2	12	8	1 or 1 1/4
5804	5	5	6 1/2	7	6 3/4	1

"Drainage outfall to Storm Structures only, except with special permit obtained through the Department of Public Works. No field connections are allowed. Minimum bottom slope of 2.00%."

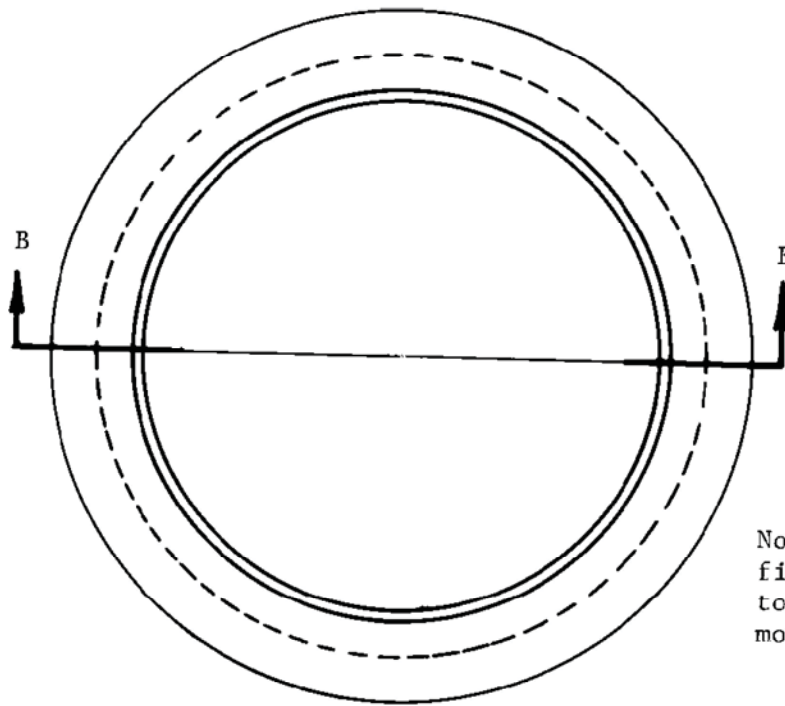
DRIVEWAY GRATE

REVISION & DATE

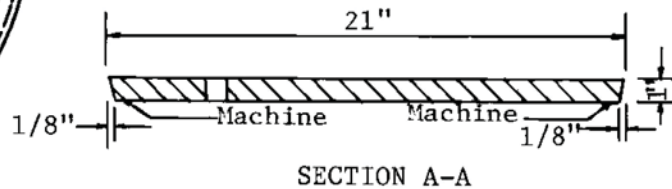
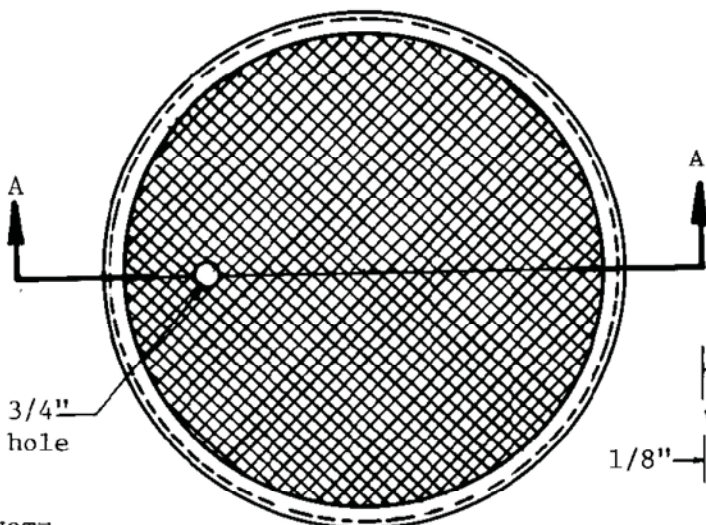
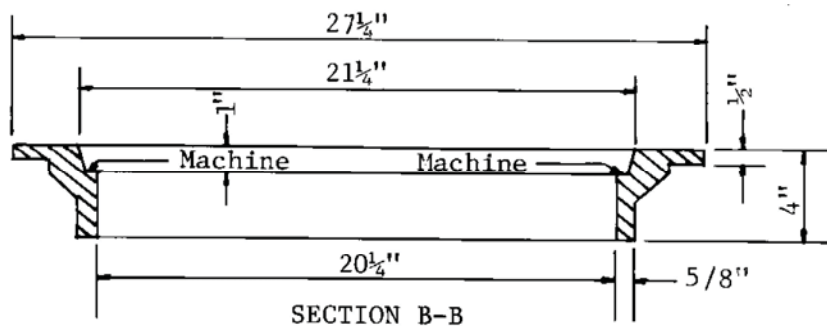


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-1.12



Note: Cover must be set firmly within frame to prevent rocking movement.



NOTE:
This frame and cover available as Temple Foundry pattern #1235 or equal.

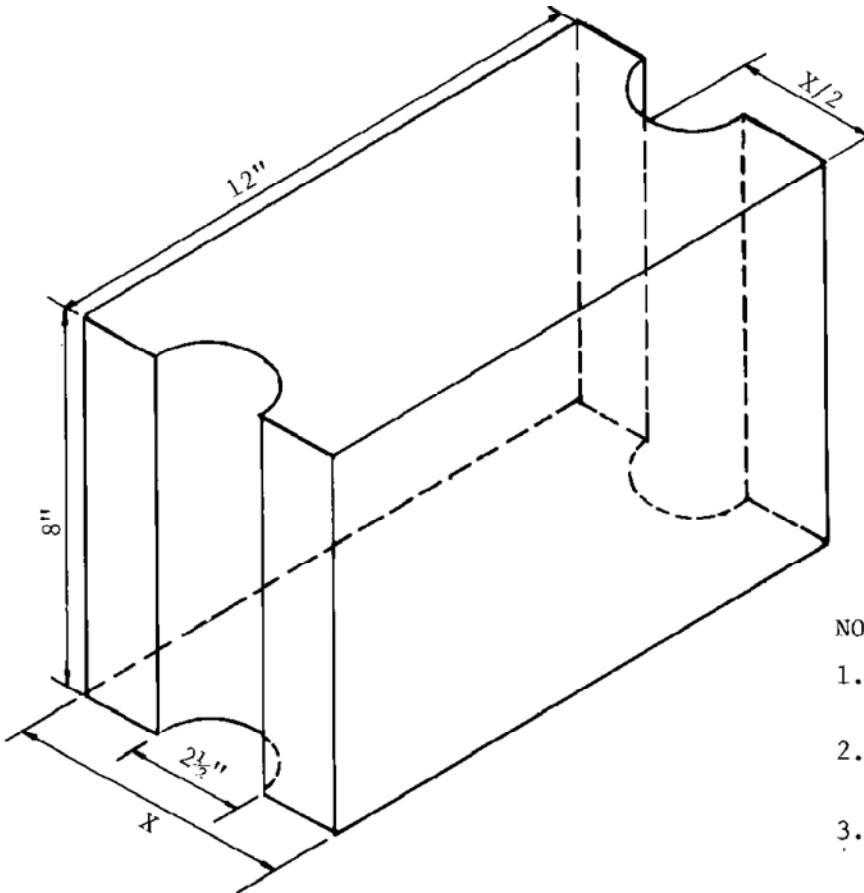
CATCH BASIN FRAME AND COVER

REVISION & DATE



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DEPARTMENT OF ENVIRONMENTAL SERVICES

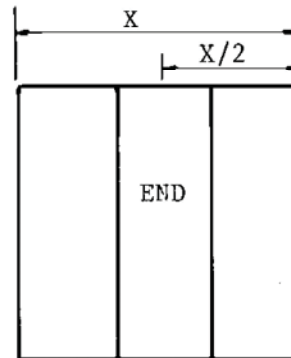
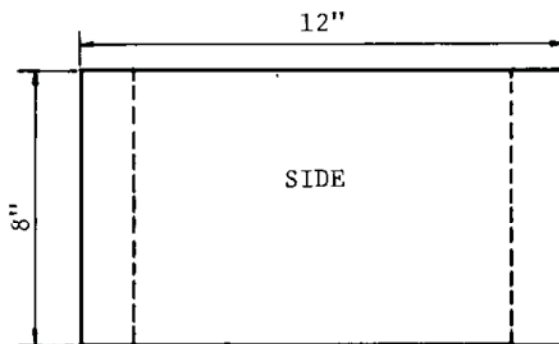
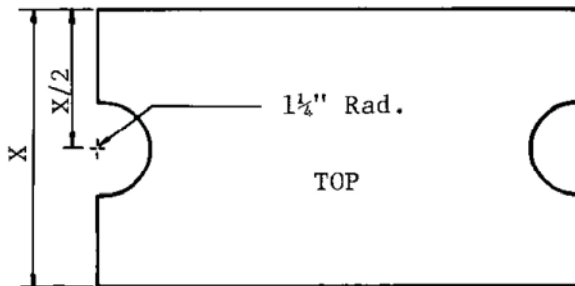
DRAWING NO.
D-1.13



Depth of Structure	Dimension X
Less than 6'	6"
6' to 12'	8"
Greater than 12'	12"

NOTES:

1. Blocks shall be of Class A3 concrete.
2. Blocks shall be placed in an upright position only.
3. 1/4" mortar joint shall be provided between the surfaces of all blocks.
4. Keyways shall be completely filled with mortar.
5. Mortar shall conform to Section 04100.



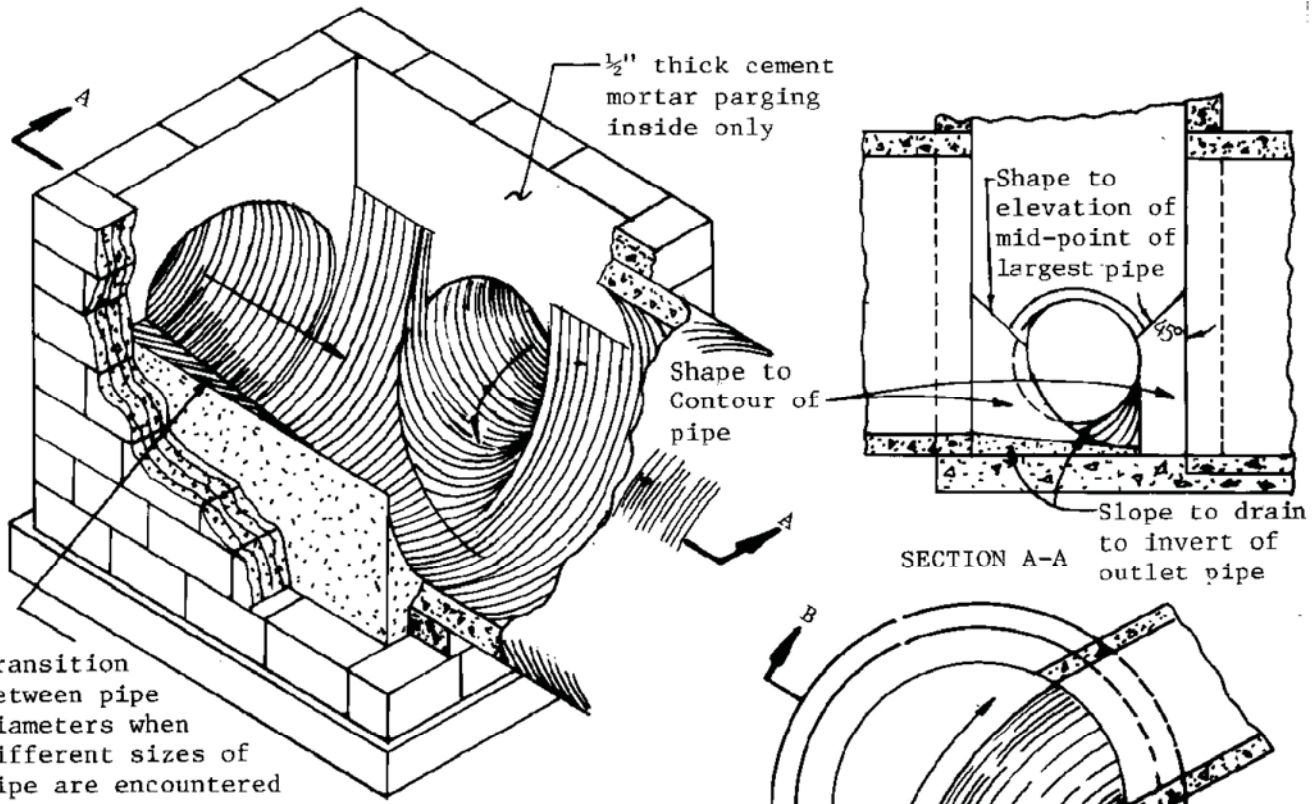
MANHOLE AND CATCH BASIN BLOCK

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-2.0

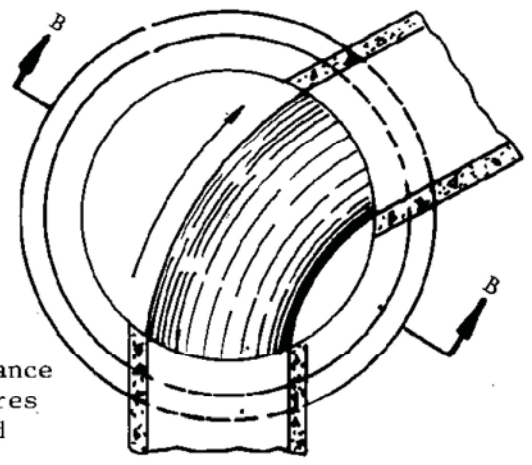


Transition between pipe diameters when different sizes of pipe are encountered

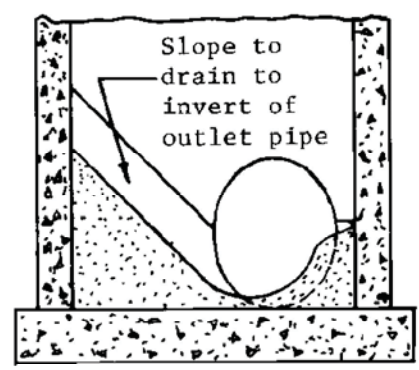
METHOD FOR SHAPING OF DROP INLETS AND STANDARD MANHOLE INTERIORS

NOTES:

1. Shaping of manhole and inlet inverts in accordance with this drawing is to apply to those structures specified on plans. The cost of furnishing and placing all materials is to be included in the price bid for the particular catch basin or manhole complete.
2. Manhole or catch basin is to be formed and constructed in accordance with applicable standard or special drawing. The invert shaping as detailed hereon is to consist of a Portland Cement Concrete mix conforming to Class A3, except that 25% of coarse aggregate may be up to 4" in diameter and consist of stone, broken brick, broken concrete, or broken concrete block. The surface shall be left smooth by means of hand trowelling. None of the coarse aggregate shall remain exposed.
3. Details of invert shaping as shown hereon are for example purposes only. Each manhole or catch basin is to be shaped individually to best fit the particular inlet and outlet configuration and flow lines.



TREATMENT IN PRECAST MANHOLES



SECTION B-B

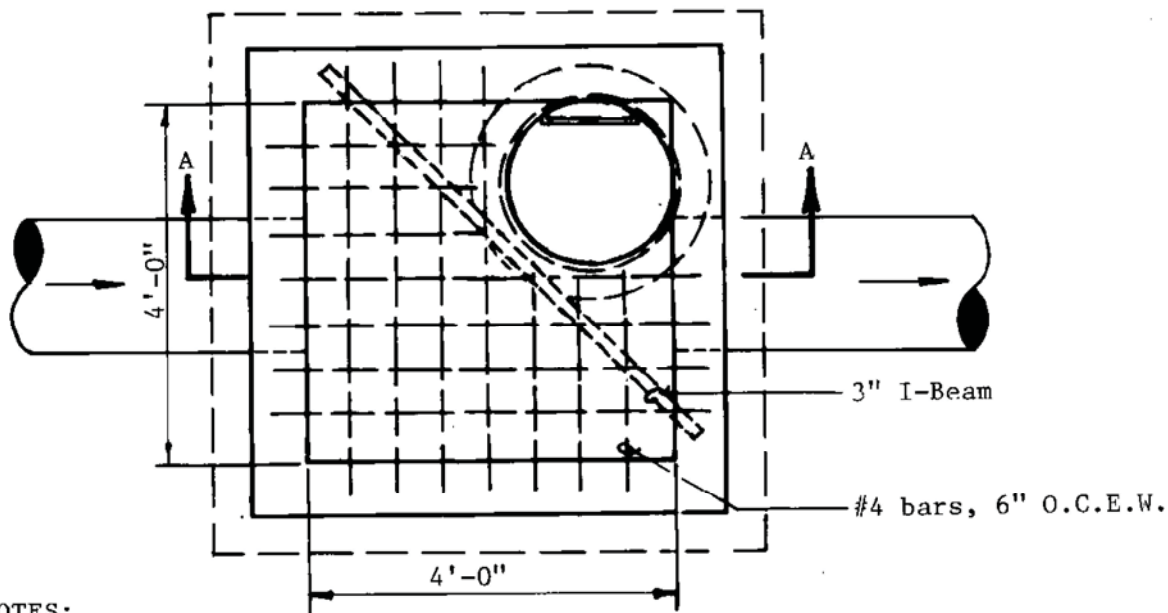
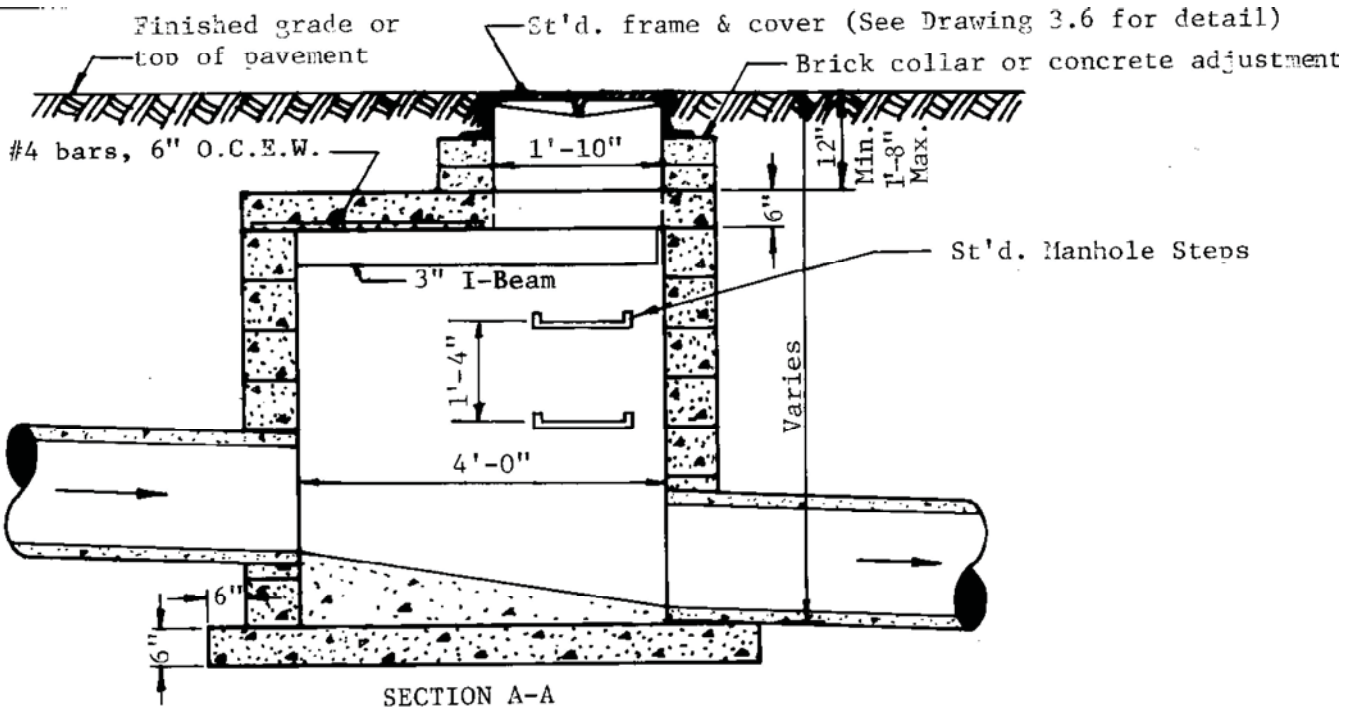
METHOD FOR SHAPING MANHOLE AND BASIN INVERTS

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-2.1



NOTES:

1. Exposed manhole frame, lid, grates and beams to be field painted with black asphaltic paint.
2. Provide 1½" of cover for all reinforcing steel.
3. Each manhole invert shall be individually shaped to provide a smooth flow line through manhole. (See Drawing D-2.1 and note 5 on Drawing D-1.1).
4. Manholes deeper than 4'-0" shall have steps 1'-4" O.C. (See Drawing M-2.0).
5. For details of manhole block, see Drawing D-2.0.

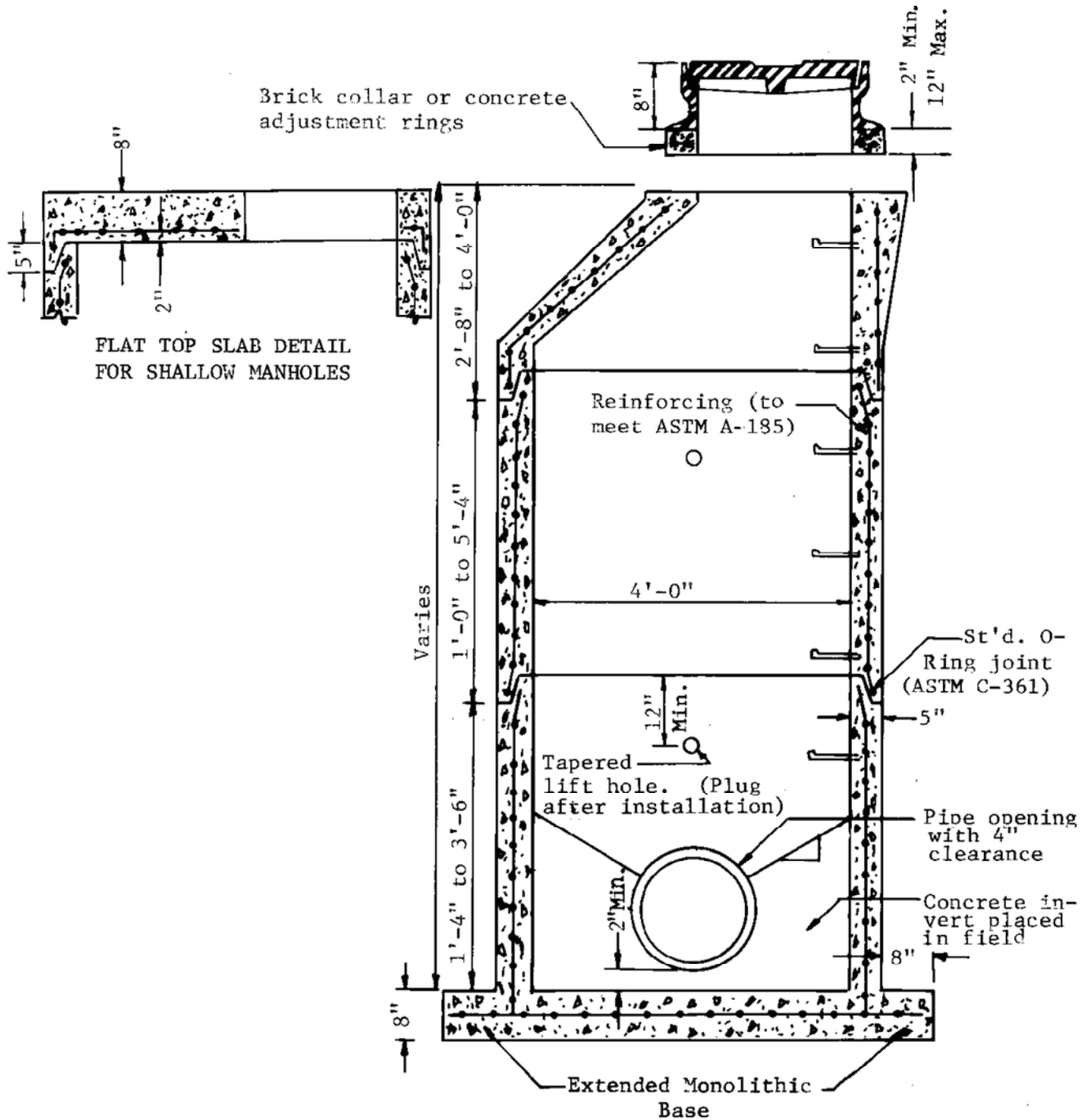
**STORM SEWER MANHOLE, MH-1
FOR PIPE SIZES 15" THROUGH 36"**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.0



NOTES:

1. Manhole shall meet all requirements of ASTM C-478.
2. Riser and/or eccentric cone section may be replaced with alternate "Flat Top Slab" for use in shallow manholes.
3. Other combinations of riser and taper sections may be used as approved by the Engineer, to achieve required height.
4. Tongue and groove joint sealer may be used in lieu of "O-Ring joint."
5. For additional notes, see Drawing D-3.0.

**STORM SEWER PRECAST MANHOLE, PH-1
FOR PIPE SIZES 15" THROUGH 36"**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.1

REFER TO VDOT STD DI-1

**STORM SEWER MANHOLE, MH-1
WITH STANDARD CB-3 GRATE COVER**

Deleted	8/1/2013
REVISION & DATE	

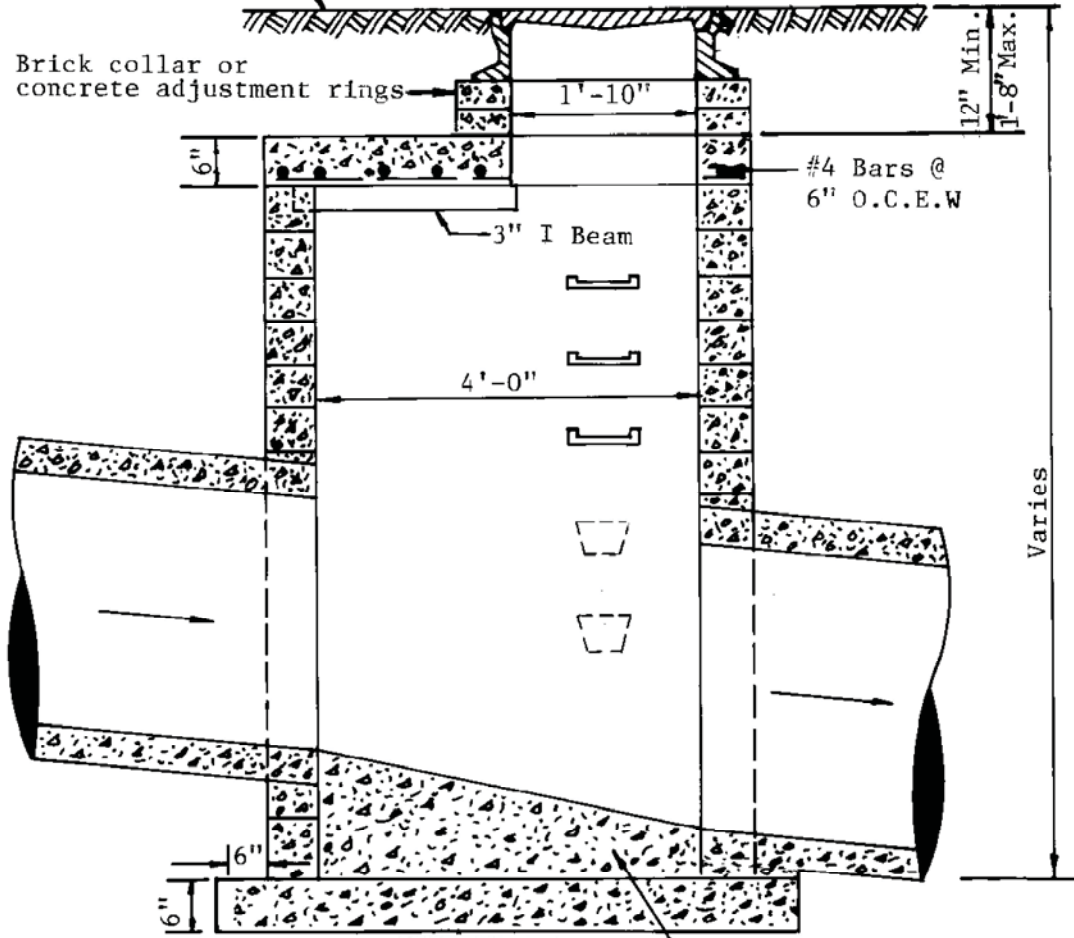


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.2

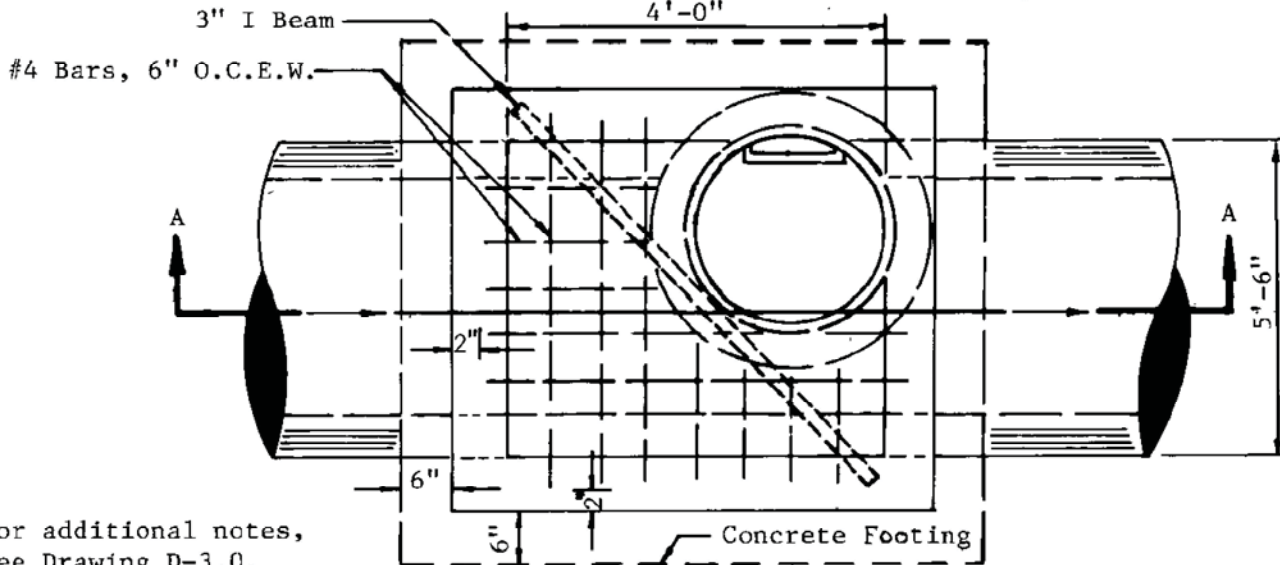
Top of pavement
or finished grade

Brick collar or
concrete adjustment rings



SECTION A-A

Shape Invert



For additional notes,
see Drawing D-3.0.

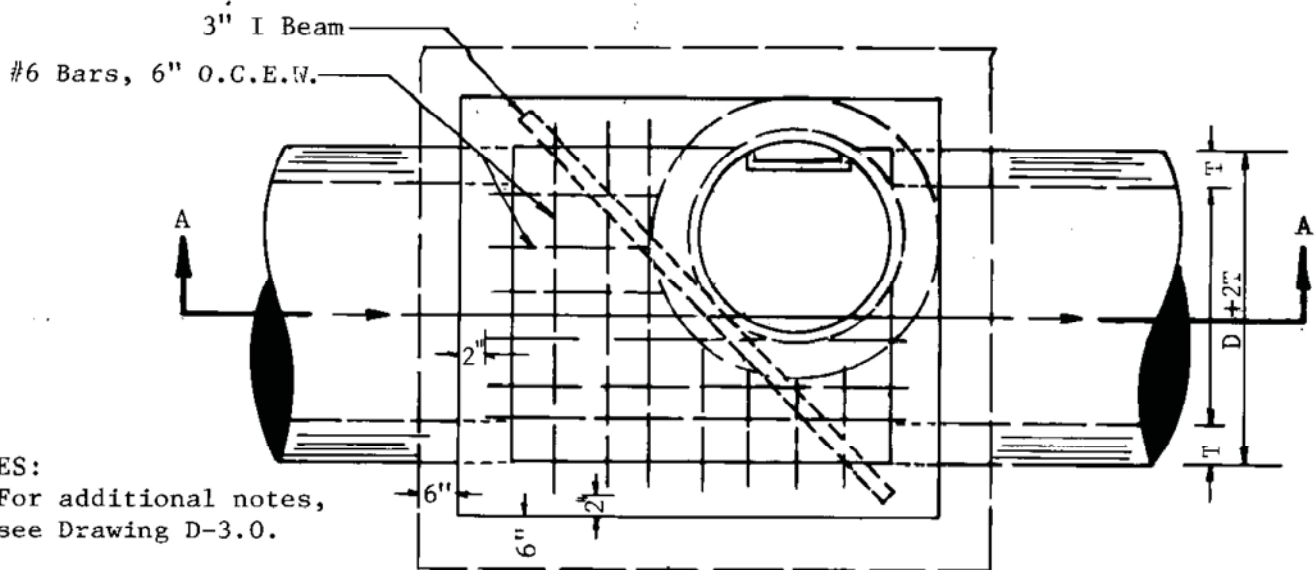
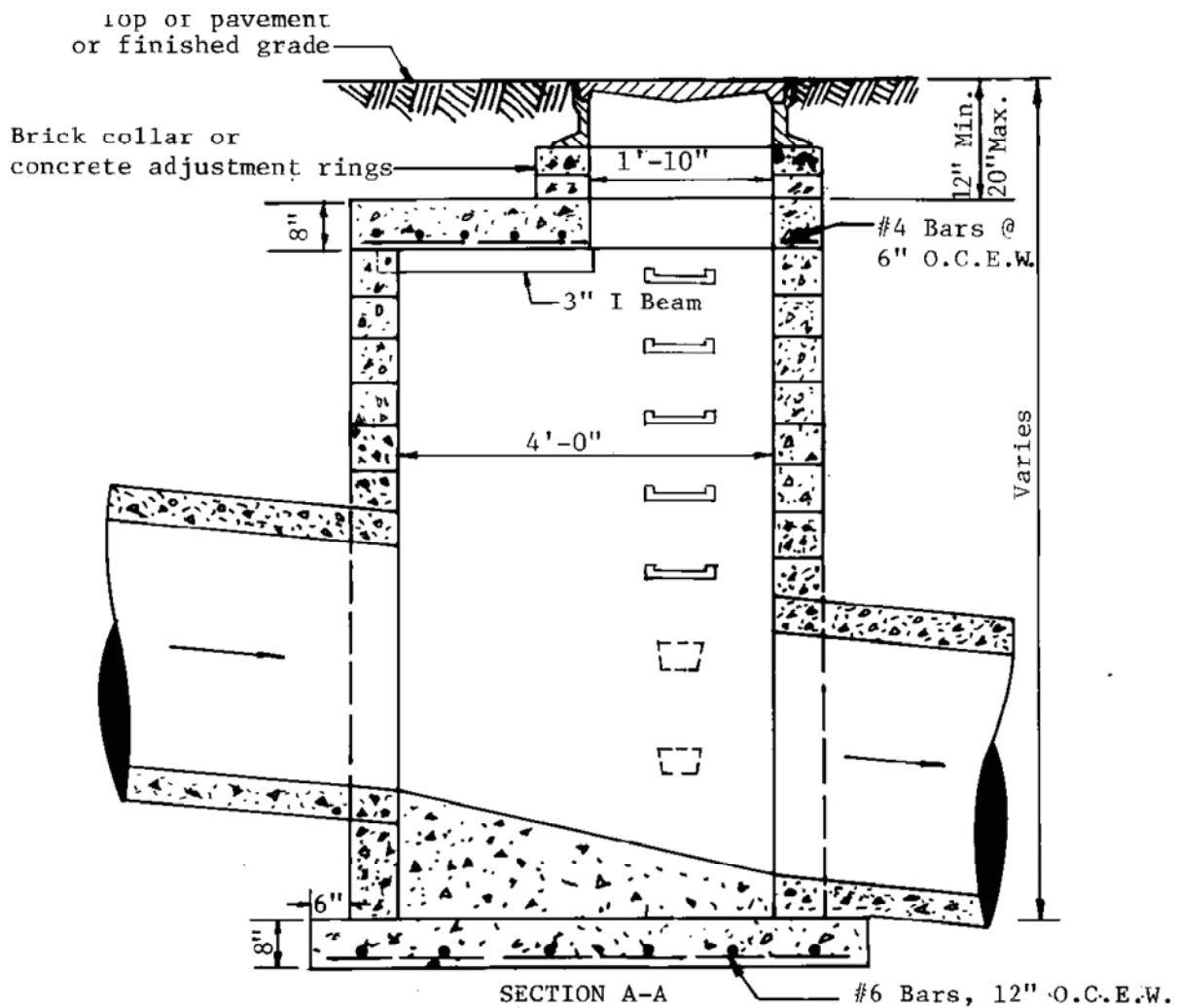
**STORM SEWER MANHOLE, MH-2
FOR PIPE SIZES 42" THROUGH 54"**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.3



NOTES:
 1. For additional notes, see Drawing D-3.0.

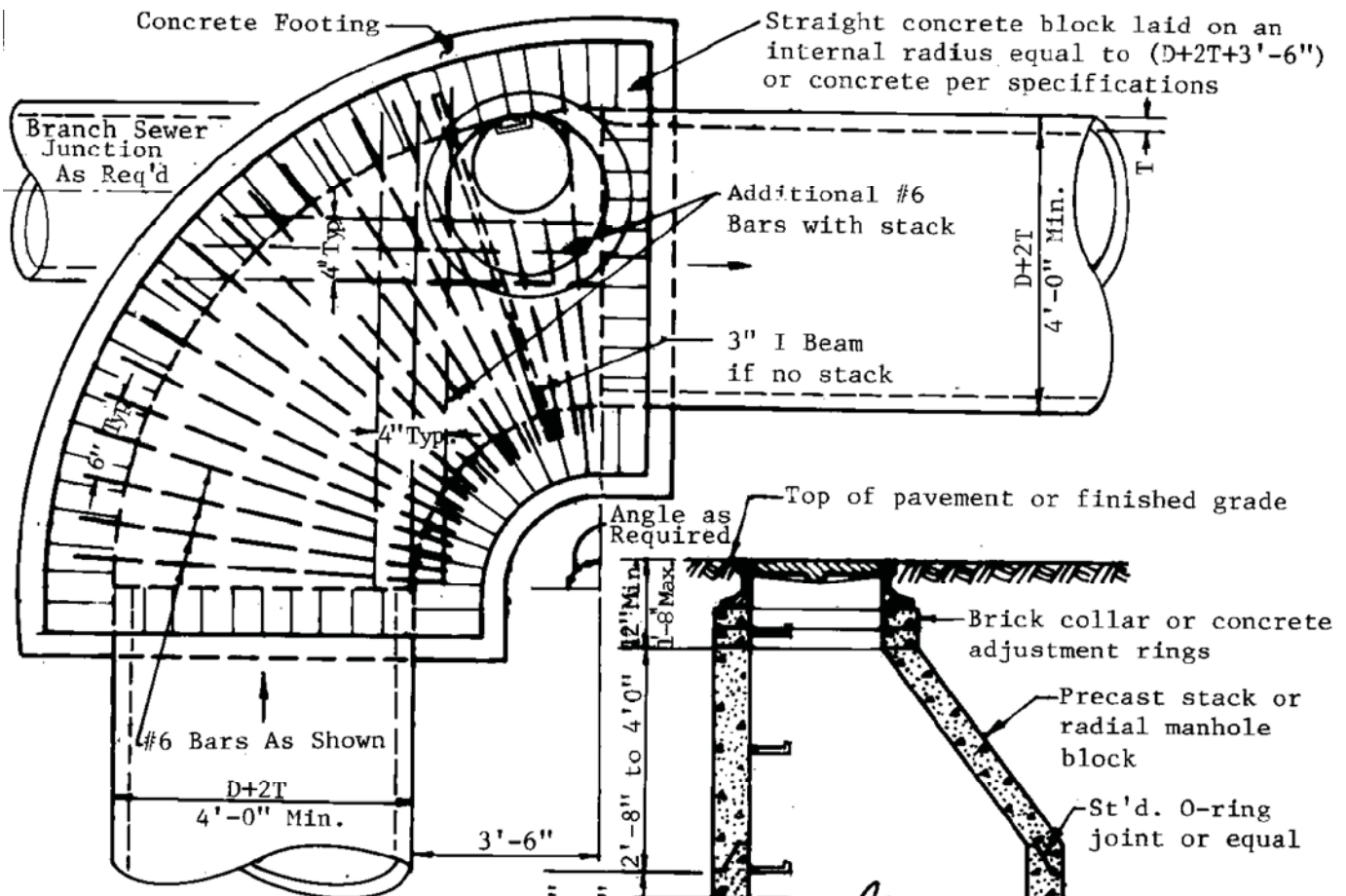
**STORM SEWER MANHOLE, MH-3
 FOR PIPE SIZE GREATER THAN 54"**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.4

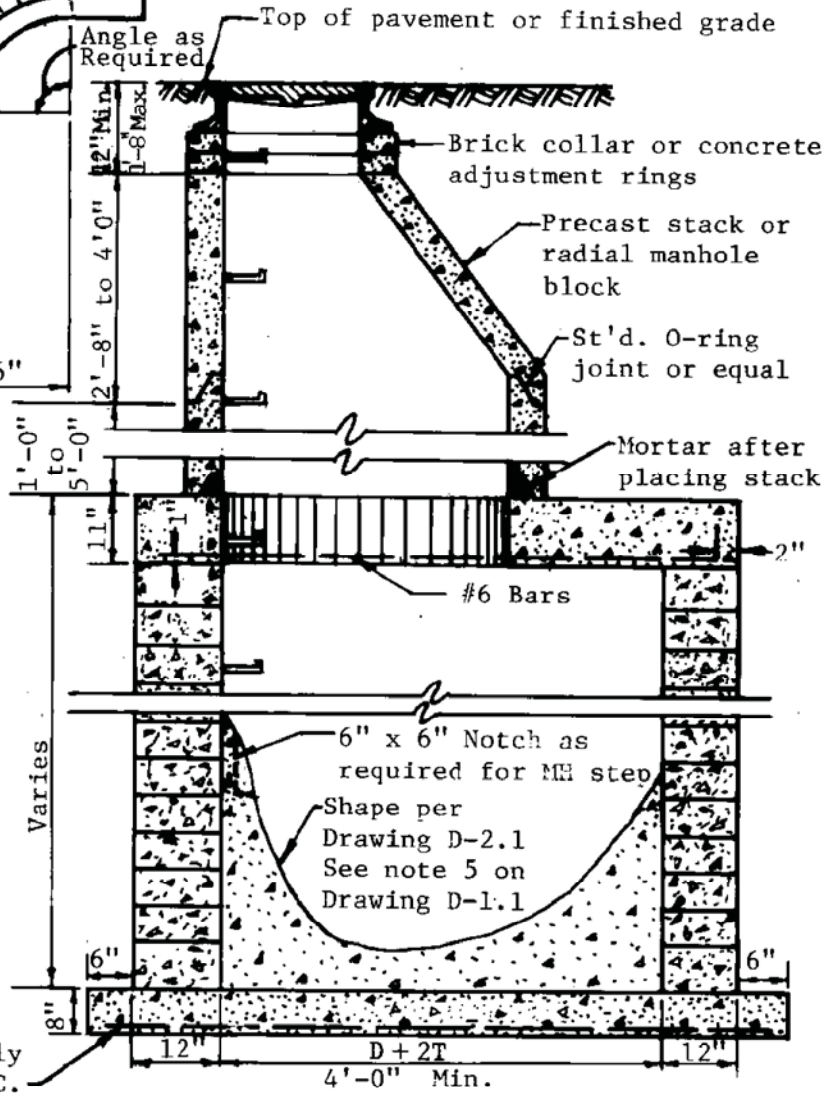


PLAN

NOTES:

1. Standard 6" concrete radial blocks may be used in lieu of precast stack
2. The 8" thick footing shall be extended to 6" outside of manhole all around.
3. For other notes, see Drawing D-3.0.

#6 Bars placed radially
12" maximum arc spacing O.C.



CROSS SECTION

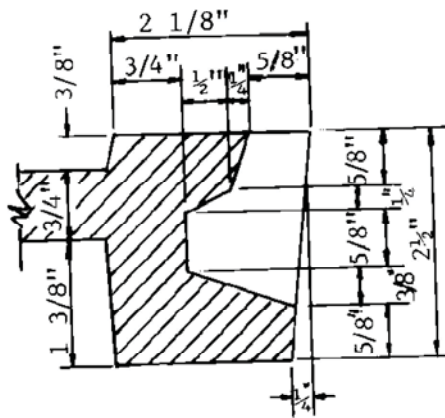
**STORM SEWER MANHOLE, MH-4
FOR PIPE SIZES GREATER THAN 24"
AND ALIGNMENT CHANGES GREATER THAN 30"**

REVISION & DATE

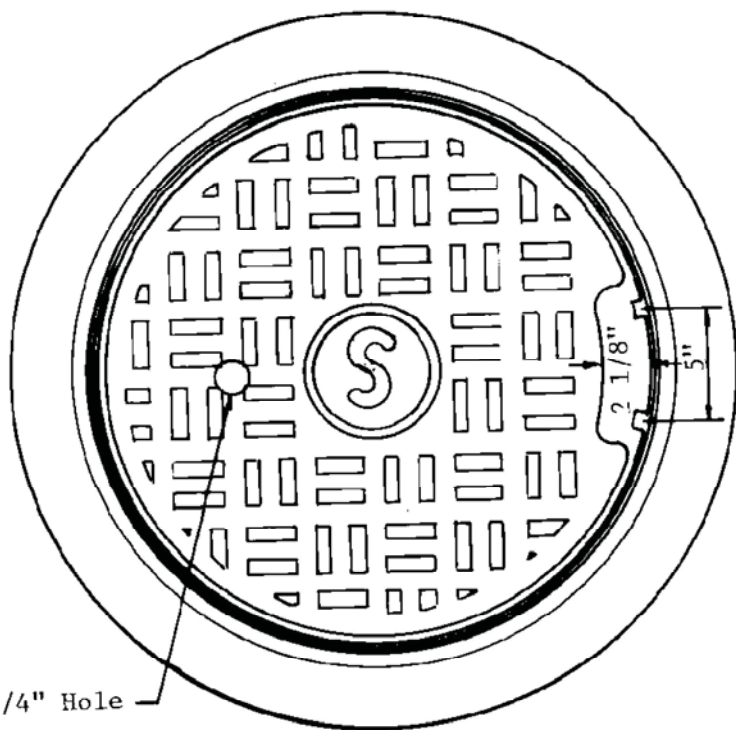


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

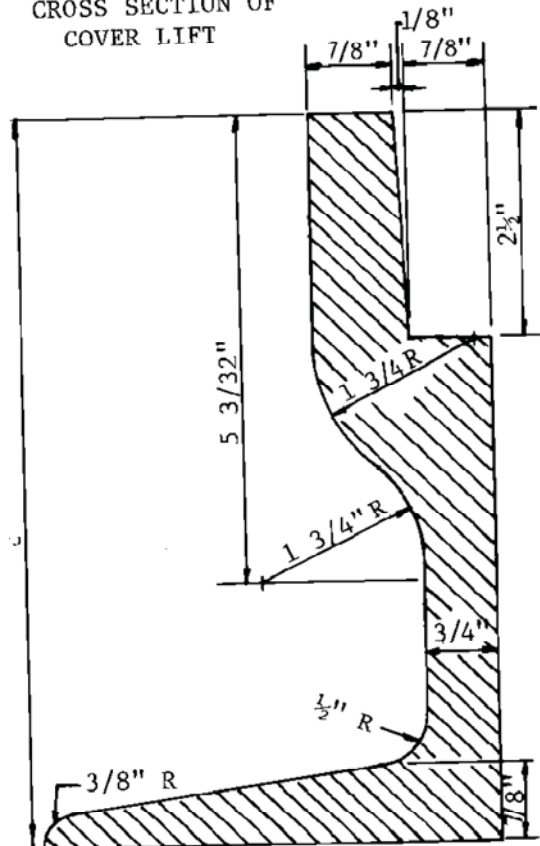
DRAWING NO.
D-3.5



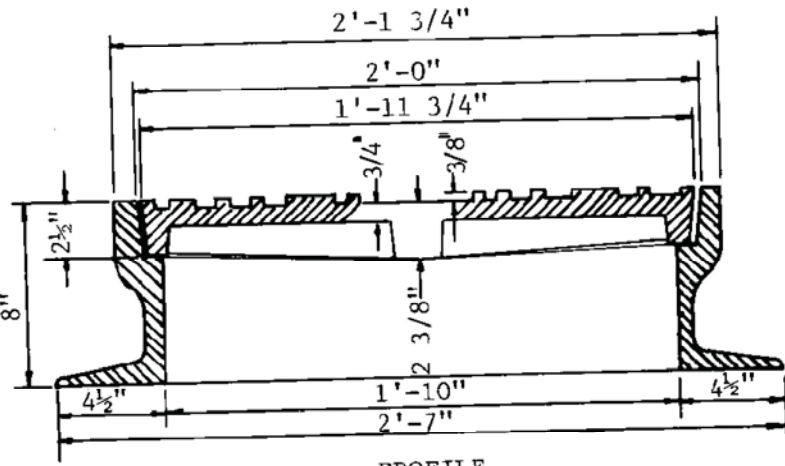
CROSS SECTION OF COVER LIFT



PLAN



CROSS SECTION OF RING



PROFILE

Minimum Average Weight	
Ring	210 lbs.
Cover	145 lbs.

NOTES:

1. This frame and cover available as pattern MH RCR-36 by Dewey Brothers, Inc. or equal.
2. If alternate grate top is specified it is available as pattern MN RCR-36A.

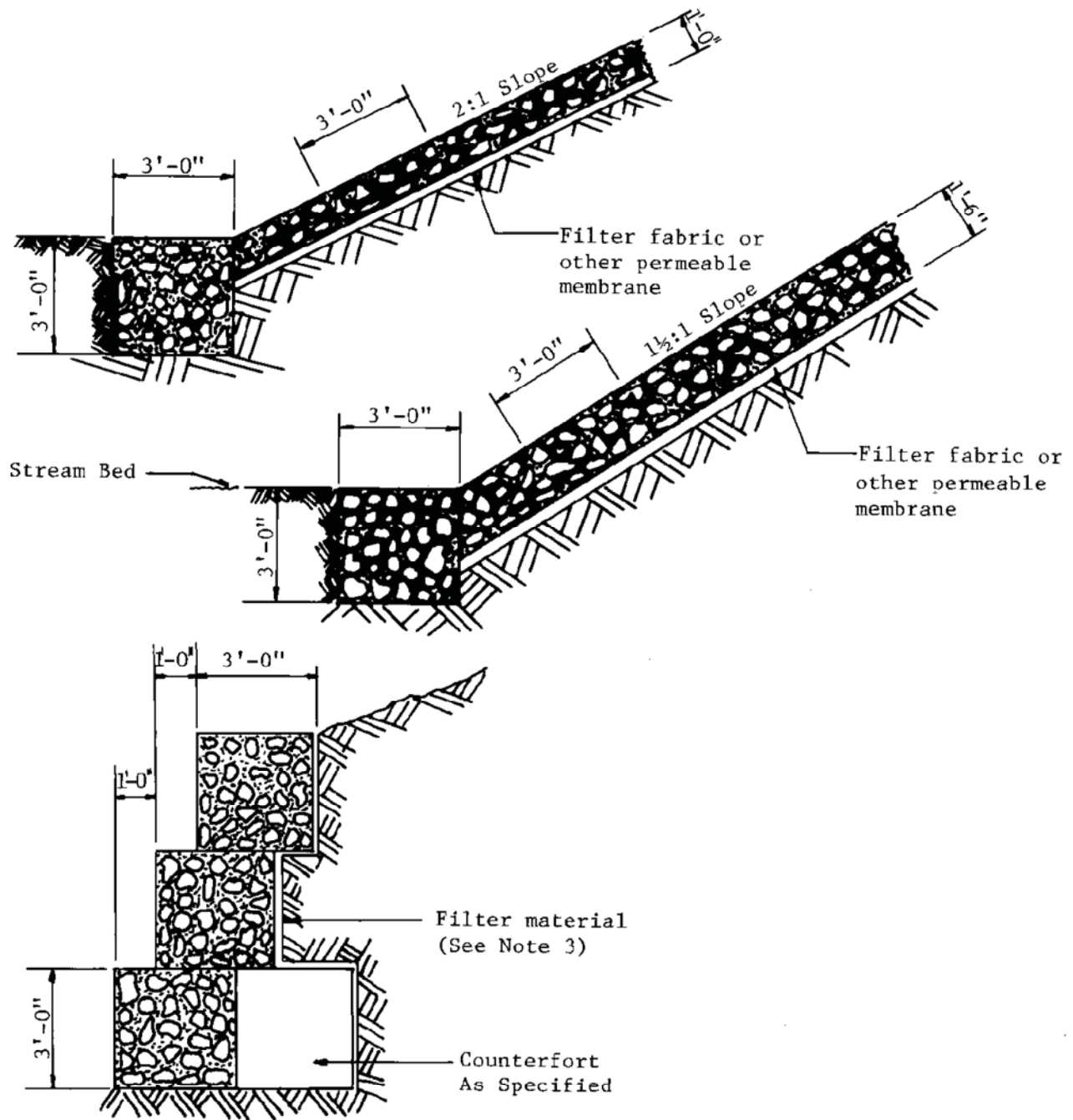
MANHOLE FRAME AND COVER

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-3.6



NOTES:

1. Stone fill size shall range from 4" minimum to 8" maximum with both measured as the longest dimension.
2. Wire mesh to be uniformly hexagonal pattern, woven in a triple twist pattern PVC coated or galvanized as specified.
3. Filter material shall be Miraf 700 or equal.
4. For additional information see specification section 02211.

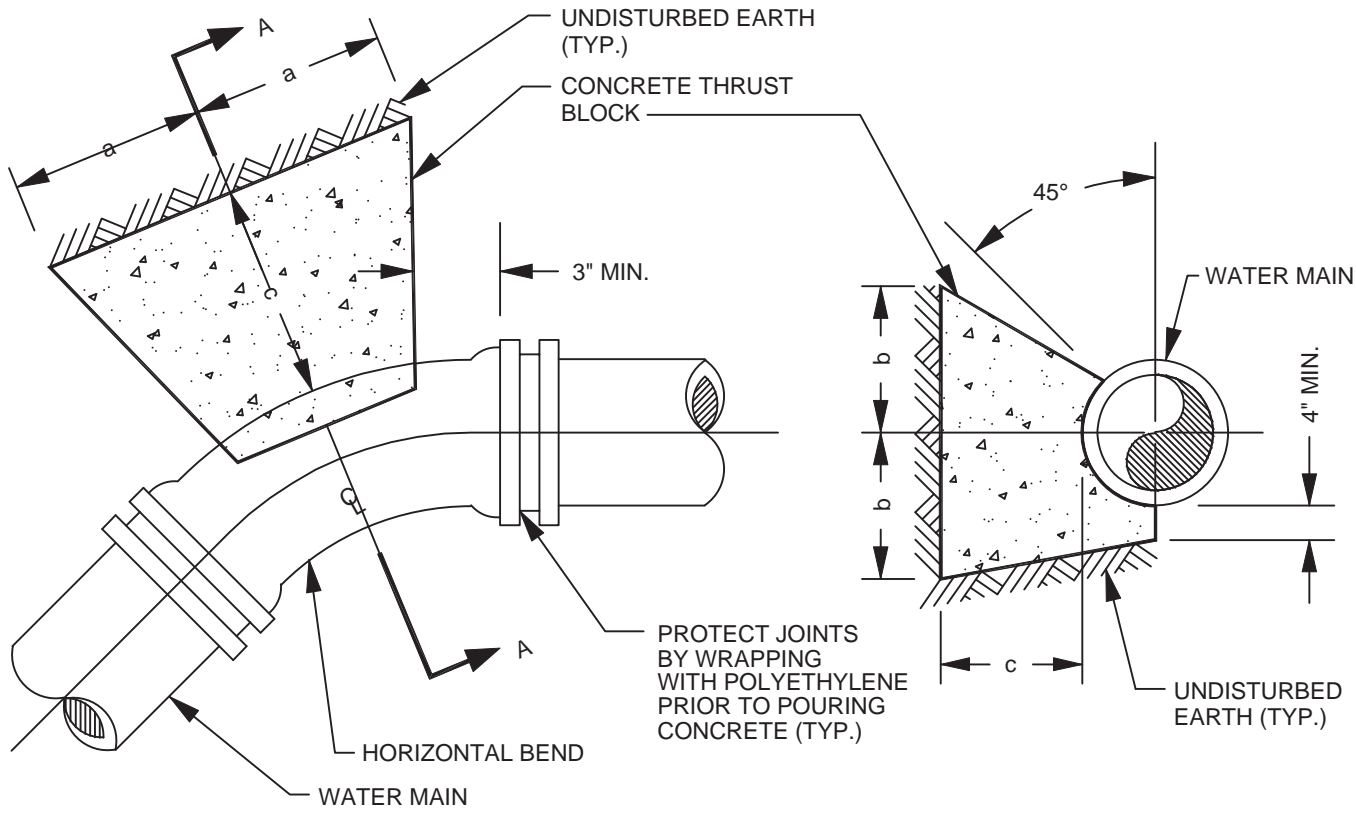
GABION REVETMENT

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
D-4.0



PLAN

SECTION A-A

PIPE DIA.	HORIZONTAL BEND								MIN. C
	11 1/4° (1/32)		22 1/2° (1/16)		45° (1/8)		90° (1/4)		
	a	b	a	b	a	b	a	b	
6"	5"	7"	7"	7"	11"	9"	15"	12"	18"
8"	7"	8"	10"	9"	14"	12"	20"	16"	18"
12"	10"	10"	16"	12"	23"	16"	36"	20"	18"
16"	12"	14"	20"	16"	32"	20"	48"	24"	24"

NOTES :

1. ALL BEARING SURFACES FOR CONCRETE BLOCKING SHALL BE UNDISTURBED EARTH WITH A MINIMUM BEARING VALUE OF 2,000 PSF. THE MINIMUM THICKNESS OF UNDISTURBED EARTH BEHIND THE BLOCKING SHALL BE 5 FEET.
2. BLOCKING SHOWN IS FOR A MAXIMUM STATIC PRESSURE OF 120 PSI PLUS WATER HAMMER ALLOWANCE OF 120 PSI.
3. FORM THE NON-BEARING SIDES OF THRUST BLOCKS BY USING PROPER FORMWORK.
4. SPECIAL BLOCKING DESIGN SHALL BE REQUIRED FOR CONDITIONS AND SIZES OTHER THAN THOSE INDICATED ON THIS SHEET.

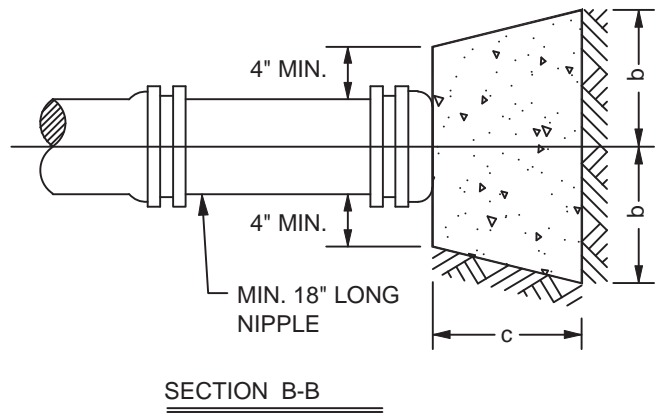
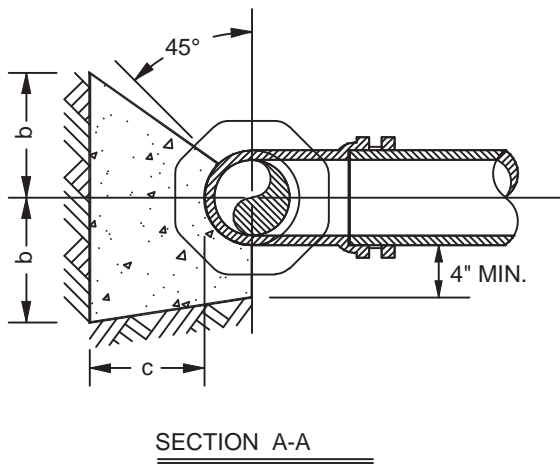
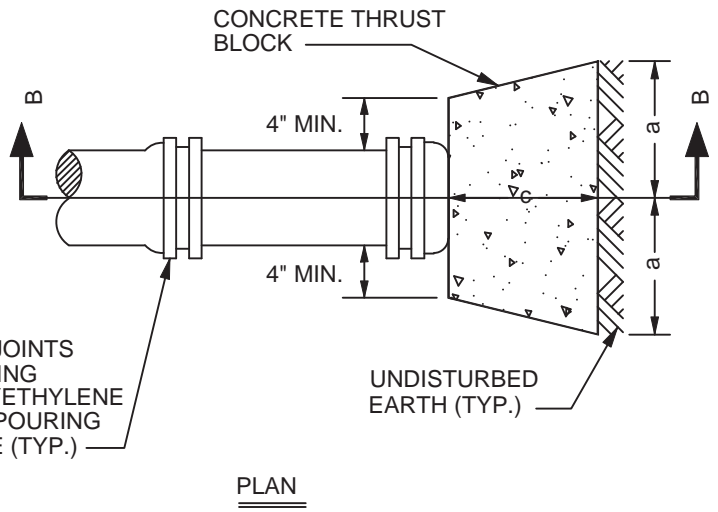
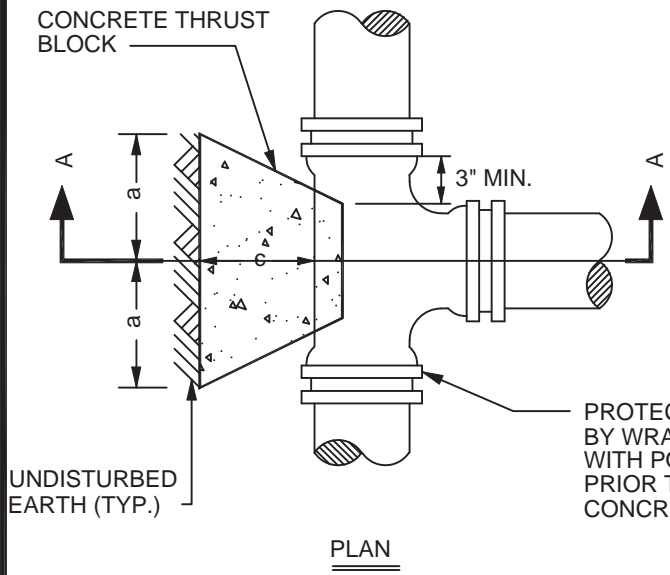
**CONCRETE THRUST BLOCKS
FOR HORIZONTAL BENDS**

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-2.0



TEES

CAPS

PIPE DIAMETER	a	b	MIN. C	
			TEES	CAPS
6"	11"	11"	12"	18"
8"	15"	15"	12"	18"
12"	24"	20"	18"	18"
16"	33"	24"	24"	24"

NOTES :

1. ALL BEARING SURFACES FOR CONCRETE BLOCKING SHALL BE UNDISTURBED EARTH WITH A MINIMUM BEARING VALUE OF 2,000 PSF. THE MINIMUM THICKNESS OF UNDISTURBED EARTH BEHIND THE BLOCKING SHALL BE 5 FEET.
2. BLOCKING SHOWN IS FOR A MAXIMUM STATIC PRESSURE OF 120 PSI PLUS WATER HAMMER ALLOWANCE OF 120 PSI. SPECIAL BLOCKING DESIGN SHALL BE REQUIRED FOR CONDITIONS AND SIZES OTHER THAN THOSE INDICATED ON THIS SHEET.
3. FORM THE NON-BEARING SIDES OF THRUST BLOCKS BY USING PROPER FORMWORK.
4. THE BLOCKS FOR THE TEES SHALL BE SIZED ACCORDING TO THE DIAMETER OF THE BRANCH MAIN.

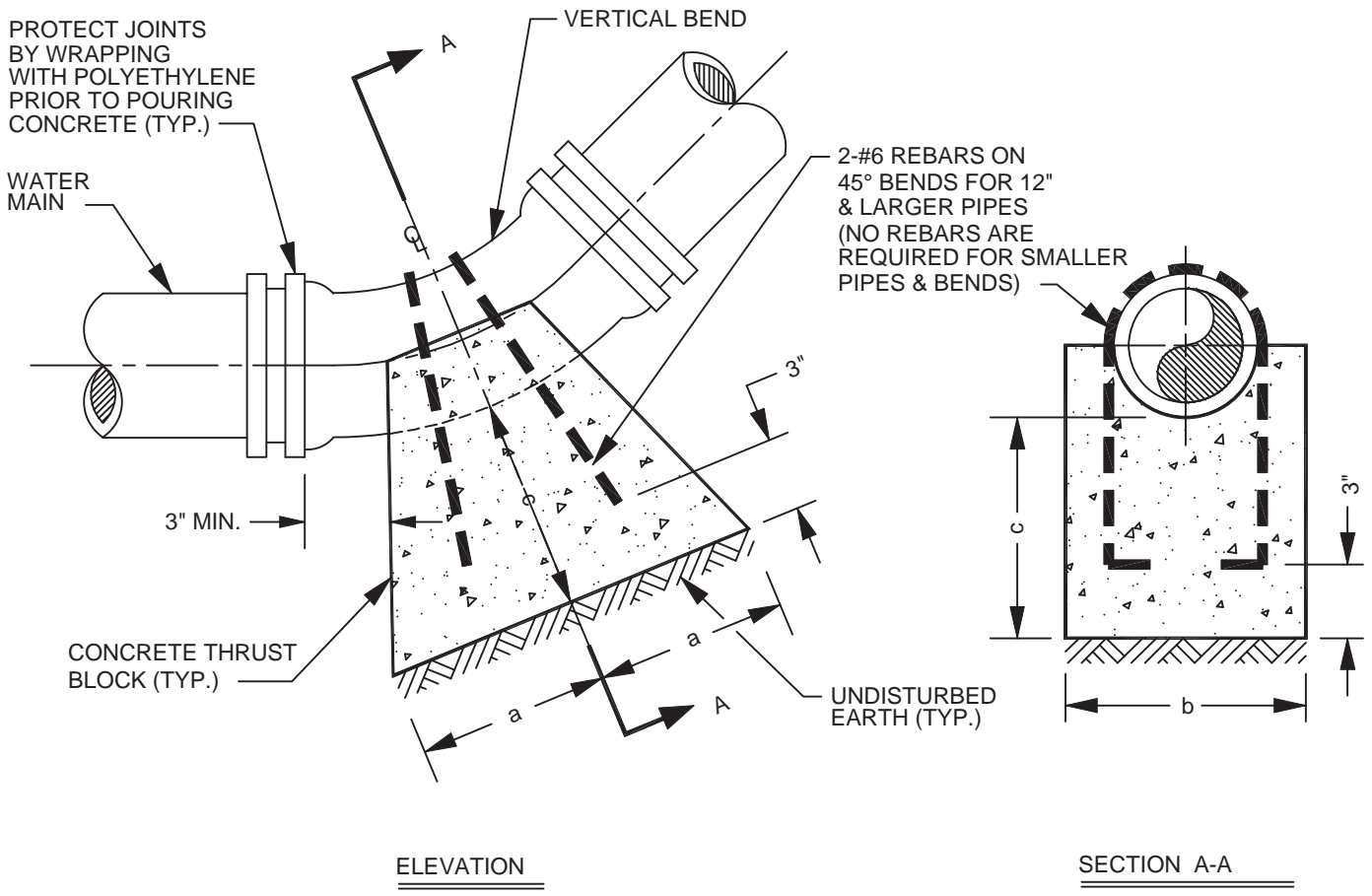
**CONCRETE THRUST BLOCKS
FOR TEES AND CAPS**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-2.1



PIPE DIA.	LOWER VERTICAL BEND								
	11 1/4° (1/32)			22 1/2° (1/16)			45° (1/8)		
	a	b	c	a	b	c	a	b	c
6"	3"	14"	9"	3"	14"	9"	6"	14"	9"
8"	3"	16"	9"	5"	16"	9"	9"	16"	9"
12"	4"	20"	9"	8"	20"	9"	14"	22"	14"
16"	6"	24"	9"	11"	24"	11"	19"	26"	19"

- NOTES :**
1. ALL BEARING SURFACES FOR CONCRETE BLOCKING SHALL BE UNDISTURBED EARTH WITH A MINIMUM BEARING VALUE OF 2,000 PSF. THE MINIMUM THICKNESS OF UNDISTURBED EARTH BENEATH THE BLOCKING SHALL BE 5 FEET.
 2. BLOCKING SHOWN IS FOR A MAXIMUM STATIC PRESSURE OF 120 PSI PLUS WATER HAMMER ALLOWANCE OF 120 PSI. SPECIAL BLOCKING DESIGN SHALL BE REQUIRED FOR CONDITIONS AND SIZES OTHER THAN THOSE INDICATED ON THIS SHEET.
 3. FORM THE NON-BEARING SIDES OF THRUST BLOCKS BY USING PROPER FORMWORK.
 4. PAINT ALL EXPOSED STEEL WITH TWO COATS OF ASPHALT PAINT.

**CONCRETE THRUST BLOCKS
FOR LOWER VERTICAL BENDS**

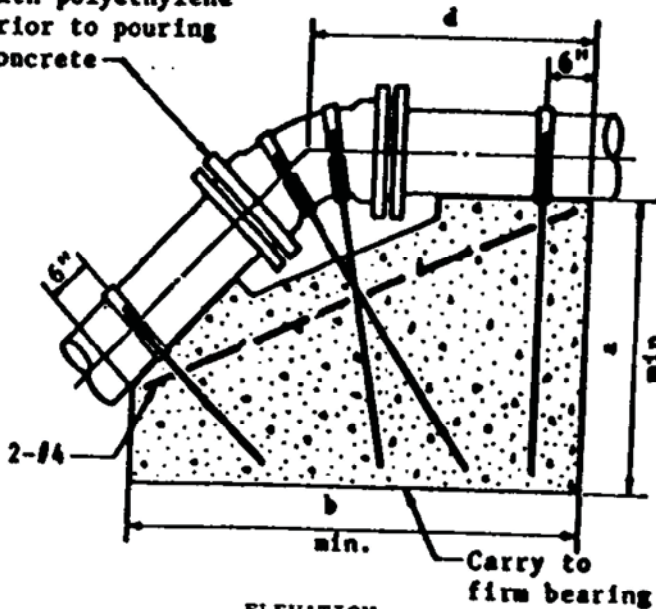
REVISION & DATE	



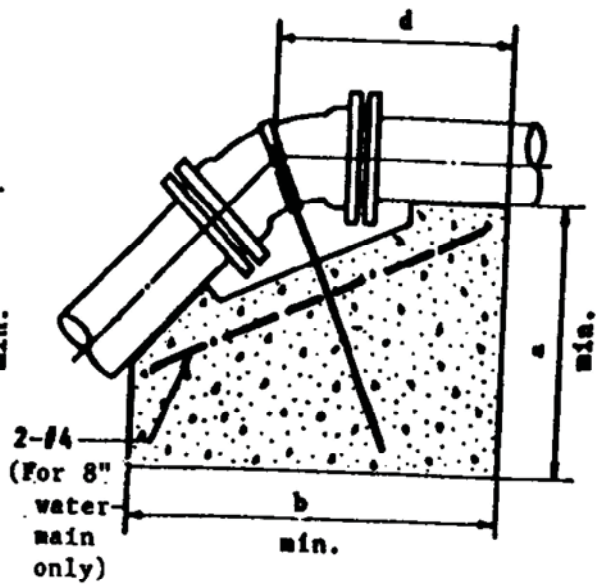
**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-2.2**

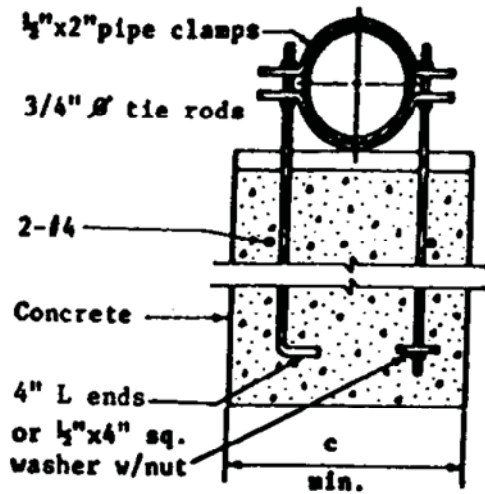
Wrap joints with polyethylene prior to pouring concrete



ELEVATION
12" WATER MAINS



ELEVATION
8" & SMALLER WATER MAINS



TYPICAL SECTION

	11 1/2° Bend			22 1/2° Bend			45° Bend		
	6"	8"	12"	6"	8"	12"	6"	8"	12"
a	21"	27"	36"	30"	39"	48"	42"	48"	60"
b	27"	36"	51"	36"	54"	78"	42"	54"	84"
c	30"	30"	36"	30"	30"	36"	30"	30"	36"
d	15"	21"	27"	21"	30"	42"	27"	36"	48"

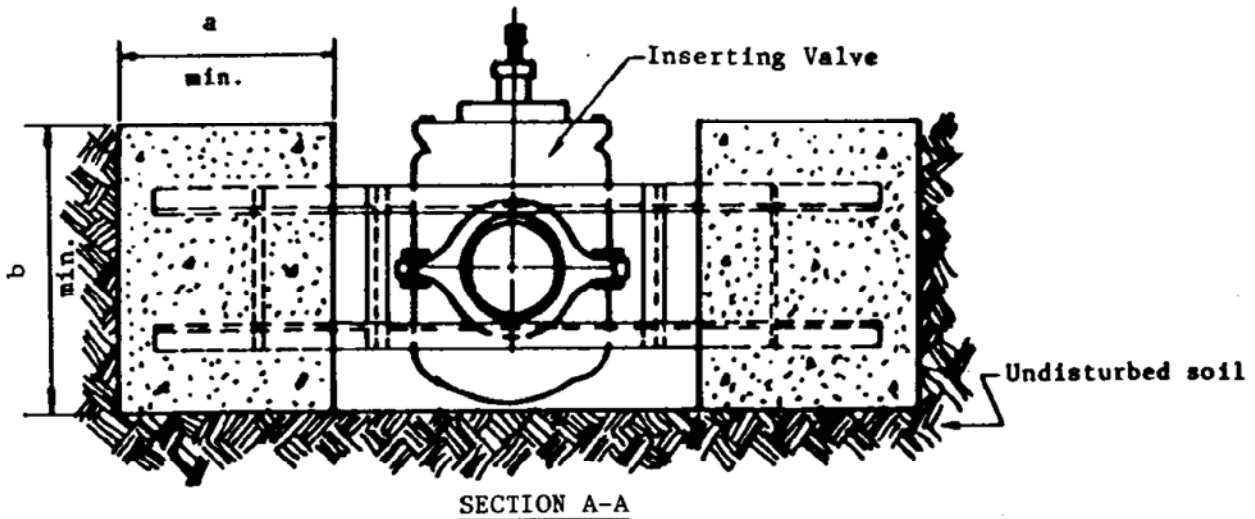
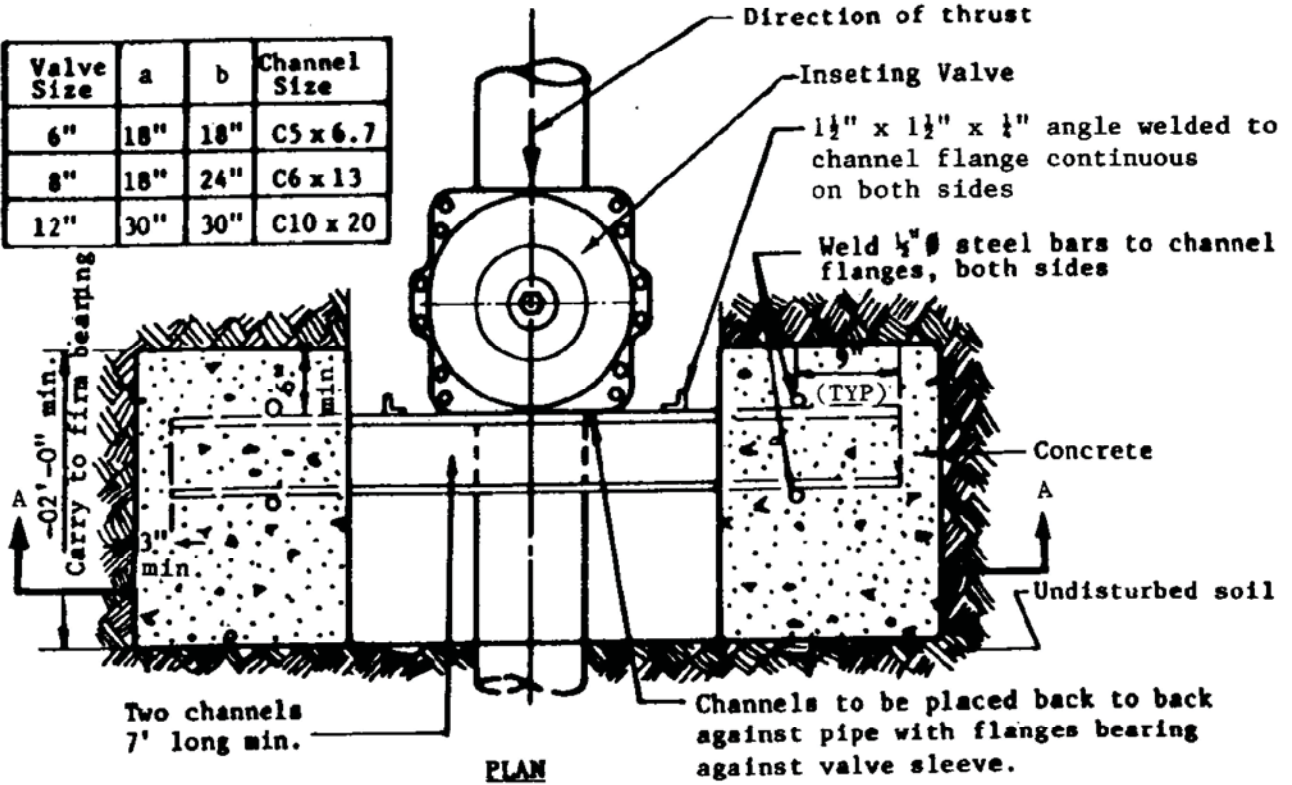
NOTES:

1. Blocking shown is for maximum static pressure of 120 psi plus water hammer allowance of 120 psi. Special blocking shall be designed for sizes and conditions other than those indicated.
2. Paint all exposed steel with 2 coats of asphalt paint.
3. Form sides of thrust blocks.

CONCRETE THRUST BLOCKS
UPPER VERTICAL BENDS

REVISION & DATE

Valve Size	a	b	Channel Size
6"	18"	18"	C5 x 6.7
8"	18"	24"	C6 x 13
12"	30"	30"	C10 x 20

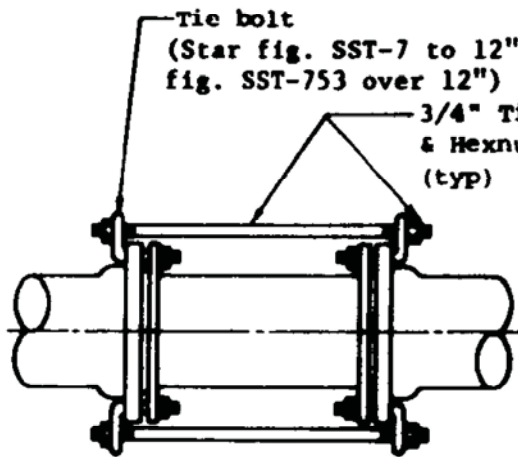


NOTES:

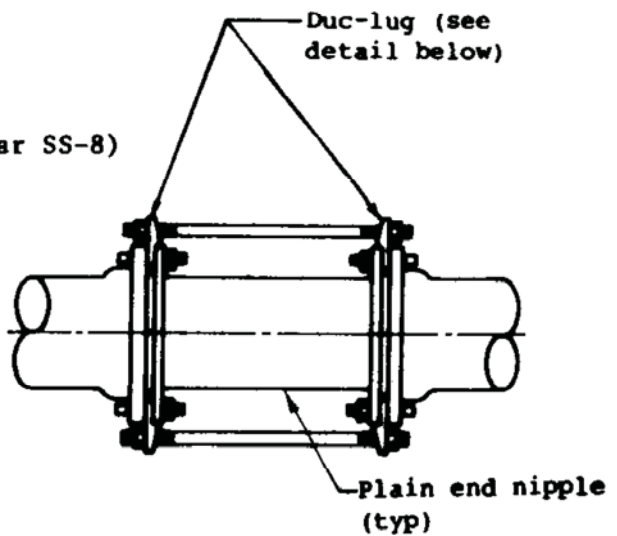
1. All bearing surfaces for concrete blocking shall be undisturbed earth with a minimum bearing value of 2000 psf. The minimum thickness of undisturbed earth behind the blocking shall be 5 feet.
2. Blocking is shown for maximum static pressure of 120 psi plus water hammer allowance of 120 psi. Special blocking shall be designed for other than those indicated on the plans.
3. Paint all exposed metal with two coats of asphalt paint.

**CONCRETE THRUST BLOCKS
INSERTING VALVES**

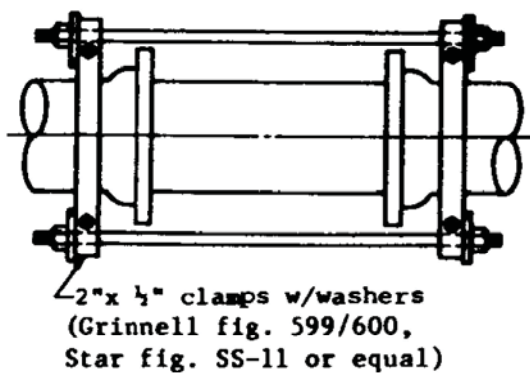
REVISION & DATE



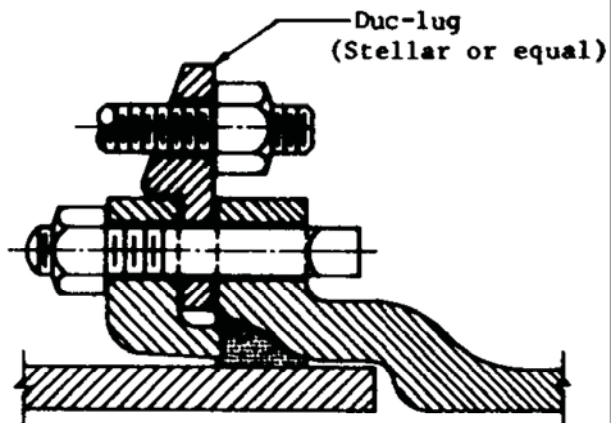
TIE BOLT TYPE



DUC-LUG TYPE



SOCKET CLAMP TYPE



DUC-LUG DETAIL

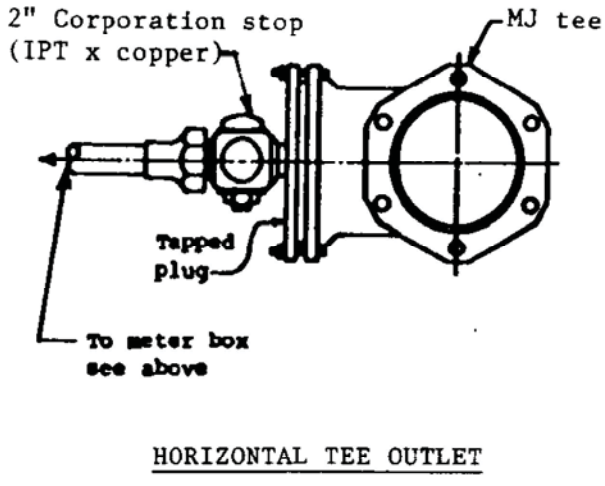
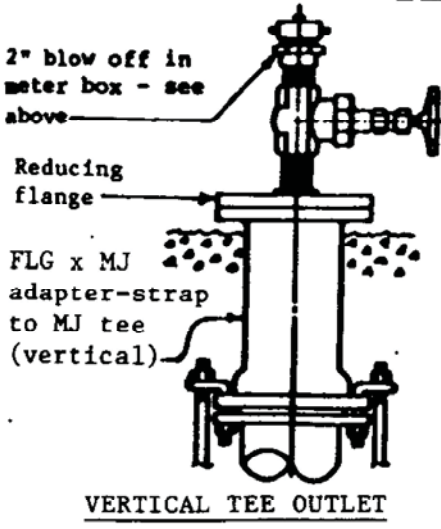
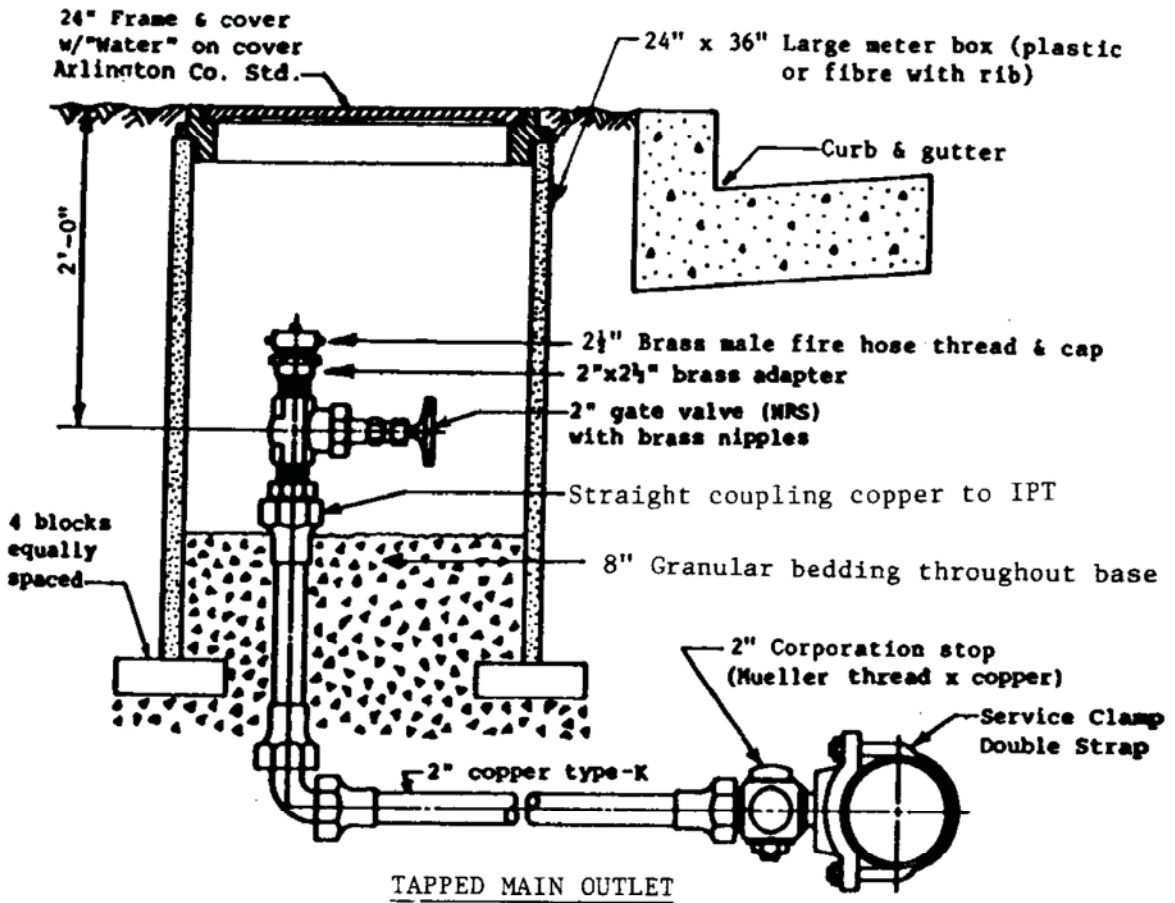
NOTES:

1. Paint all exposed steel with two coats of asphalt paint.
2. Positive lock type restrained joints may be used if approved by Water, Sewer & Streets Division.
3. Socket clamps may be used only for ties to existing 8" & smaller poured joints.

Pipe size	No. of Tie rods
6 "	2
8 "	2
12 "	4
14 "	5
16 "	6
20 "	7

RESTRAINED JOINT DETAIL

REVISION & DATE



LEGEND.
 FLG = Flanged
 IPT = Iron pipe thread
 NRS = Non rising stem
 MJ = Mechanical joint

BLOWOFF DETAILS

REVISION & DATE	



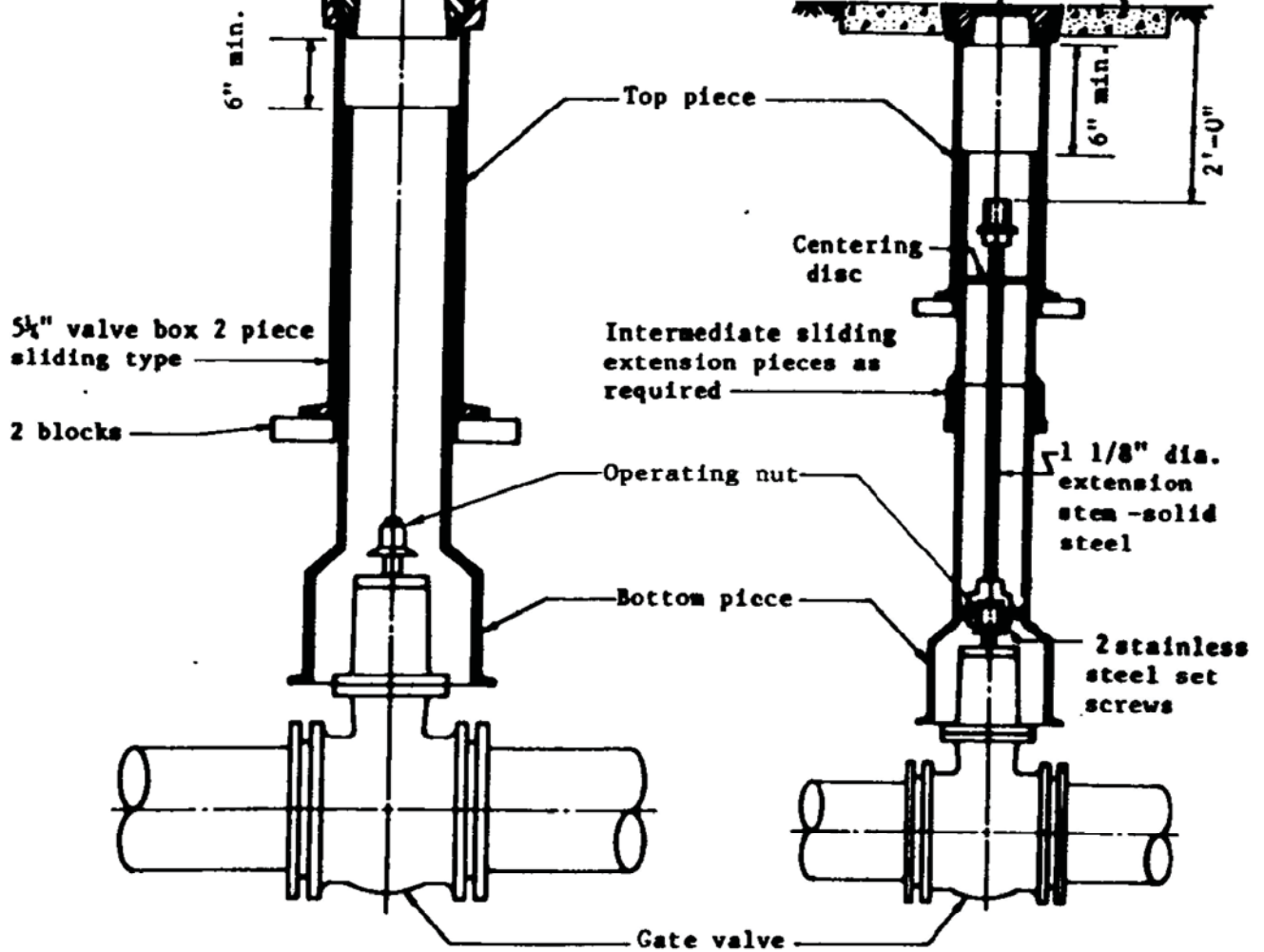
ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-4.0

Valve box cap marked "water"

Finished grade

Provide 18" sq. concrete or asphalt pad when valve is located in unpaved area



NORMAL SETTING

DEEP SETTING

NOTES.

1. Provide extension stem when operating nut is over 5 feet deep.
2. Valves shall be strapped to adjacent fittings unless directed otherwise.

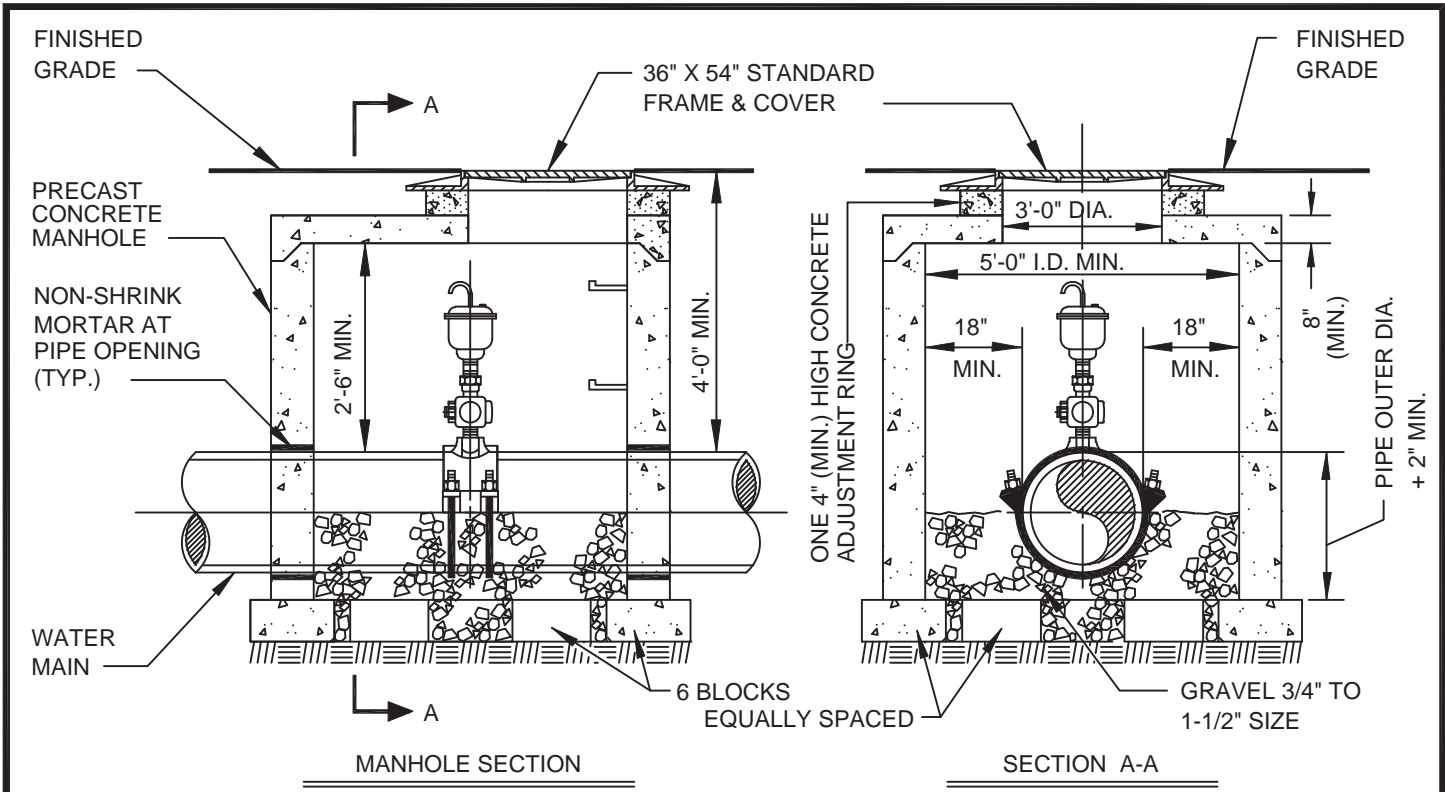
GATE VALVE SETTING

REVISION & DATE



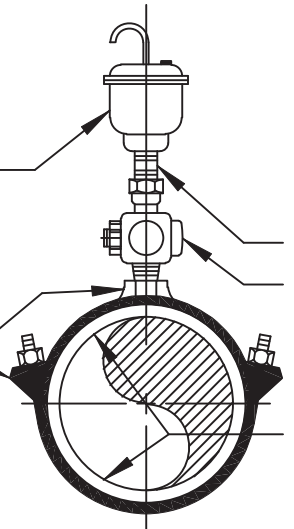
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-5.0



AIR RELEASE VALVE -
APCO MODEL 200 WITH
3/8" ORIFICE,
CRISPIN MODEL PL20
WITH 5/16" ORIFICE
OR APPROVED EQUAL

SERVICE CLAMP -
DOUBLE STRAP BY
MUELLER CO. OR
APPROVED EQUAL

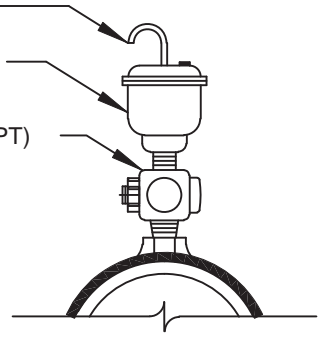


TAPPED OUTLET

SCREENED OUTLET
AIR RELEASE VALVE
CORPORATION STOP
(AWWA THREAD X MIPT)

BRASS NIPPLE (TYP.)
CORPORATION STOP
(AWWA THREAD X FIPT)

WATER MAIN



ALTERNATE
ARRANGEMENT

LEGEND :

FIPT = FEMALE IRON PIPE THREAD
MIPT = MALE IRON PIPE THREAD

NOTES :

1. AIR RELEASE VALVE AND PIPING SHALL BE 2-INCH UNLESS INDICATED OTHERWISE.
2. AIR RELEASE VALVE SHALL NOT BE LOCATED IN AN AREA SUBJECT TO FLOODING OR HIGH WATER TABLE. SPECIAL VENT PIPING AND SUMP PUMP WILL BE REQUIRED WHERE SUCH LOCATION CANNOT BE AVOIDED.
3. TO PROTECT FROM FREEZING, A 4' X 4' X 3/32" THICK MINICEL CROSS LINKED POLYETHYLENE PIT INSULATING BLANKET BY FORD METER BOX CO. OR APPROVED EQUAL SHALL BE WRAPPED AROUND THE AIR RELEASE VALVE.

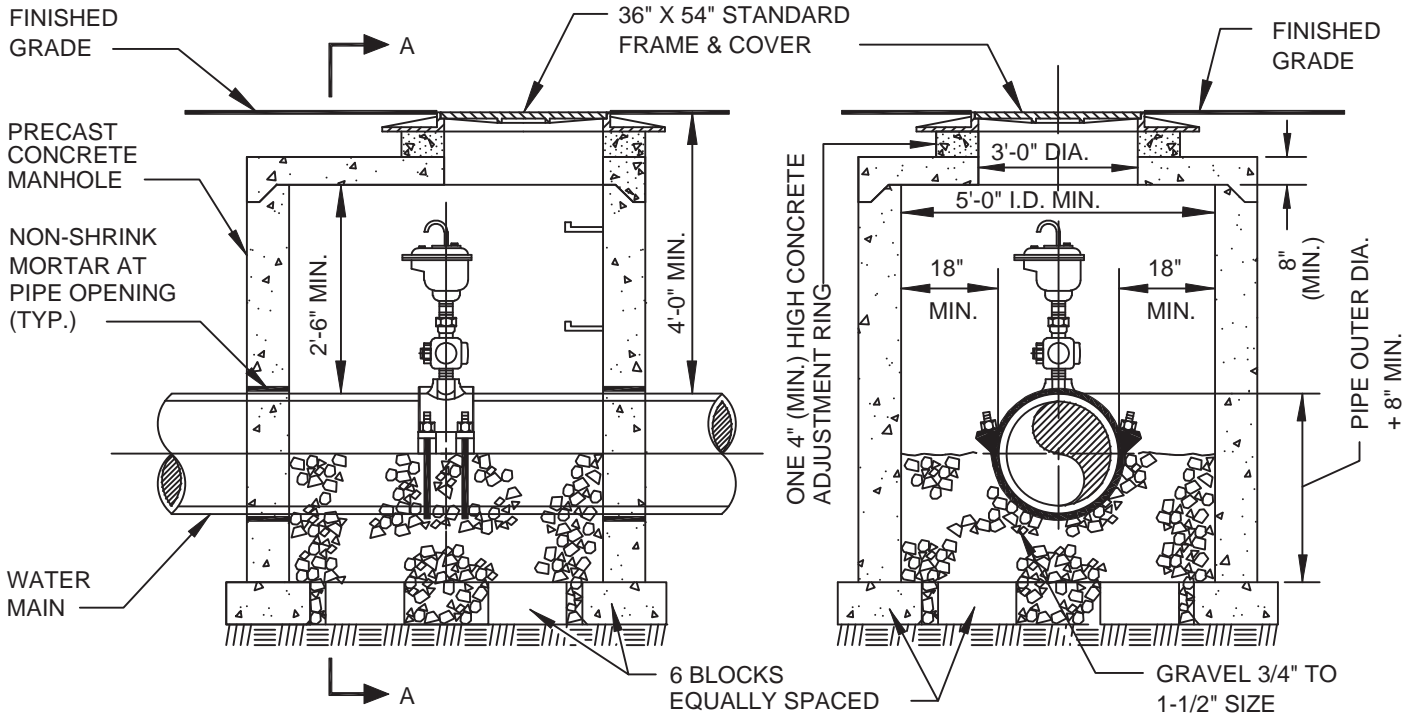
AIR RELEASE VALVE

REVISION & DATE



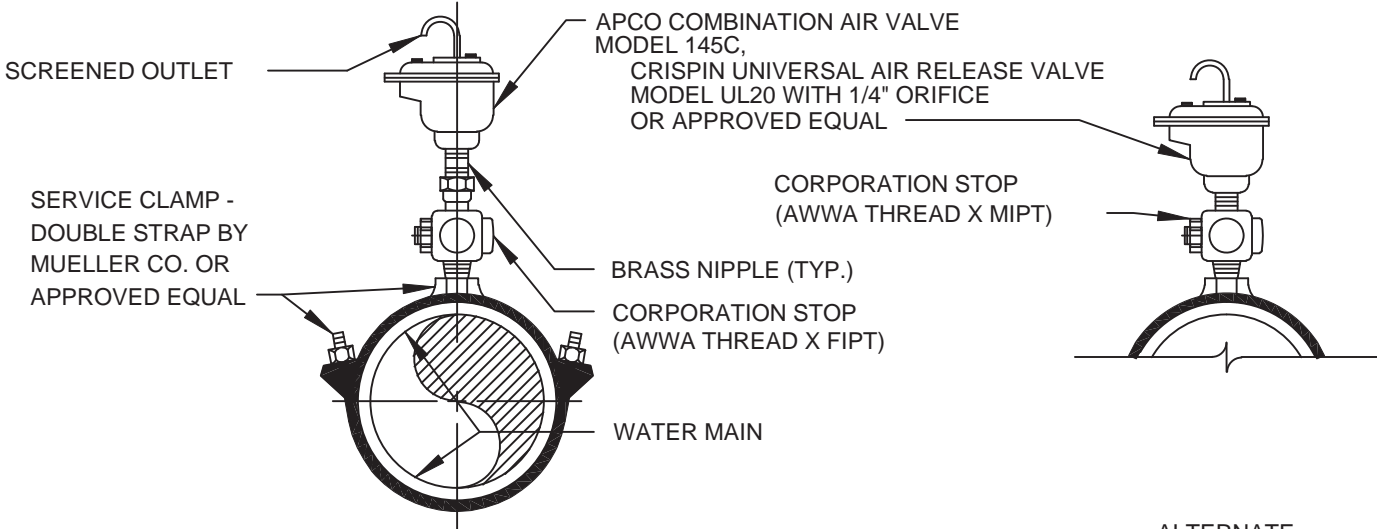
**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-6.0**



MANHOLE SECTION

SECTION A-A



TAPPED OUTLET

ALTERNATE ARRANGEMENT

LEGEND :

FIPT = FEMALE IRON PIPE THREAD
 MIPT = MALE IRON PIPE THREAD

NOTES :

1. AIR AND VACUUM VALVE AND PIPING SHALL BE 2-INCH UNLESS INDICATED OTHERWISE.
2. AIR AND VACUUM VALVE SHALL NOT BE LOCATED IN AN AREA SUBJECT TO FLOODING OR HIGH WATER TABLE. SPECIAL VENT PIPING AND SUMP PUMP WILL BE REQUIRED WHERE SUCH LOCATION CANNOT BE AVOIDED.
3. TO PROTECT FROM FREEZING, A 4' X 4' X 3/32" THICK MINICEL CROSS LINKED POLYETHYLENE PIT INSULATING BLANKET BY FORD METER BOX CO. OR APPROVED EQUAL SHALL BE WRAPPED AROUND THE AIR AND VACUUM VALVE.

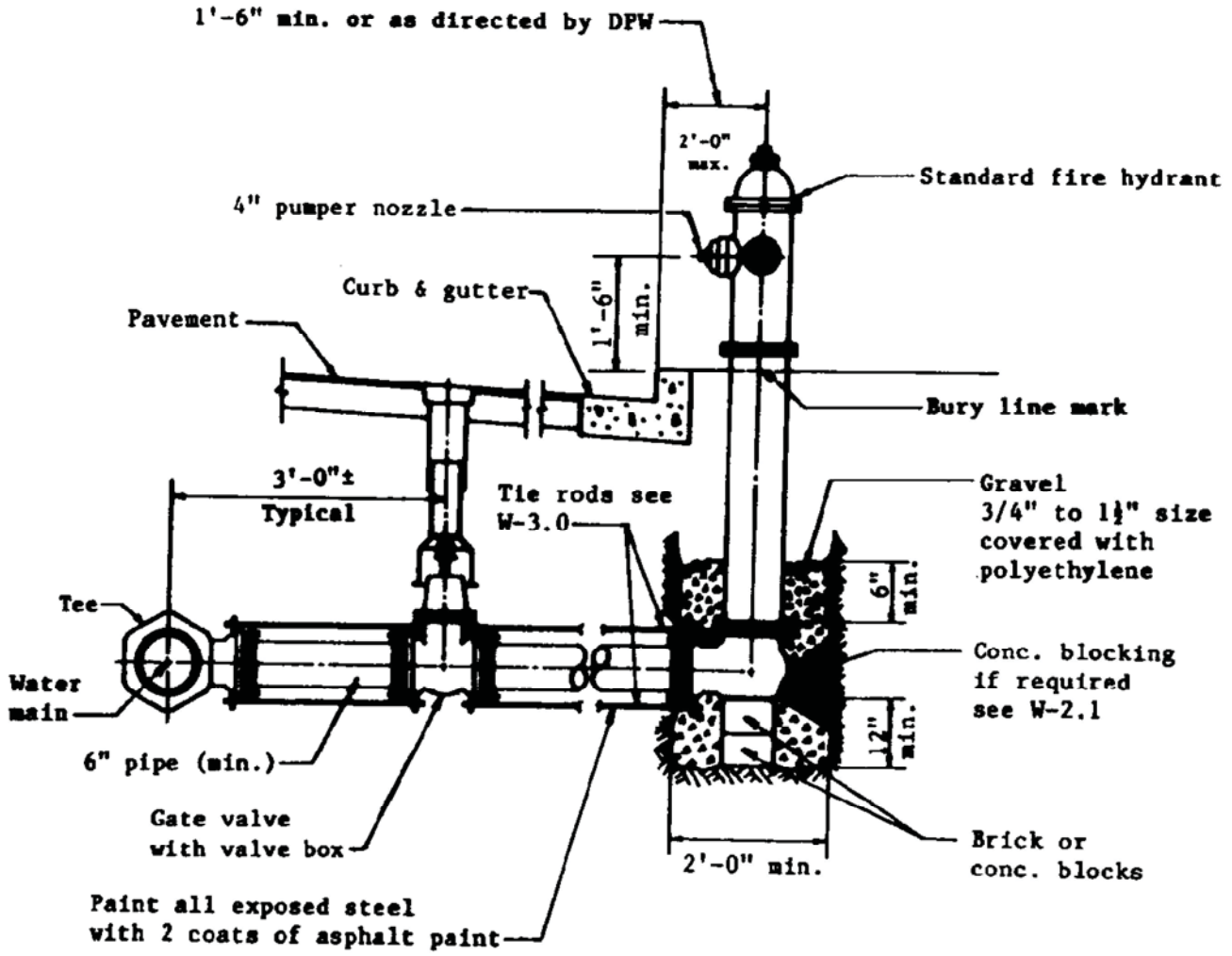
AIR AND VACUUM VALVE

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-6.1



ELEVATION

NOTES:

1. All valves and fire hydrants shall be strapped to main unless directed otherwise.
2. Provide vertical offsets or bends as required to set hydrants at proper grade.
3. Maximum bury depth of fire hydrant is 6' unless approved otherwise.

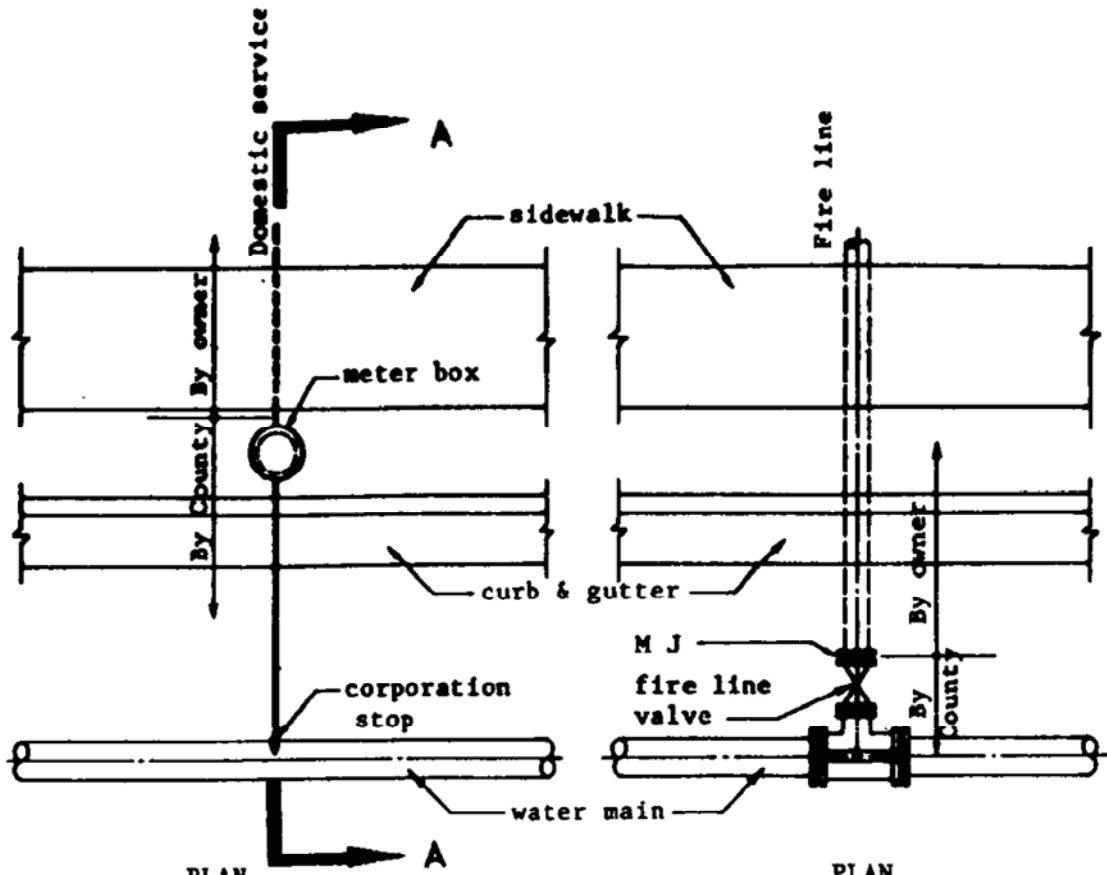
FIRE HYDRANT SETTING

REVISION & DATE



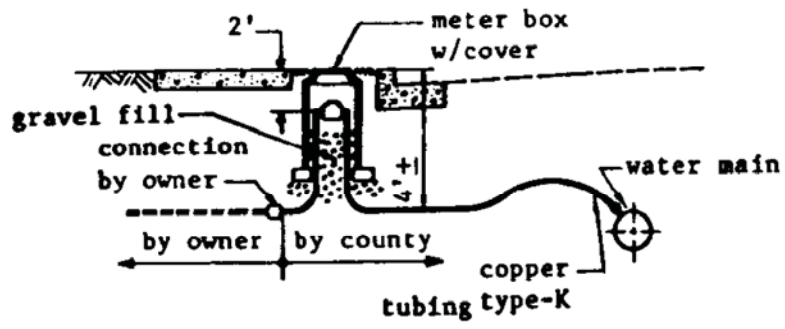
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-7.0



PLAN
2-INCH & SMALLER SERVICE

PLAN
FIRE LINE
(If required)



SECTION A-A

Service Size	Meter Size	Box Size
1"	3/4"	18"
1 1/2"	1 1/2"	24"
2"	2"	36"

LEGEND
MJ- Mechanical Joint

NOTES:

- SERVICES WILL BE INSTALLED AFTER ALL FEES HAVE BEEN PAID AND ALL SITE CONDITIONS FOR SETTING THE METER HAVE BEEN MET.
- THE PROPERTY OWNER'S PLUMBER SHALL BE RESPONSIBLE FOR CONNECTING TO THE COUNTY METER INSTALLATION. PLUMBER SHALL NOT ENTER METER BOX.

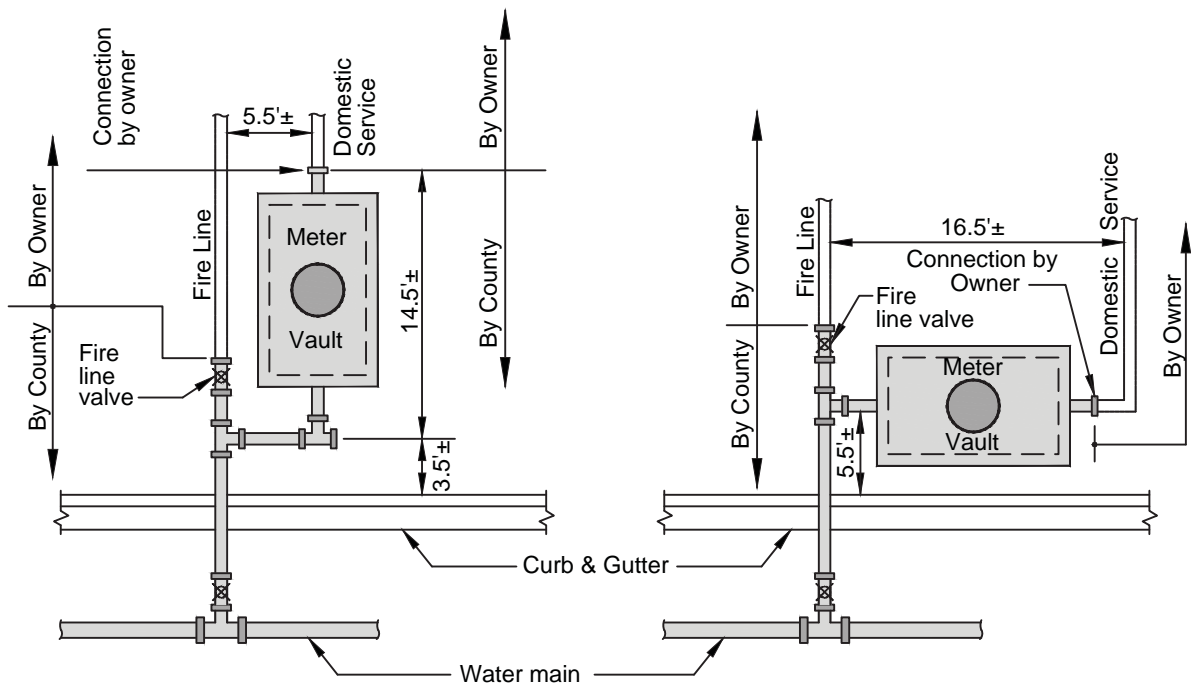
**WATER SERVICE CONNECTIONS
2-INCH AND SMALLER**

REVISION & DATE



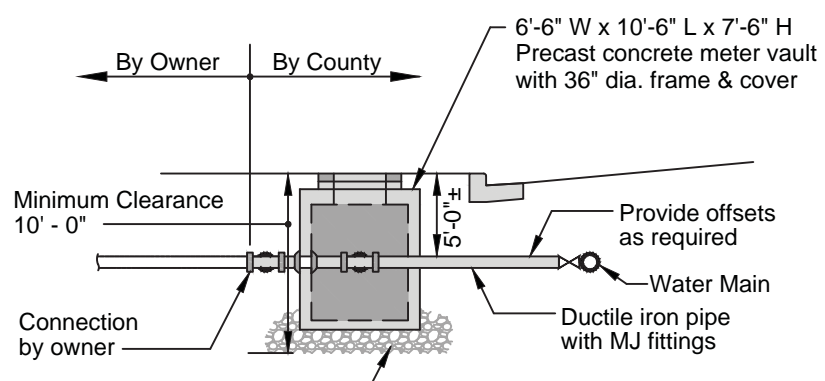
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-8.0



PLAN

ALTERNATE PLAN



TYPICAL SECTION

LEGEND
MJ = Mechanical joint

NOTES :

1. Services will be installed by County after all fees have been paid and all site conditions for setting the meter have been met.
2. The property owner's plumber shall be responsible for connecting to the County's meter installation. Plumber shall not enter meter vault.
3. Fire line valve will be omitted if no fire line is required.
4. Separate fire line installation shall be similar to the one shown in W- 8.0.
5. Alternate piping configuration will be installed as necessary for special situations as approved.
6. A permanent clear space 20' x 15' x 10' deep shall be provided behind the curb for water meter vault.

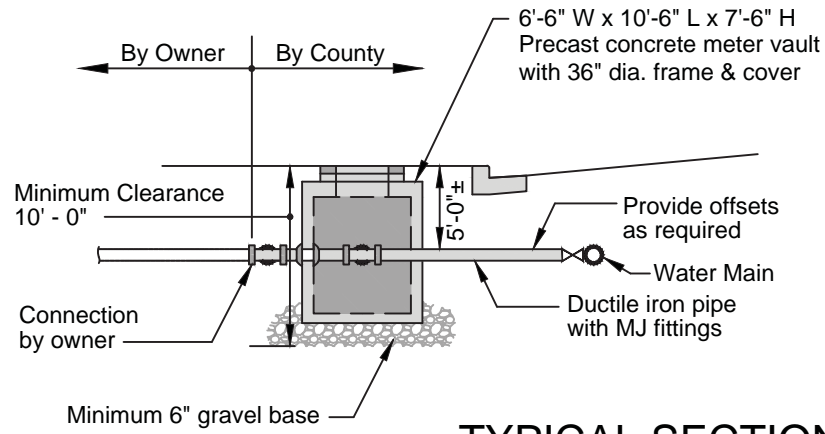
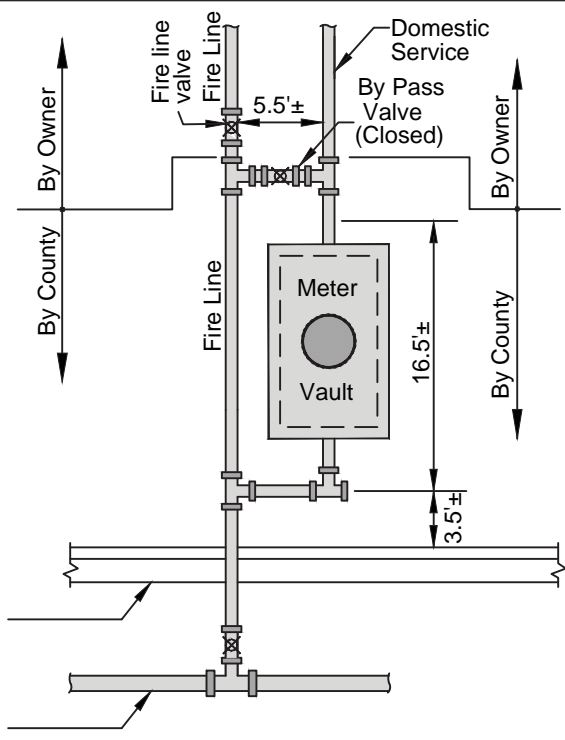
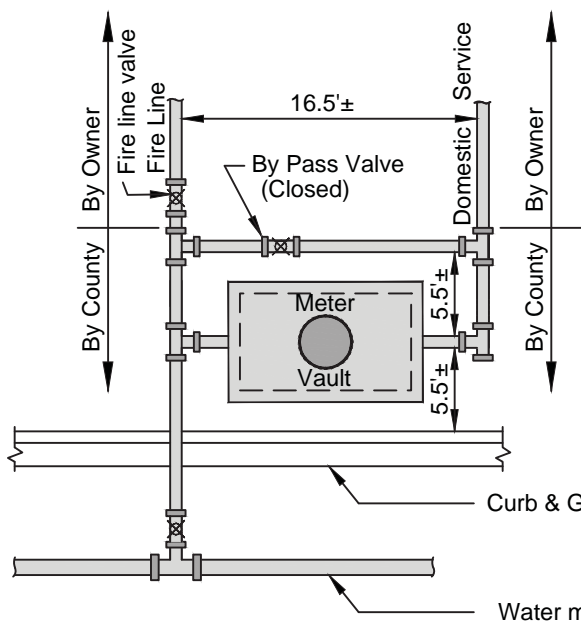
**WATER SERVICE CONNECTIONS
3 - INCH AND 4 - INCH**

Vault Dim	7/11/2013
REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-8.1**



LEGEND
MJ = Mechanical joint

NOTES :

1. Services will be installed by County after all fees have been paid and all site conditions for setting the meter have been met.
2. The property owner's plumber shall be responsible for connecting to the County's meter installation. Plumber shall not enter meter vault.
3. Fire line valve will be omitted if no fire line is required.
4. Separate fire line installation shall be similar to the one shown in W- 8.0.
5. Alternate piping configuration will be installed as necessary for special situations as approved.
6. A permanent clear space 25' x 20' x 10' shall be provided behind the curb for water meter vault.

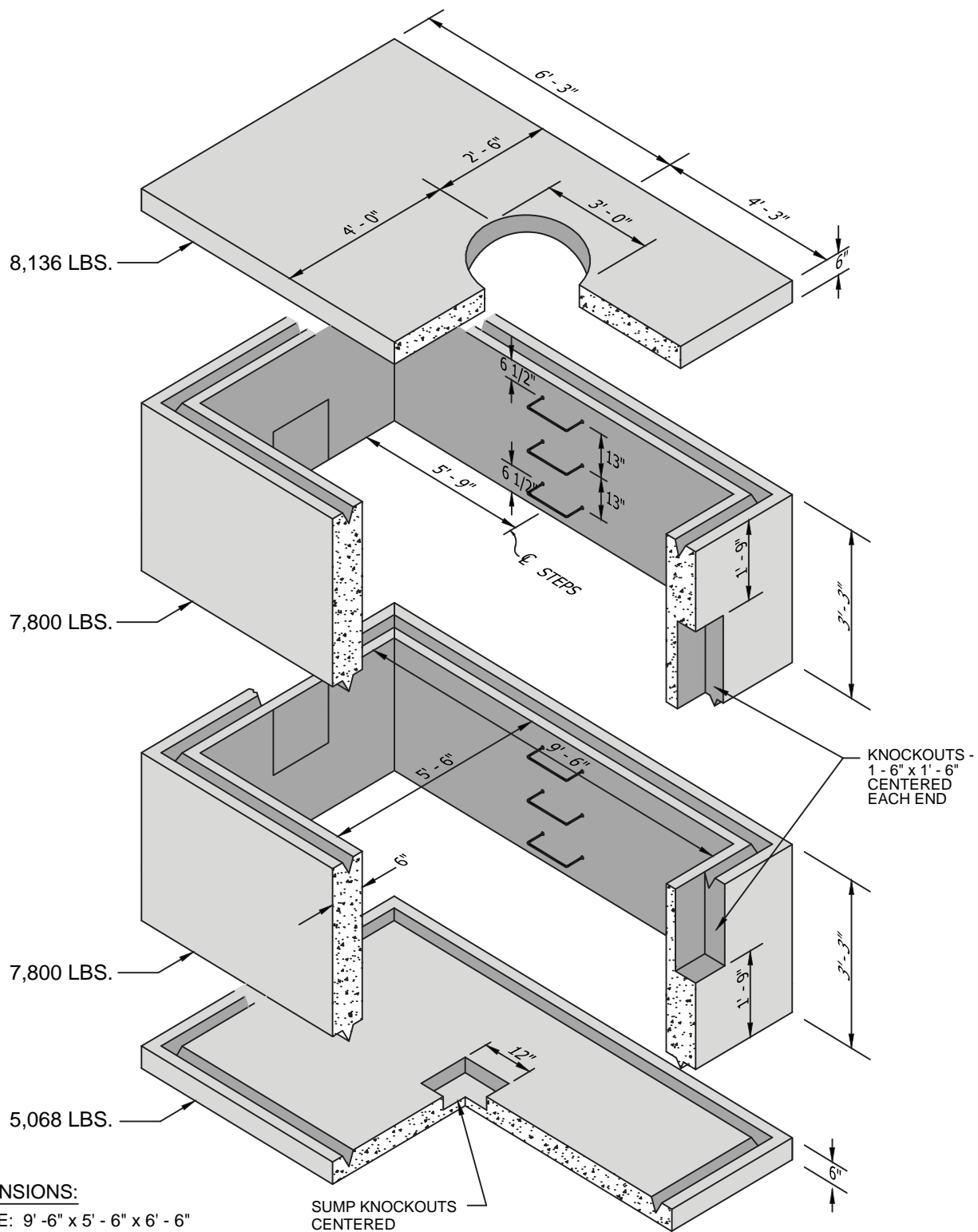
**WATER SERVICE CONNECTIONS
6 - INCH AND 8 - INCH**

Vault Dim	7/11/2013
REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-8.2**



DIMENSIONS:

INSIDE: 9' - 6" x 5' - 6" x 6' - 6"
 OUTSIDE: 10' - 6" x 6' - 6" x 7' - 6"

KNOCKOUTS SIZED & LOCATED AS SHOWN

SUMP KNOCKOUTS
 CENTERED

KNOCKOUTS -
 1' - 6" x 1' - 6"
 CENTERED
 EACH END

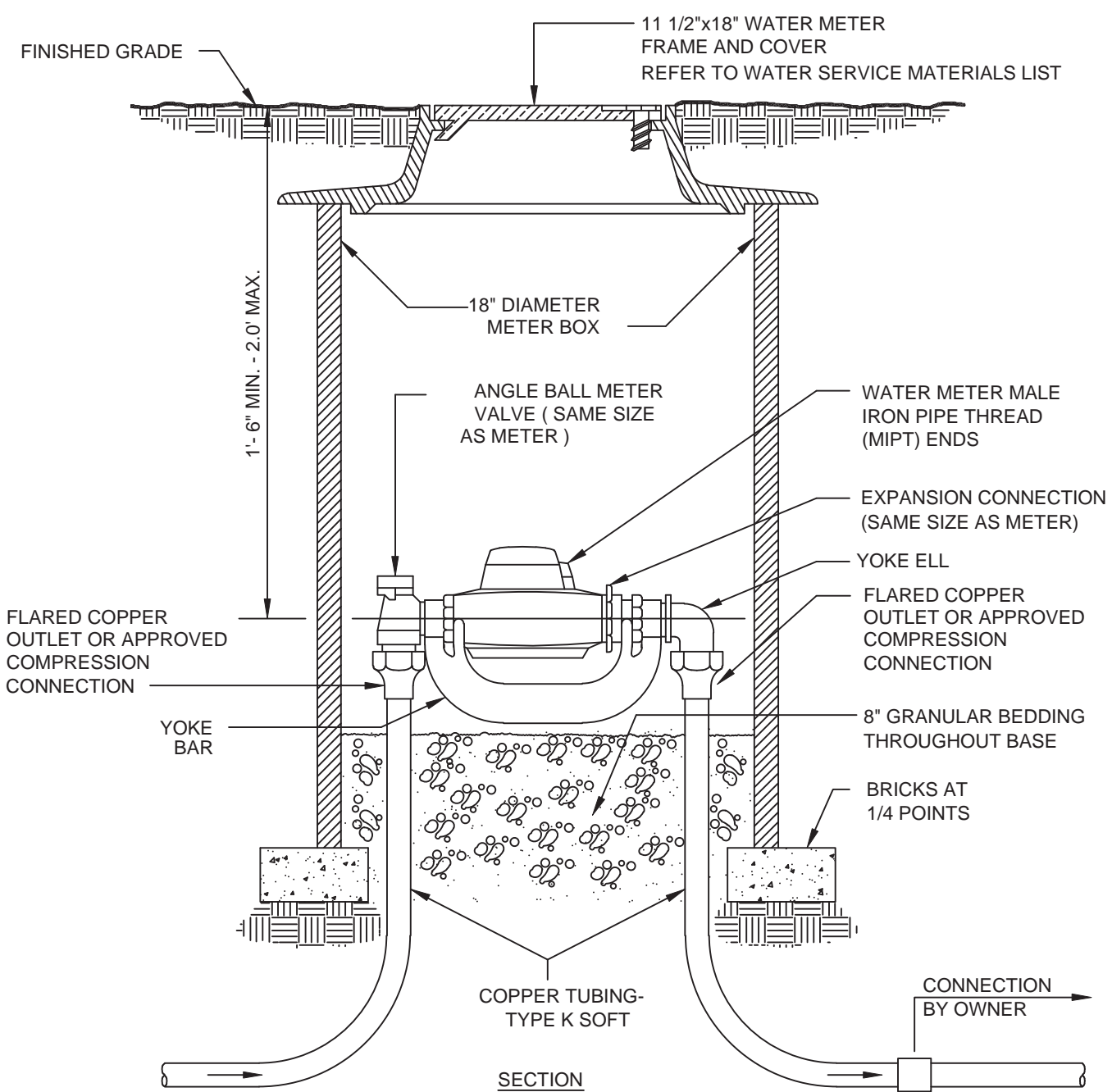
**UTILITY VAULT
 PRECAST REINFORCED CONCRETE**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
 W-8.3**



NOTE: THE MINIMUM SIZE OF NEW WATER SERVICES SHALL BE 1-INCH.

FOR RELOCATION OF EXISTING SERVICE ONLY

WATER SERVICE SIZE	3/4"	1"
COPPER TUBING SIZE	3/4"	1"
METER AND YOKE SIZE	5/8"	3/4"
ANGLE VALVE (METER END x OUTLET END)	5/8"x3/4"	3/4"x1"
YOKE ELL (METER END x OUTLET END)	5/8"x3/4"	3/4"x1"

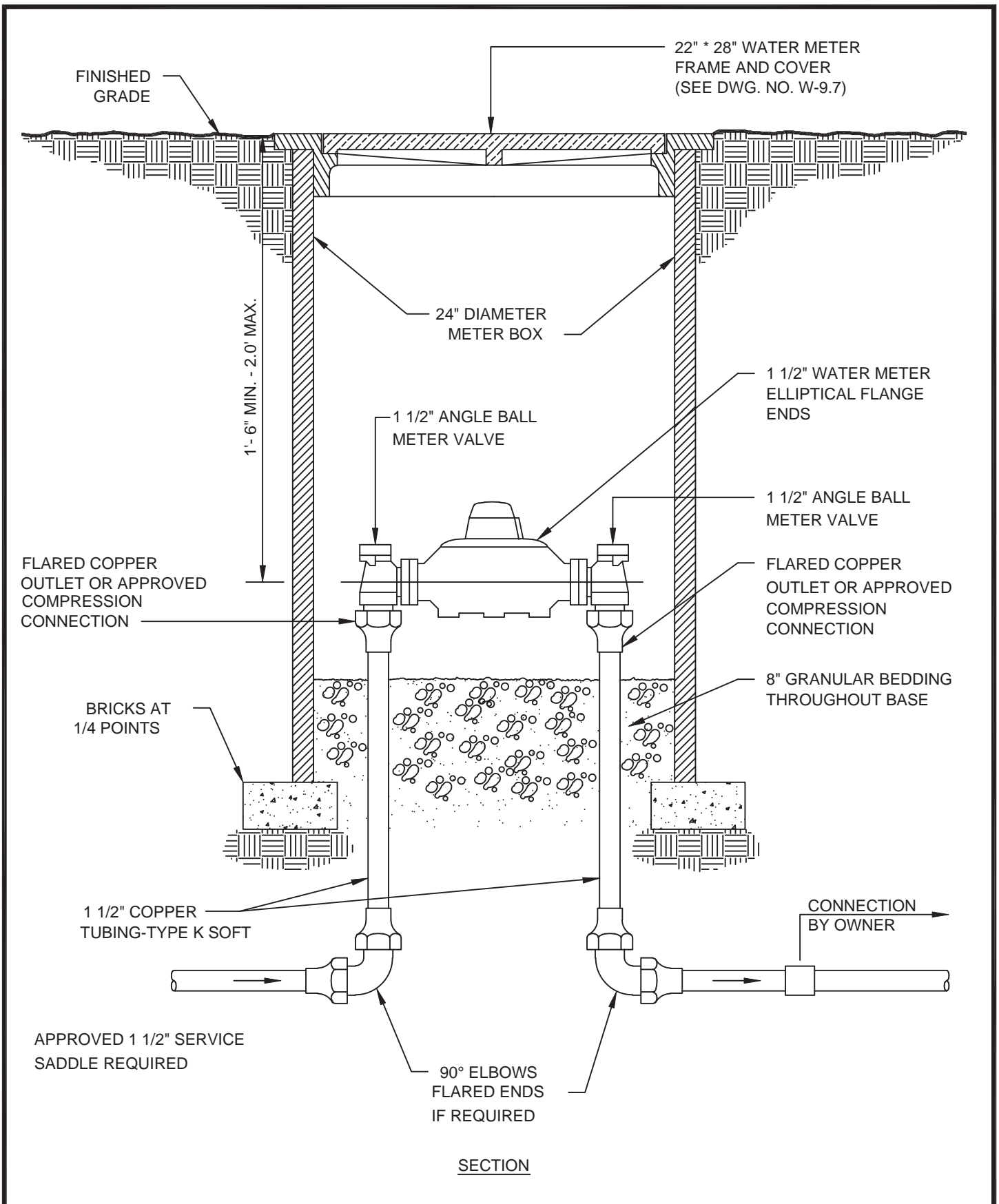
WATER METER INSTALLATION 3/4-INCH AND 1-INCH SERVICE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

REVISION & DATE	

DRAWING NO.
W-9.0



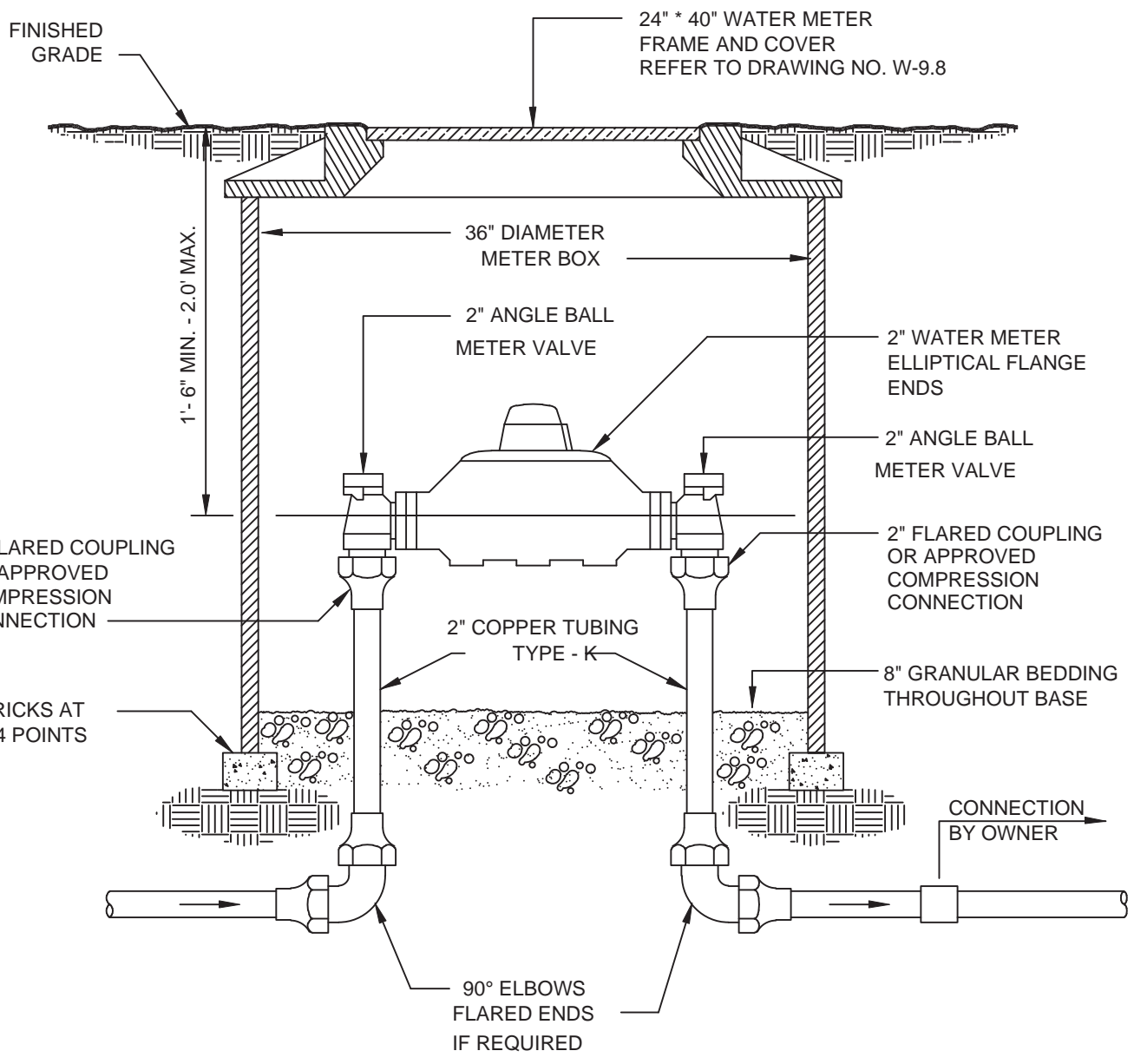
**WATER METER INSTALLATION
1 1/2 INCH SERVICE**

REVISION & DATE	

**DRAWING NO.
W-9.1**



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**



SECTION

APPROVED 2" SERVICE SADDLE REQUIRED

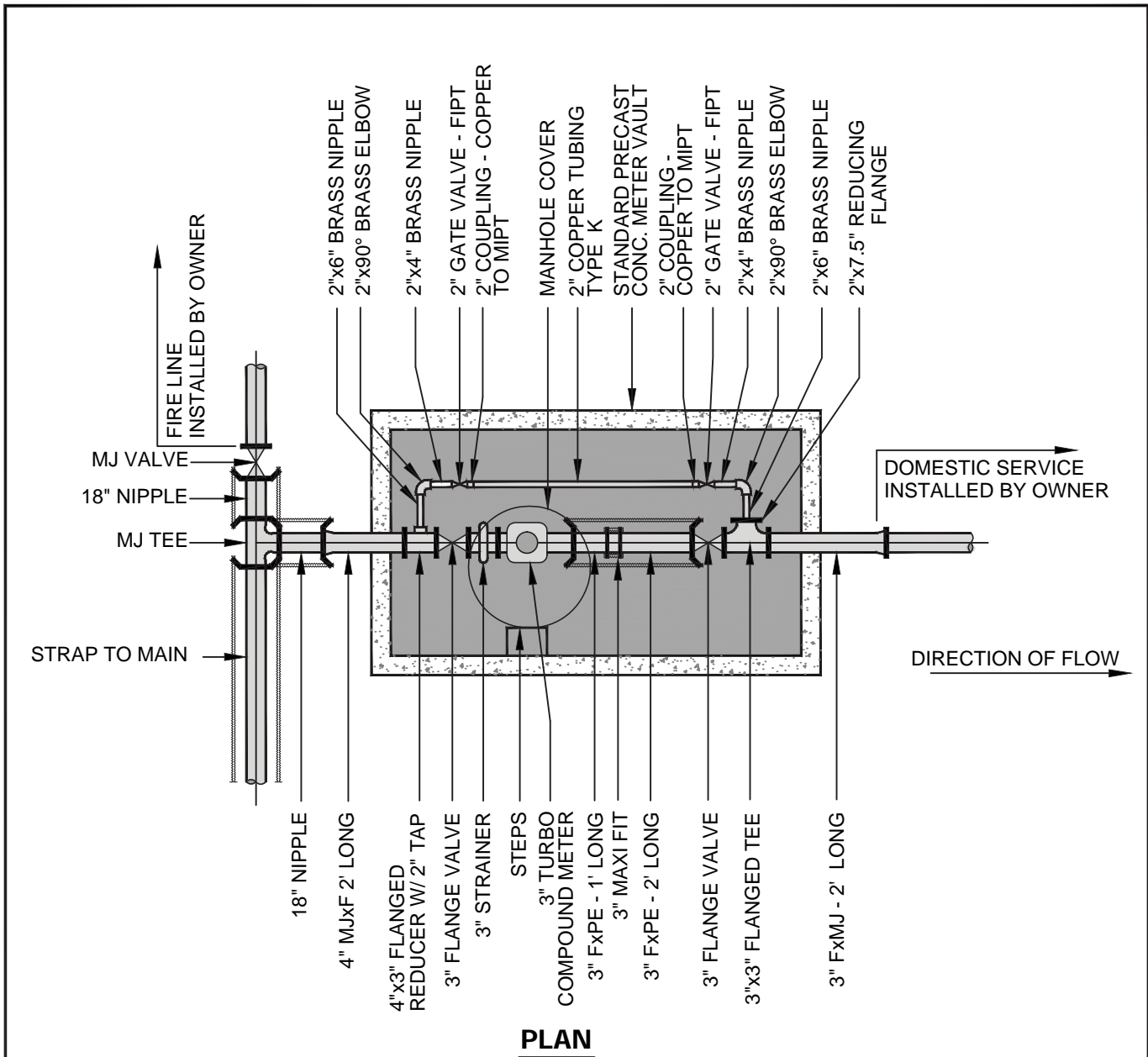
**WATER METER INSTALLATION
2 INCH SERVICE**

REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-9.2**



NOTES:

1. F = FLANGE JOINT, MJ = MECHANICAL JOINT, PE = PLAIN END
FIPT= FEMALE IRON PIPE THREAD, MIPT= MALE IRON PIPE THREAD.
2. FOR OTHER WATER SERVICE DETAILS SEE DRAWING NO. W - 8.1, W-8.3
3. PIPE FROM MAIN TO METER INSTALLATION TEE SHALL BE 4" IF NO FIRE LINE IS
REQUIRED, OTHERWISE PIPE SHALL BE SAME SIZE AS FIRE LINE.
4. PIPE AND FITTING 3" AND LARGER SHALL BE DUCTILE IRON. JOINTS SHALL BE STRAPPED
AS SHOWN.
5. WHEN LOOKING IN THE DIRECTION OF FLOW, STEPS SHALL BE LOCATED ON THE RIGHT HAND
SIDE OF VAULT.

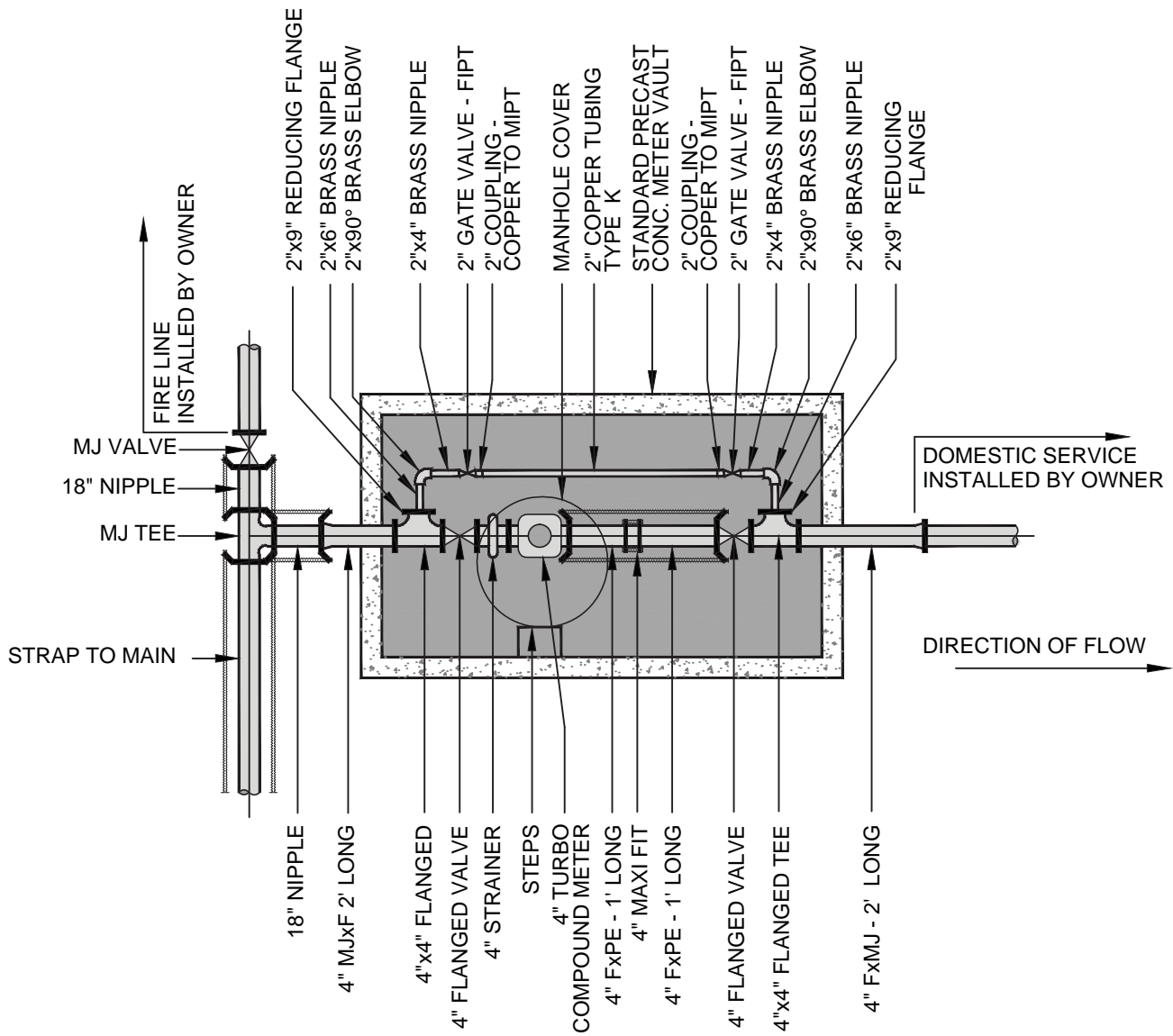
**WATER METER INSTALLATION
3 INCH SERVICE**

Config	7/11/2013
REVISION & DATE	

**DRAWING NO.
W-9.3**



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**



PLAN

NOTES:

1. F = FLANGE JOINT, MJ = MECHANICAL JOINT, PE = PLAIN END
FIPT= FEMALE IRON PIPE THREAD, MIPT= MALE IRON PIPE THREAD.
2. FOR OTHER WATER SERVICE DETAILS SEE DRAWING NO. W - 8.1, W-8.3.
3. PIPE FROM MAIN TO METER INSTALLATION TEE SHALL BE SAME SIZE AS SERVICE MAIN
IF NO FIRE LINE IS REQUIRED, OTHERWISE PIPE SHALL BE SAME SIZE AS FIRE LINE.
4. PIPE AND FITTING 3" AND LARGER SHALL BE DUCTILE IRON. JOINTS SHALL BE STRAPPED
AS SHOWN.
5. WHEN LOOKING IN THE DIRECTION OF FLOW, STEPS SHALL BE LOCATED ON THE RIGHT HAND
SIDE OF VAULT.

**WATER METER INSTALLATION
4 INCH SERVICE**

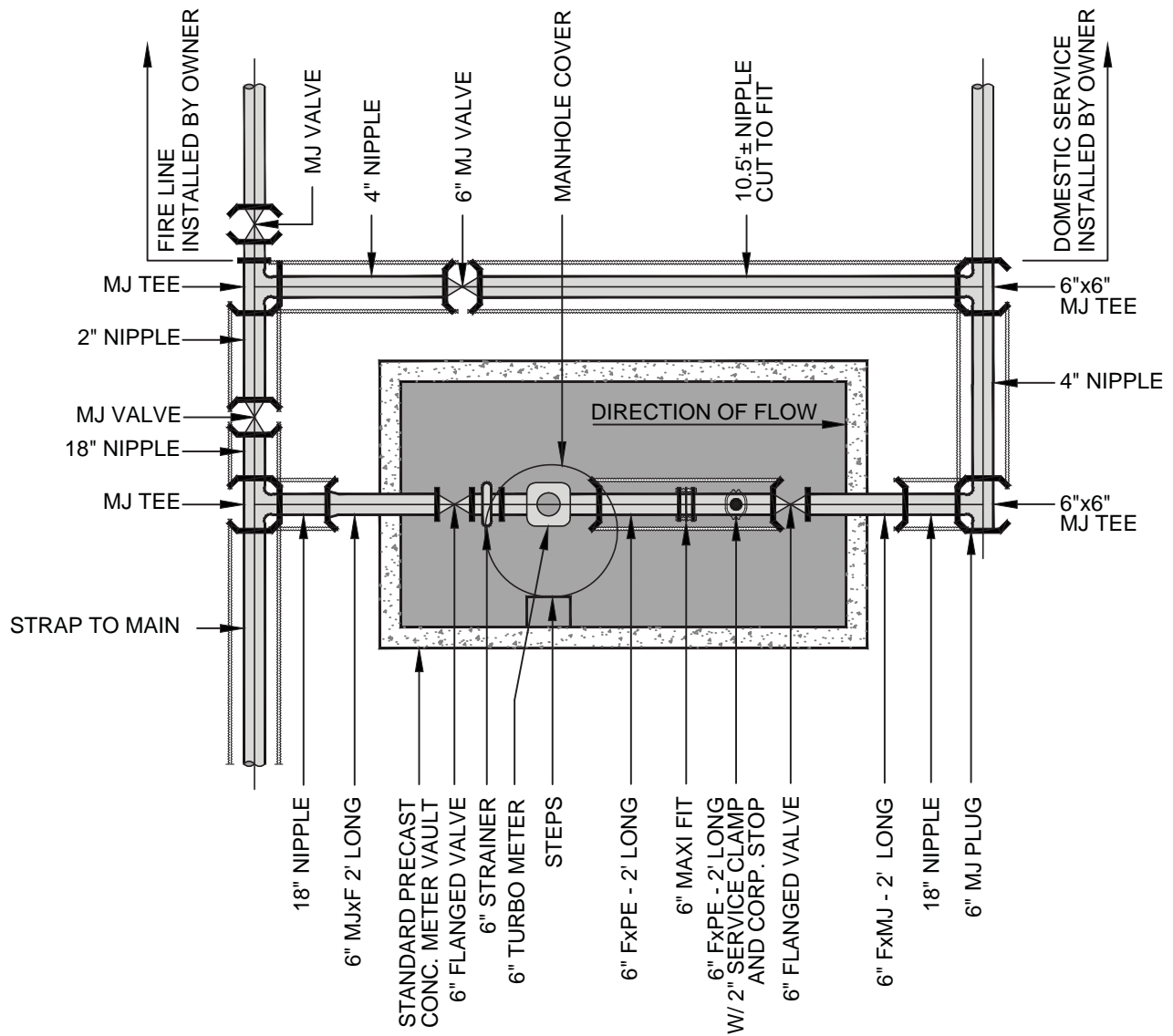
Config 7/11/2013

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-9.4**



PLAN

NOTES:

1. F = FLANGE JOINT, MJ = MECHANICAL JOINT, PE = PLAIN END
2. FOR OTHER WATER SERVICE DETAILS SEE DRAWING NO. W - 8.2, W-8.3.
3. PIPE FROM MAIN TO METER INSTALLATION TEE SHALL BE SAME SIZE AS SERVICE MAIN IF NO FIRE LINE IS REQUIRED, OTHERWISE PIPE SHALL BE SAME SIZE AS FIRE LINE.
4. PIPE AND FITTING 3" AND LARGER SHALL BE DUCTILE IRON. JOINTS SHALL BE STRAPPED AS SHOWN.
5. WHEN LOOKING IN THE DIRECTION OF FLOW, STEPS SHALL BE LOCATED ON THE RIGHT HAND SIDE OF VAULT.

**WATER METER INSTALLATION
6 INCH SERVICE**

Config 7/11/2013

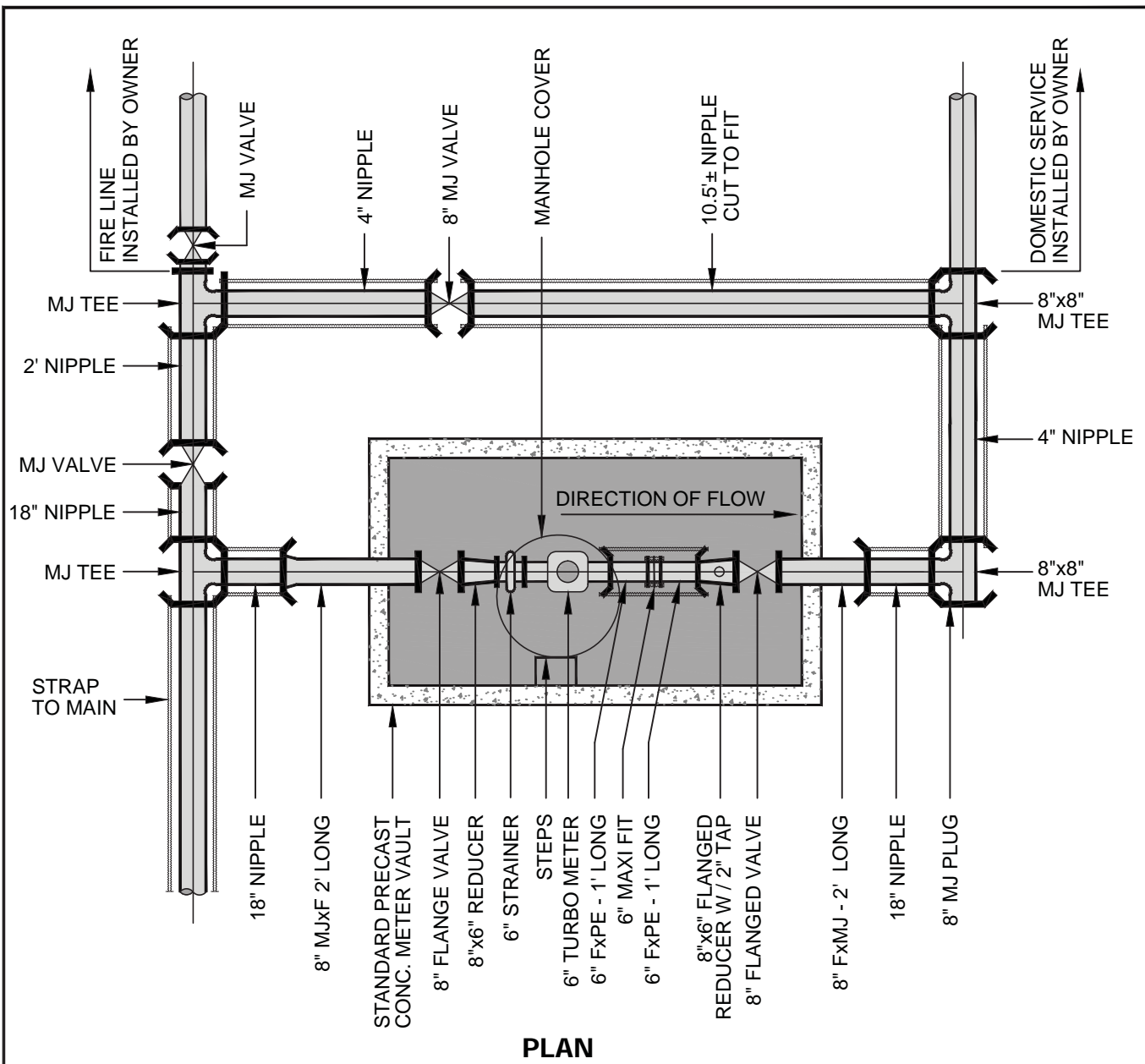
REVISION & DATE



ARLINGTON
VIRGINIA

**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-9.5**



NOTES:

1. F = FLANGE JOINT, MJ = MECHANICAL JOINT, PE = PLAIN END
2. FOR OTHER WATER SERVICE DETAILS SEE DRAWING NO. W - 8.2, W-8.3.
3. PIPE FROM MAIN TO METER INSTALLATION TEE SHALL BE SAME SIZE AS SERVICE MAIN IF NO FIRE LINE IS REQUIRED, OTHERWISE PIPE SHALL BE SAME SIZE AS FIRE LINE.
4. PIPE AND FITTING 3" AND LARGER SHALL BE DUCTILE IRON. JOINTS SHALL BE STRAPPED AS SHOWN.
5. WHEN LOOKING IN THE DIRECTION OF FLOW, STEPS SHALL BE LOCATED ON THE RIGHT HAND SIDE OF VAULT.

**WATER METER INSTALLATION
8 INCH SERVICE**

Config 7/11/2013

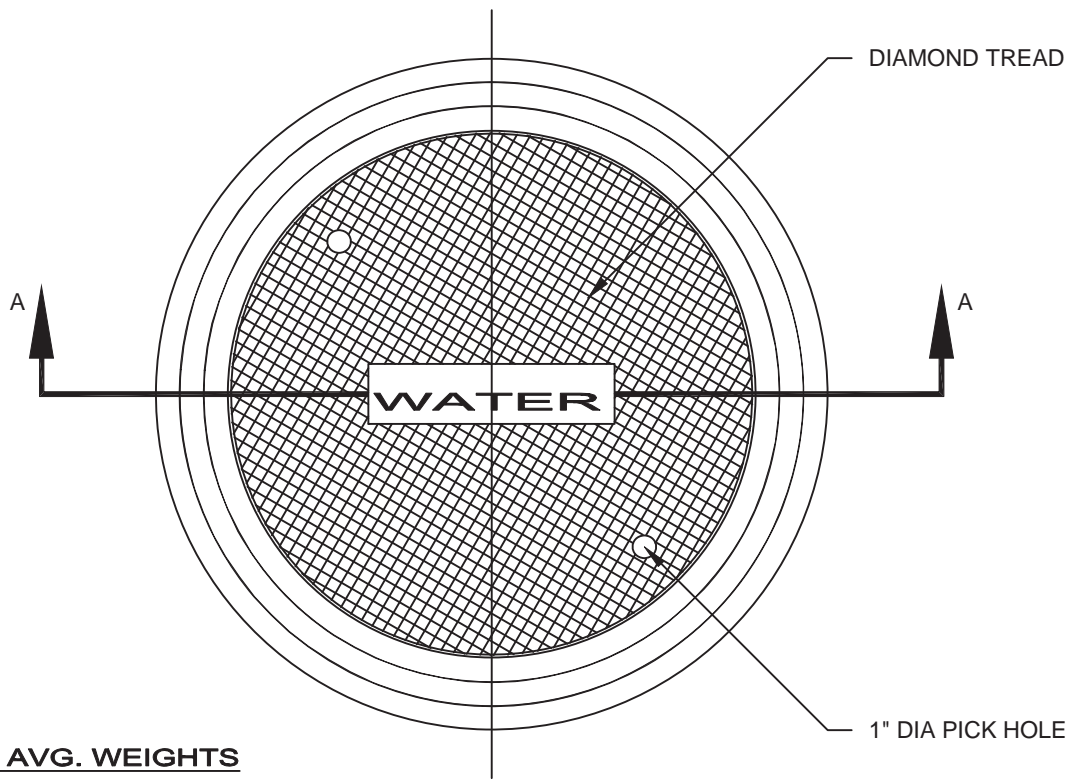
REVISION & DATE



ARLINGTON
VIRGINIA

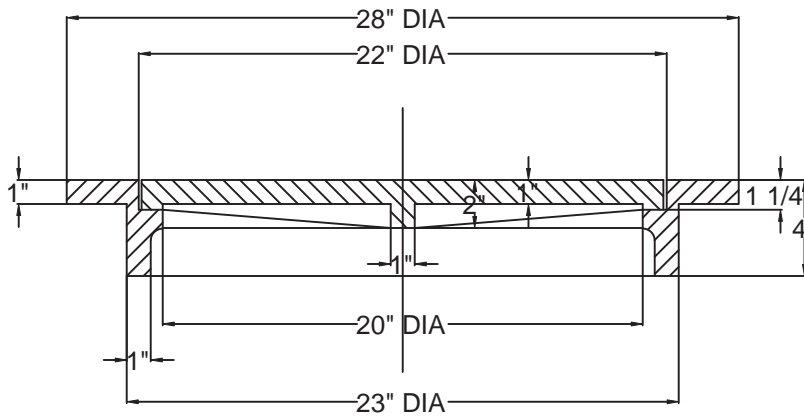
**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-9.6**



MINIMUM AVG. WEIGHTS
FRAME . . . 120 LBS.
COVER . . . 95 LBS.
TOTAL . . . 215 LBS.

PLAN



SECTION A-A

NOTE:

1. FRAME AND COVER ARE GRAY CAST IRON ASTM A-48 CLASS 30 (MIN).

**22"x28" FRAME AND COVER
 FOR 24" I.D. WATER METER BOX**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
 W-9.7**



COVER INSERT

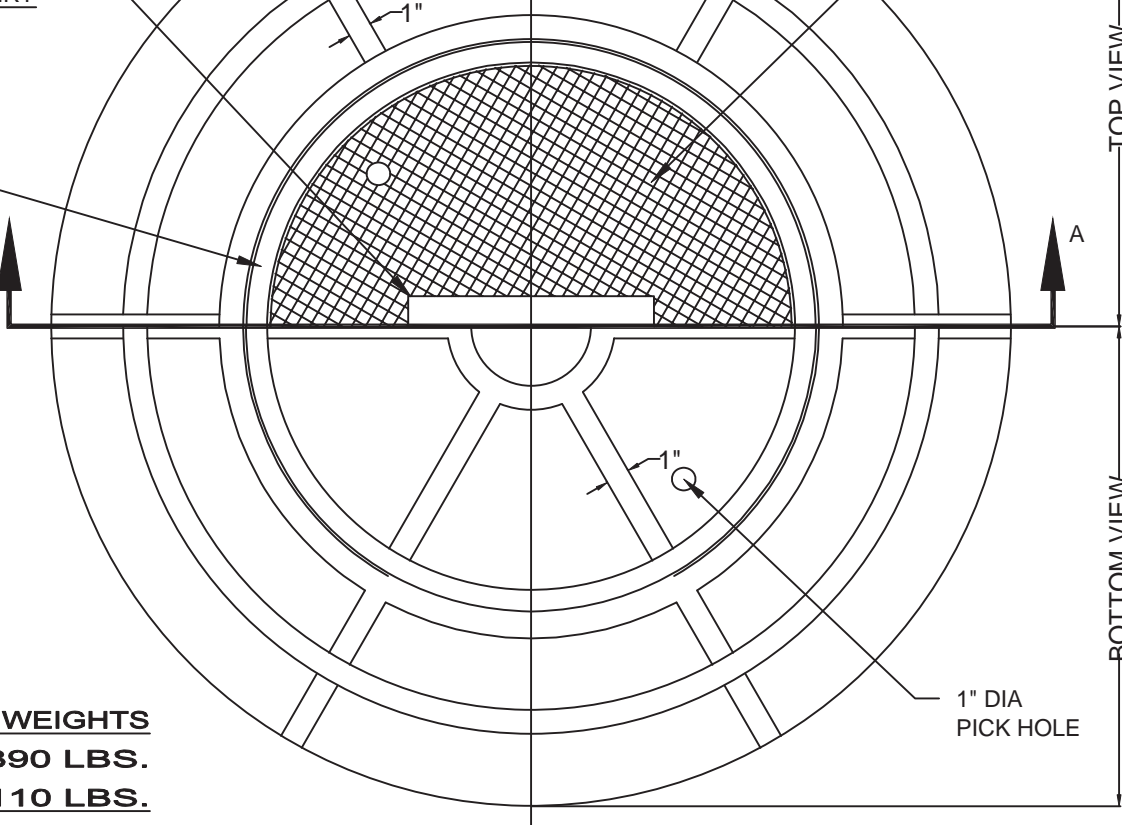
1" BORDER

A

DIAMOND TREAD

TOP VIEW

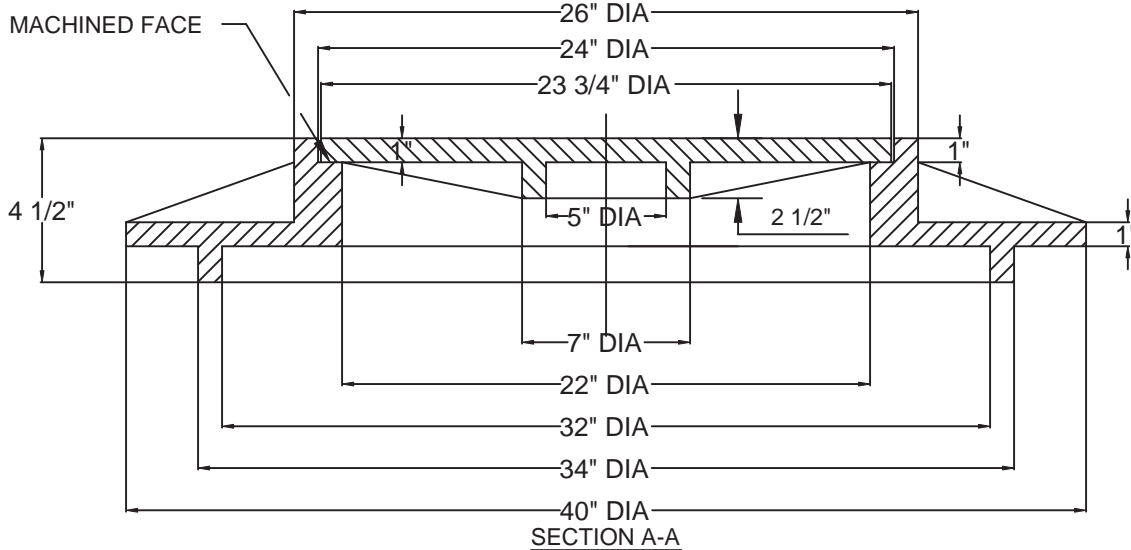
BOTTOM VIEW



1" DIA PICK HOLE

MINIMUM AVG. WEIGHTS
FRAME . . . 390 LBS.
COVER . . . 110 LBS.
TOTAL . . . 500 LBS.

PLAN



MACHINED FACE

SECTION A-A

NOTES:

1. FRAME AND COVER ARE GRAY CAST IRON ASTM A-48 CLASS 30 (MIN).
2. BOTH FRAME AND COVER ARE MACHINED ON HORIZONTAL BEARING SURFACES.

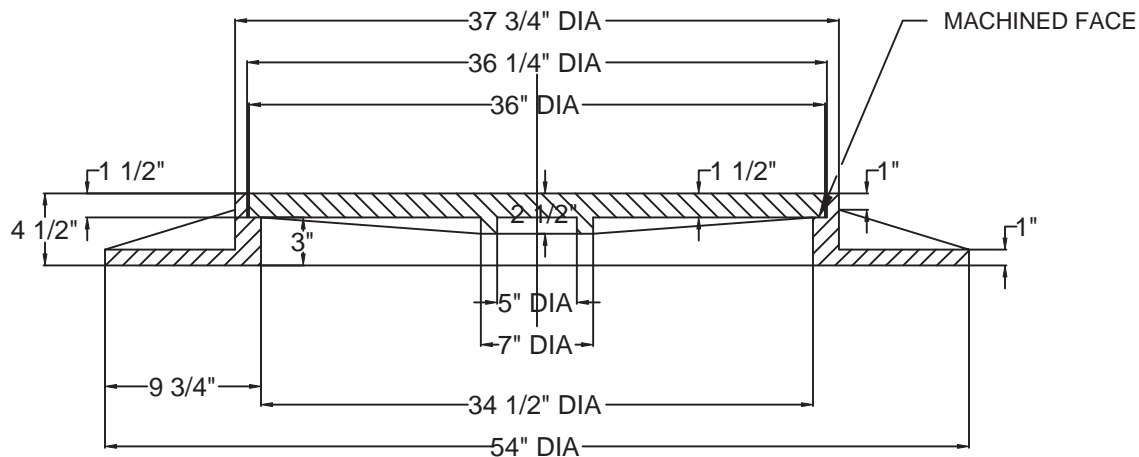
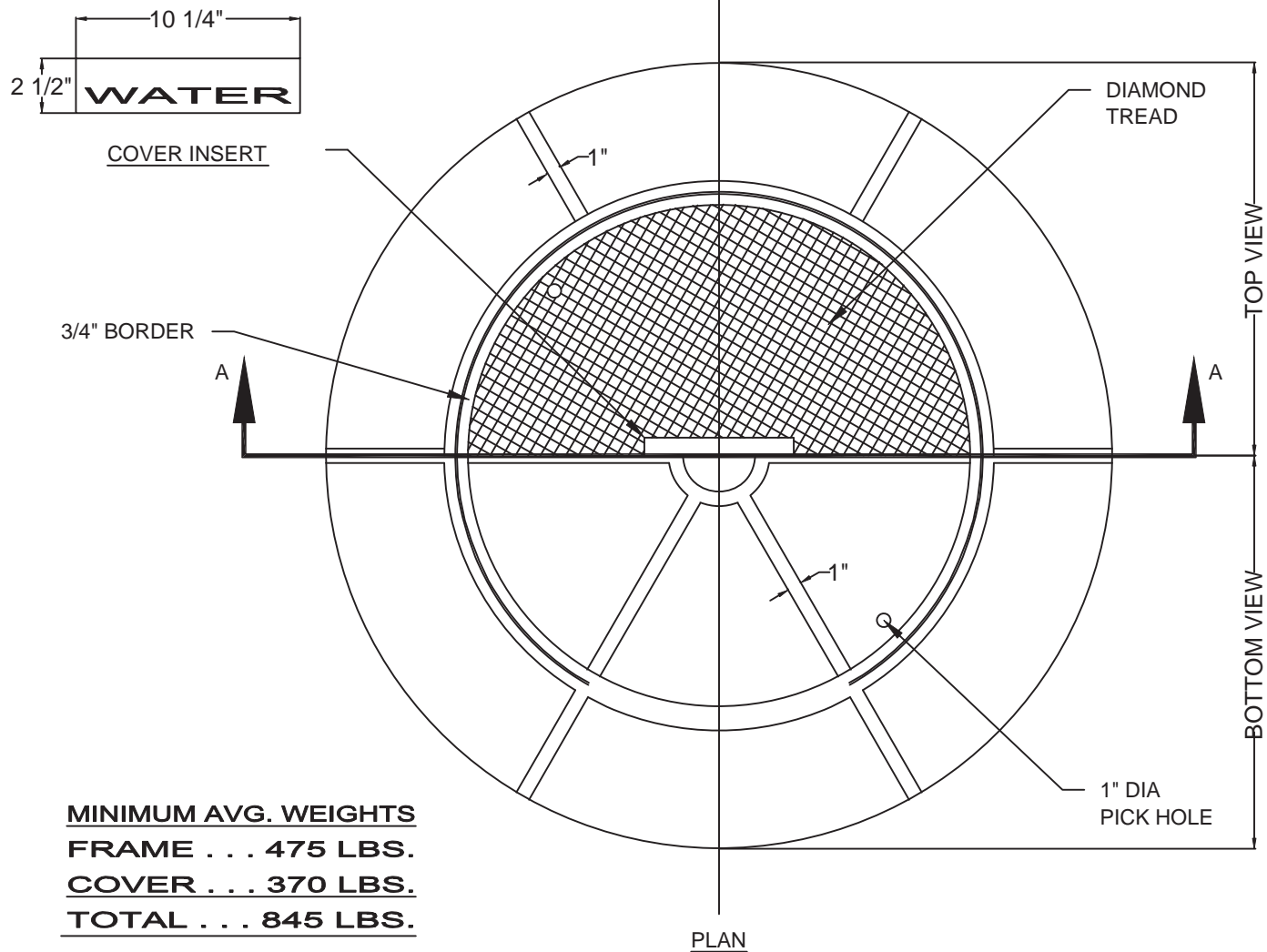
**24"x40" FRAME AND COVER
 FOR 36" I.D. WATER METER BOX**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
W-9.8



NOTES:

1. FRAME AND COVER ARE GRAY CAST IRON ASTM A-48 CLASS 30 (MIN).
2. BOTH FRAME AND COVER ARE MACHINED ON HORIZONTAL BEARING SURFACES.

**36"x54" FRAME AND COVER
FOR CONCRETE WATER METER VAULT**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-9.9**

**CONTACT WATER/SEWER ENGINEERING
FOR WATER METER DETAILS
703-228-3677**

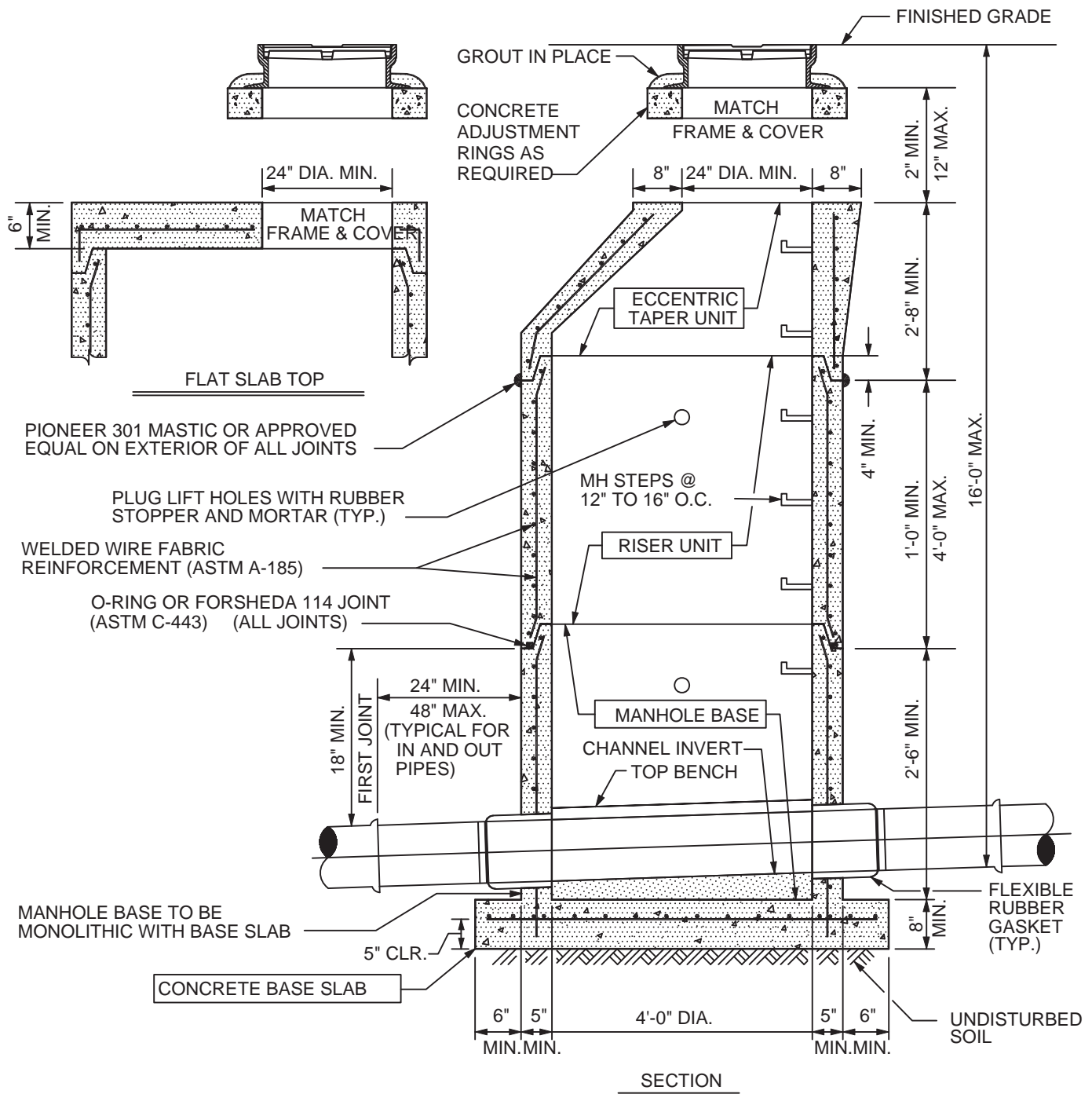
**WATER METER
FACT SHEET**

Rev Data	7/11/2013
REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
W-10.0**



SECTION

NOTES :

1. PRECAST CONCRETE SHALL BE MINIMUM VDOT CLASS A-4 AND POURED CONCRETE SHALL BE MINIMUM VDOT CLASS A-3.
2. PRECAST REINFORCED CONCRETE MANHOLE SECTION SHALL CONFORM TO A.S.T.M. C-478.
3. USE 4'-0" I.D. MANHOLES FOR 24" AND SMALLER SEWER PIPES UNLESS INDICATED OTHERWISE.
4. SEE DRAWING NO. S-2.4 FOR CHANNEL AND FOUNDATION DETAILS.
5. FLAT SLAB TOPS SHALL BE USED ONLY WHEN APPROVED BY COUNTY.
6. FOR GROUTING OF CHANNEL INVERTS SEE DRAWING NO. S-2.1.
7. FOR MANHOLES DEEPER THAN 16 FEET, DESIGN CALCULATIONS SHALL BE SUBMITTED TO THE COUNTY FOR APPROVAL.

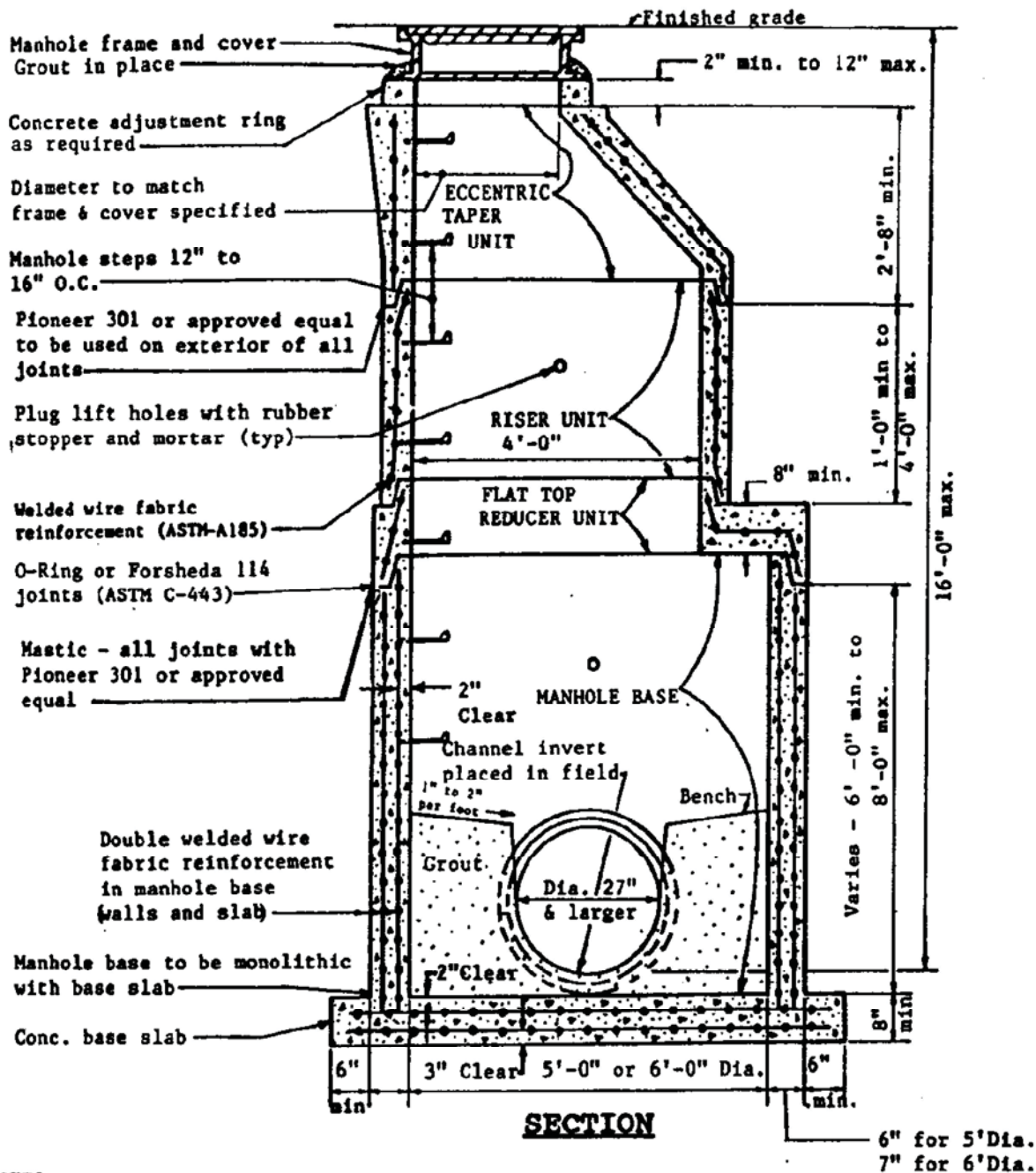
**MANHOLE
PRECAST CONCRETE 4'-0" I.D.**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
S-2.0**



NOTES:

1. Precast conc. shall be min. class A-4 (VDOT) & poured conc. shall be min. class A-3 (VDOT)
2. Precast reinforced concrete manhole sections shall conform to ASTM C-478.
3. For shallow manholes, use flat top slab.
4. Use 5' or 6' I.D. manhole with 36" frame & cover for 27" and larger sewers.
5. See 4' I.D. manhole detail for details not shown.
6. See S-2.4 for foundation and channel details.
7. For manholes deeper than 16' and for larger than 6' I.D., design calculations shall be submitted to the County for approval.

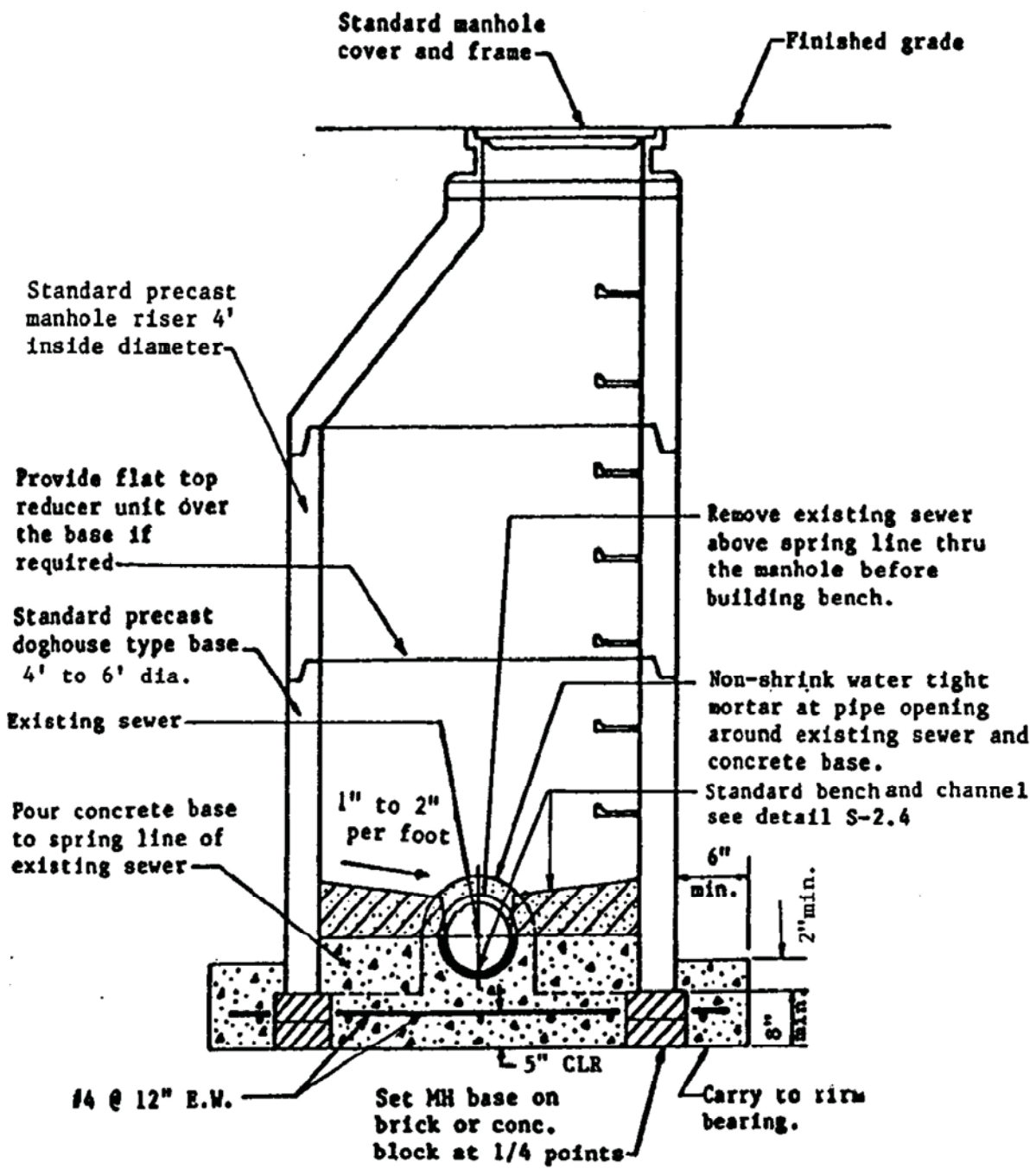
**MANHOLE
PRECAST CONCRETE 5'-0" & 6'-0" I.D.**

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
S-2.1



NOTES

1) For notes and other details see drgs S-2.0 and S-2.1

**MANHOLE
CONSTRUCT OVER EXISTING SEWER**

REVISION & DATE	

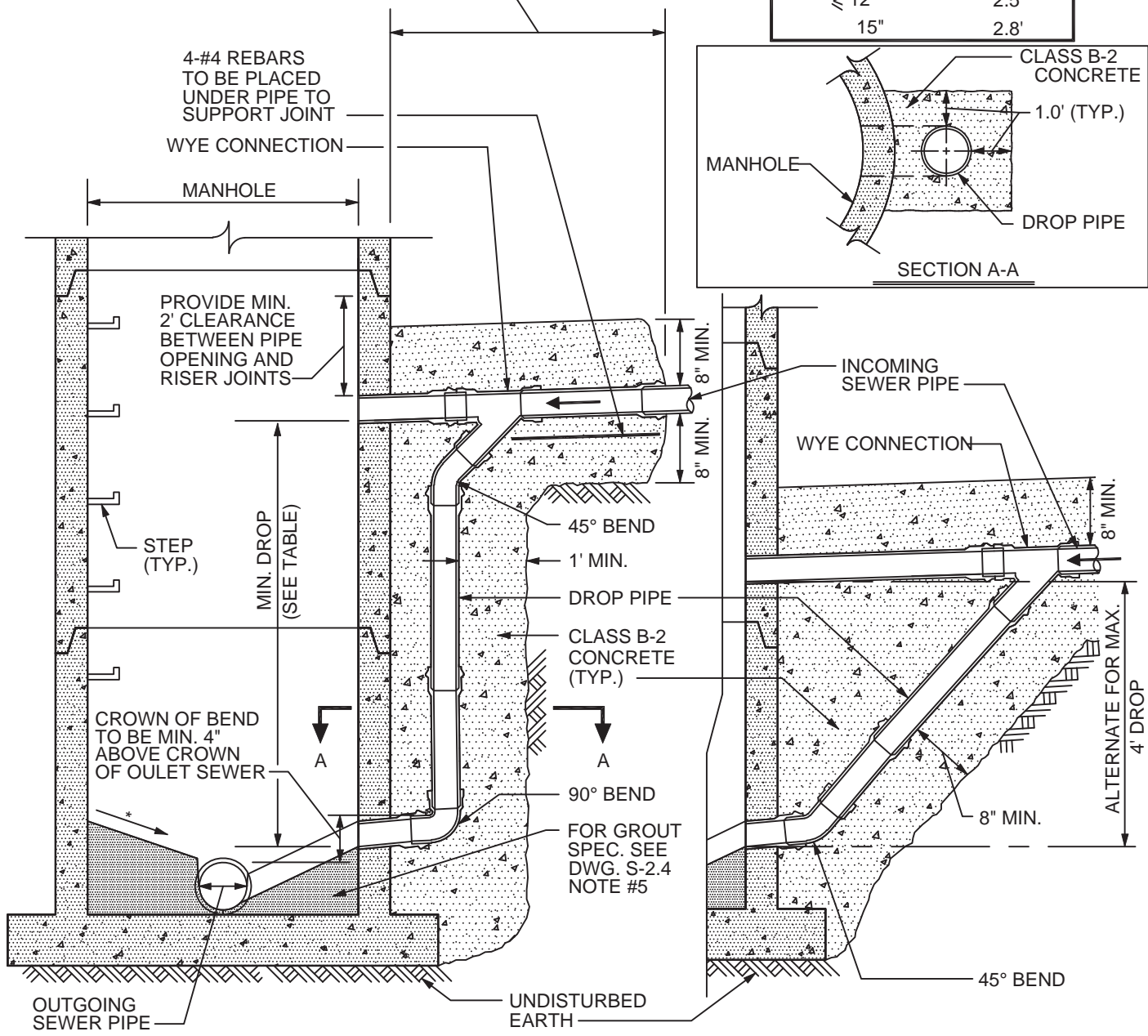
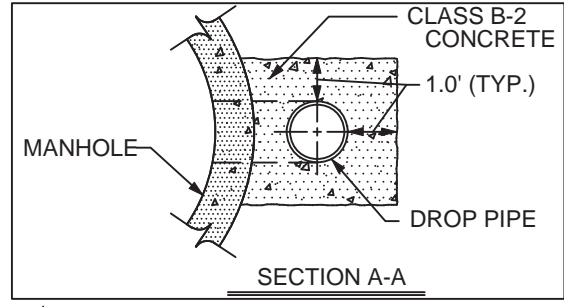


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
S-2.2

CONCRETE ENCASEMENT TO EXTEND TO FIRST PIPE JOINT BEYOND MANHOLE
 DROP CONNECTION EXCAVATION (MIN. 3')

INCOMING SEWER PIPE DIAMETER (INCHES)	MINIMUM DROP (FEET)
≤ 12"	2.5'
15"	2.8'



* BENCH SLOPE = 1" TO 2" PER FT. (TYP.)

TYPICAL SECTION

ALTERNATE DROP CONNECTION
 (FOR 4' MAX. DROP)

NOTES :

1. FOR MANHOLE DIMENSIONS AND OTHER DETAILS SEE DRAWING No. S-2.0 & S-2.1.
2. DROP CONNECTION TRENCH WIDTH TO BE THE SAME AS APPROACH TRENCH.
3. DROP CONNECTION SHALL NOT INTERFERE WITH STEPS.
4. DROP PIPE SHALL BE OF THE SAME SIZE AND MATERIAL AS THE INCOMING SEWER PIPE.
5. DROP CONNECTION FOR SEWER PIPE DIAMETER LARGER THAN 15" SHALL REQUIRE SPECIAL DESIGN TO BE SUBMITTED TO THE COUNTY FOR APPROVAL.

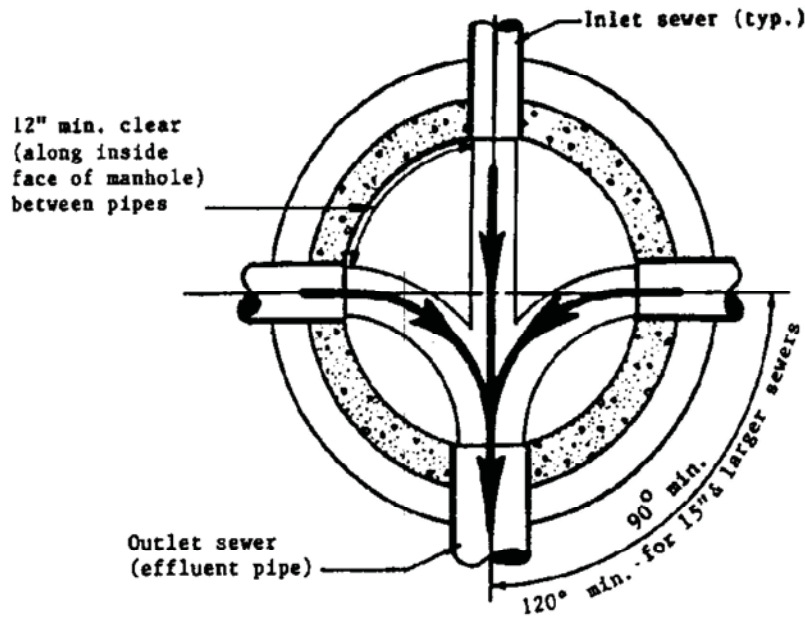
**SANITARY SEWER MANHOLE
 WITH OUTSIDE DROP CONNECTION**

REVISION & DATE	

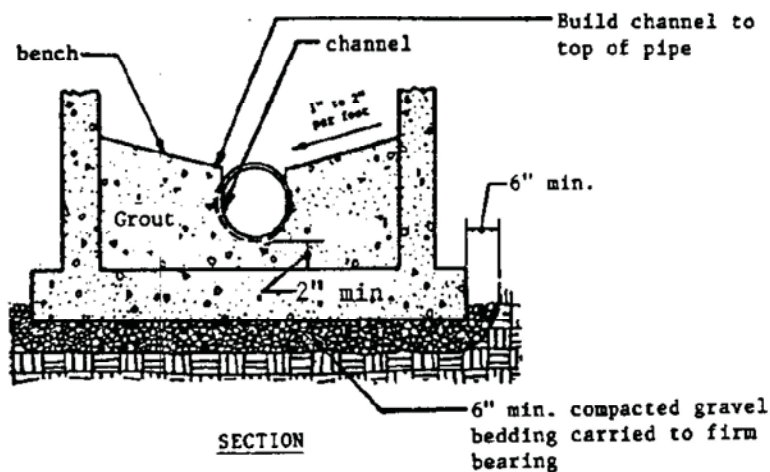


ARLINGTON COUNTY, VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
S-2.3



PLAN



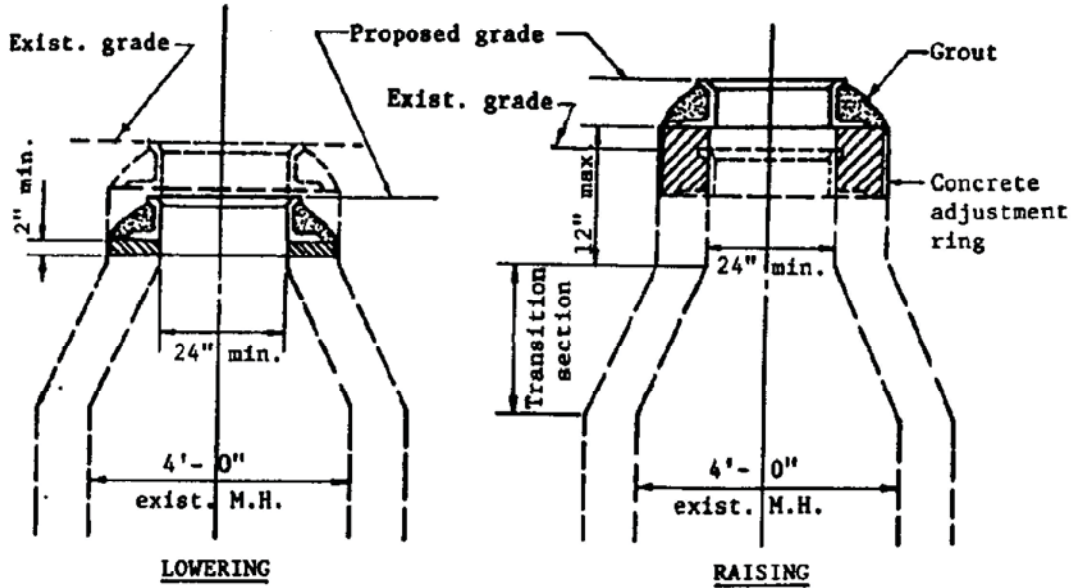
SECTION

NOTES:

1. Maximum allowable fall from inlet sewer to outlet sewer is 12".
2. Maximum number of allowable inlet sewers per manhole is 3.
3. Invert channels in terminal manholes must be constructed the same width as the effluent pipe for the full width of the manhole. This includes manholes with laterals.
4. Channel width shall match inside diameter of inlet and outlet pipes.
5. Grout for benches and channels shall consist of VDOT class B-2 hydraulic cement concrete mix. The surface of channels shall be hand trowelled smooth with no coarse aggregate exposed. The benches shall have a light broom finish.
6. Invert slope in the channel will be same as provided for the outlet sewer but not less than 2% for the intermediate manholes & 8.33% for the terminal manholes.

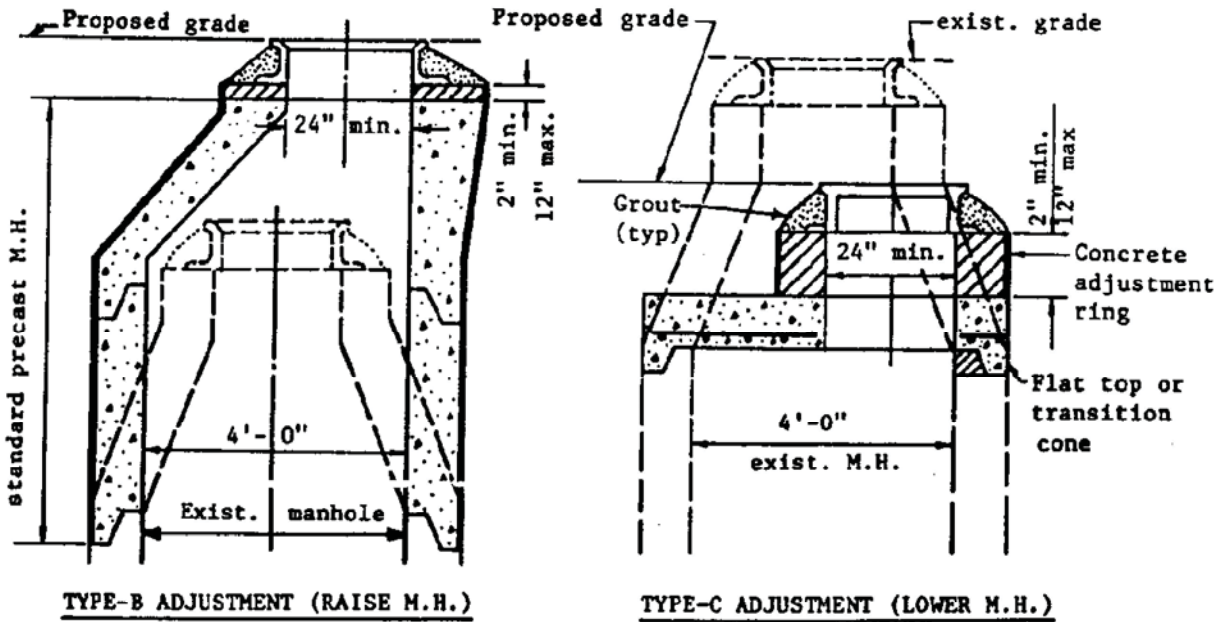
**MANHOLES
CHANNELS AND FOUNDATIONS**

REVISION & DATE



TYPE-A ADJUSTMENT (FRAME & COVER ONLY)

Raise or lower frame and cover such that height of 2' neck section, excluding frame and cover, does not exceed 12" maximum or 2" minimum. If range is exceeded, use Type-B or Type-C adjustment.



TYPE-B ADJUSTMENT (RAISE M.H.)
Remove existing transition section and construct new manhole as required.

TYPE-C ADJUSTMENT (LOWER M.H.)
Remove existing transition section and manhole to 2' min. below proposed grade and construct new manhole as required.

**MANHOLES
ADJUSTMENTS TO NEW GRADES**

REVISION & DATE

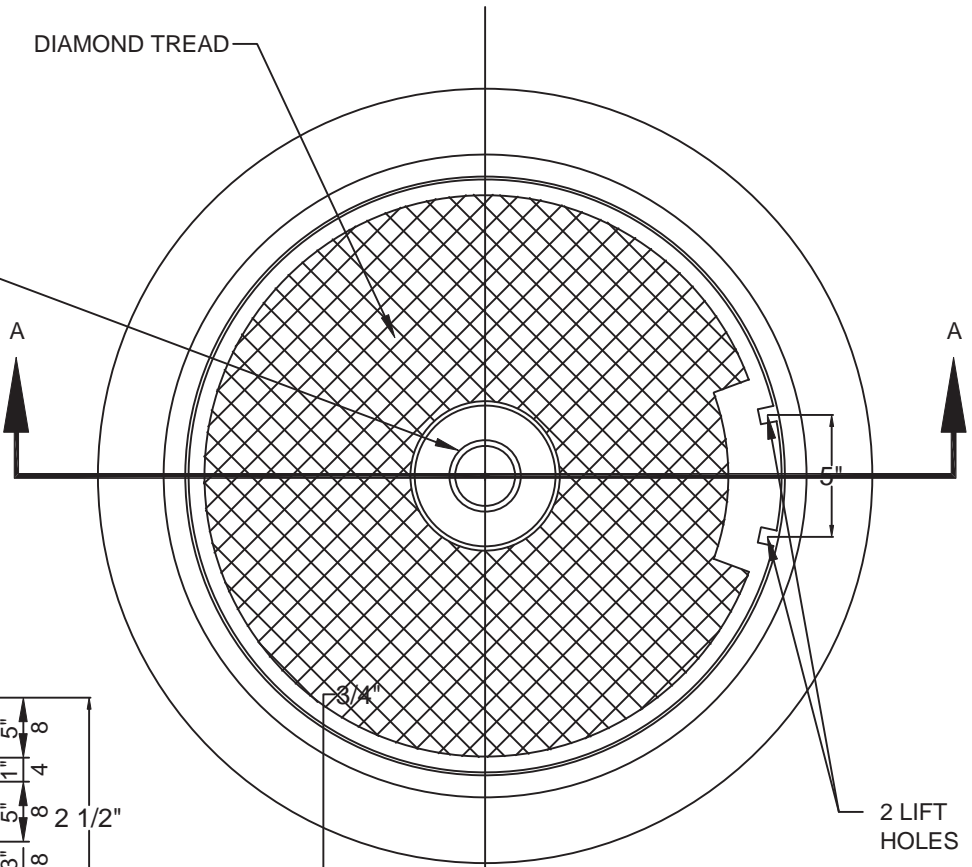


COVER INSERT

DIAMOND TREAD

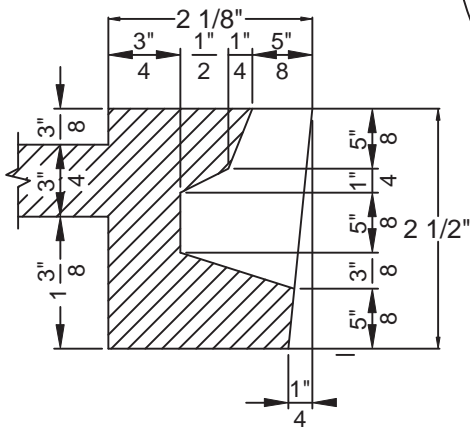
A

A



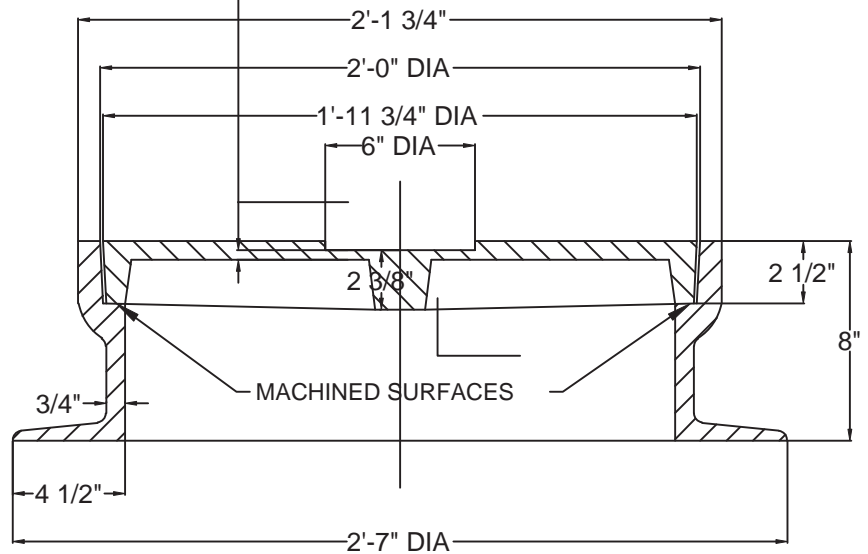
2 LIFT HOLES

PLAN



LIFT HOLE SECTION

MINIMUM AVG. WEIGHTS
FRAME . . . 210 LBS.
COVER . . . 145 LBS.
TOTAL . . . 355 LBS.



SECTION A-A

NOTE:

1. BOTH FRAME AND COVER ARE MACHINED ON HORIZONTAL BEARING SURFACES.

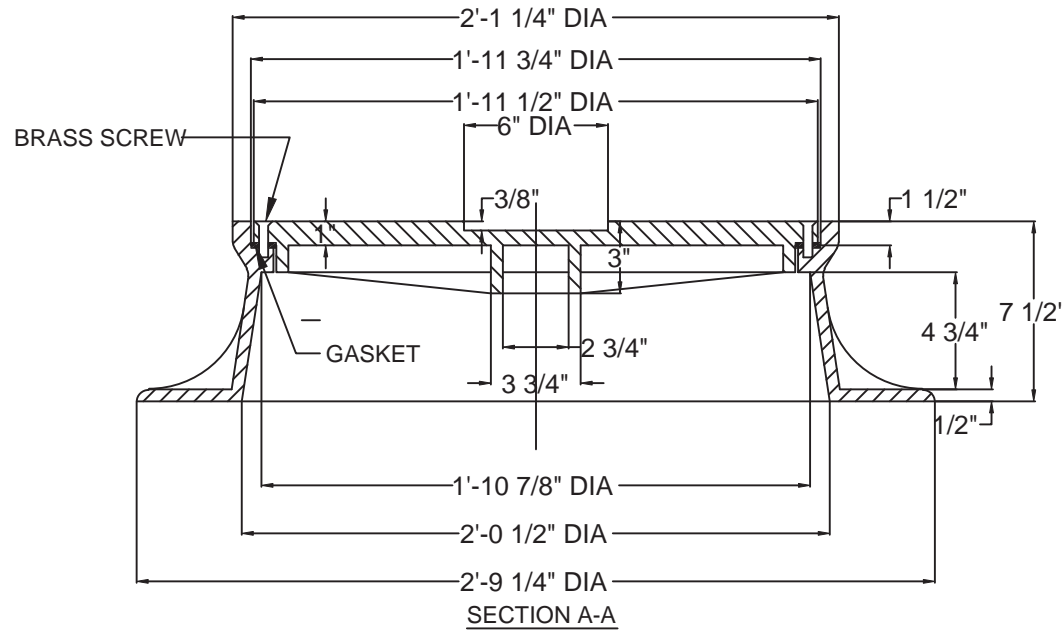
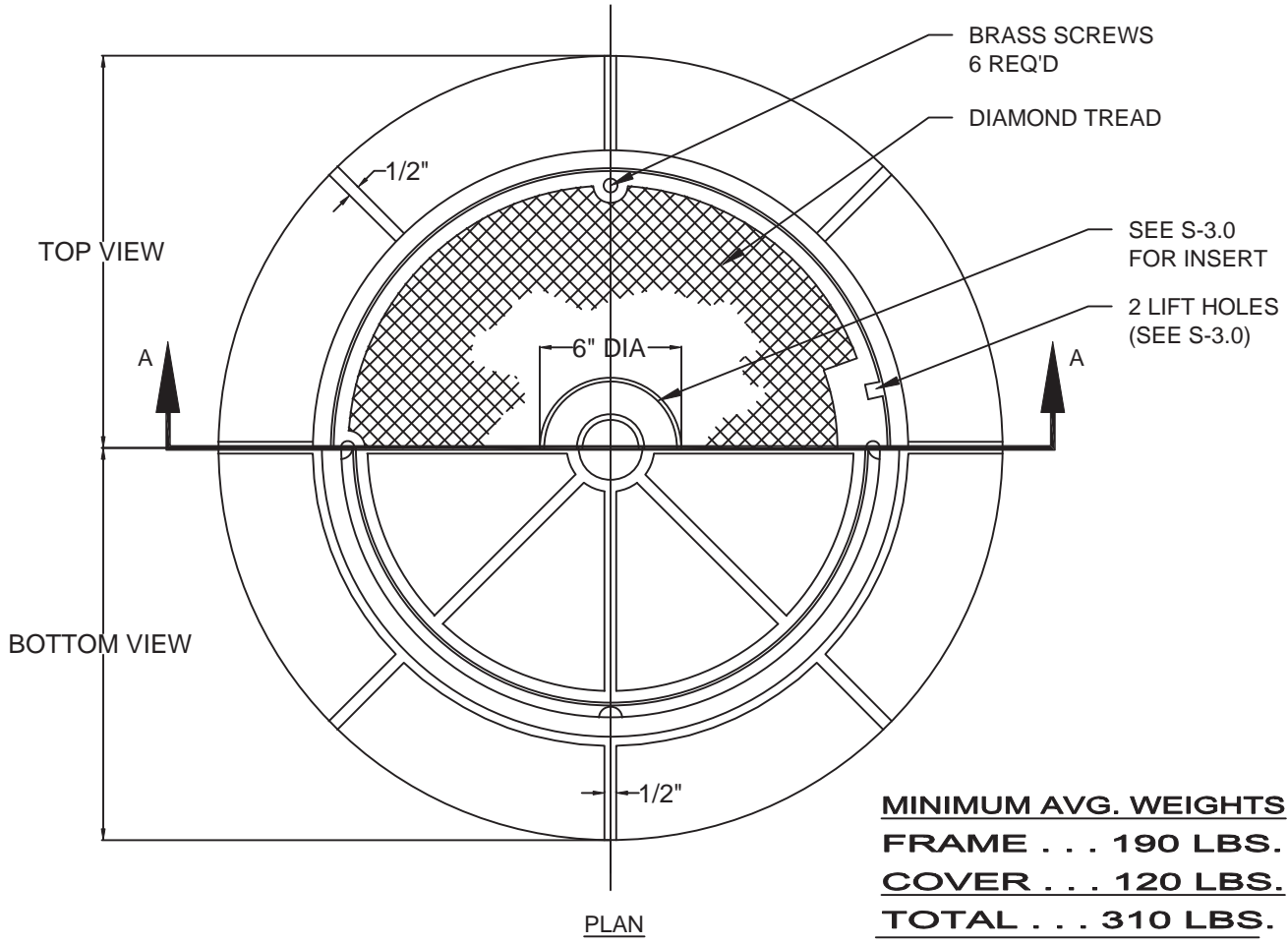
MANHOLE FRAME AND COVER
24-INCH DIAMETER (MHC-1)

REVISION & DATE




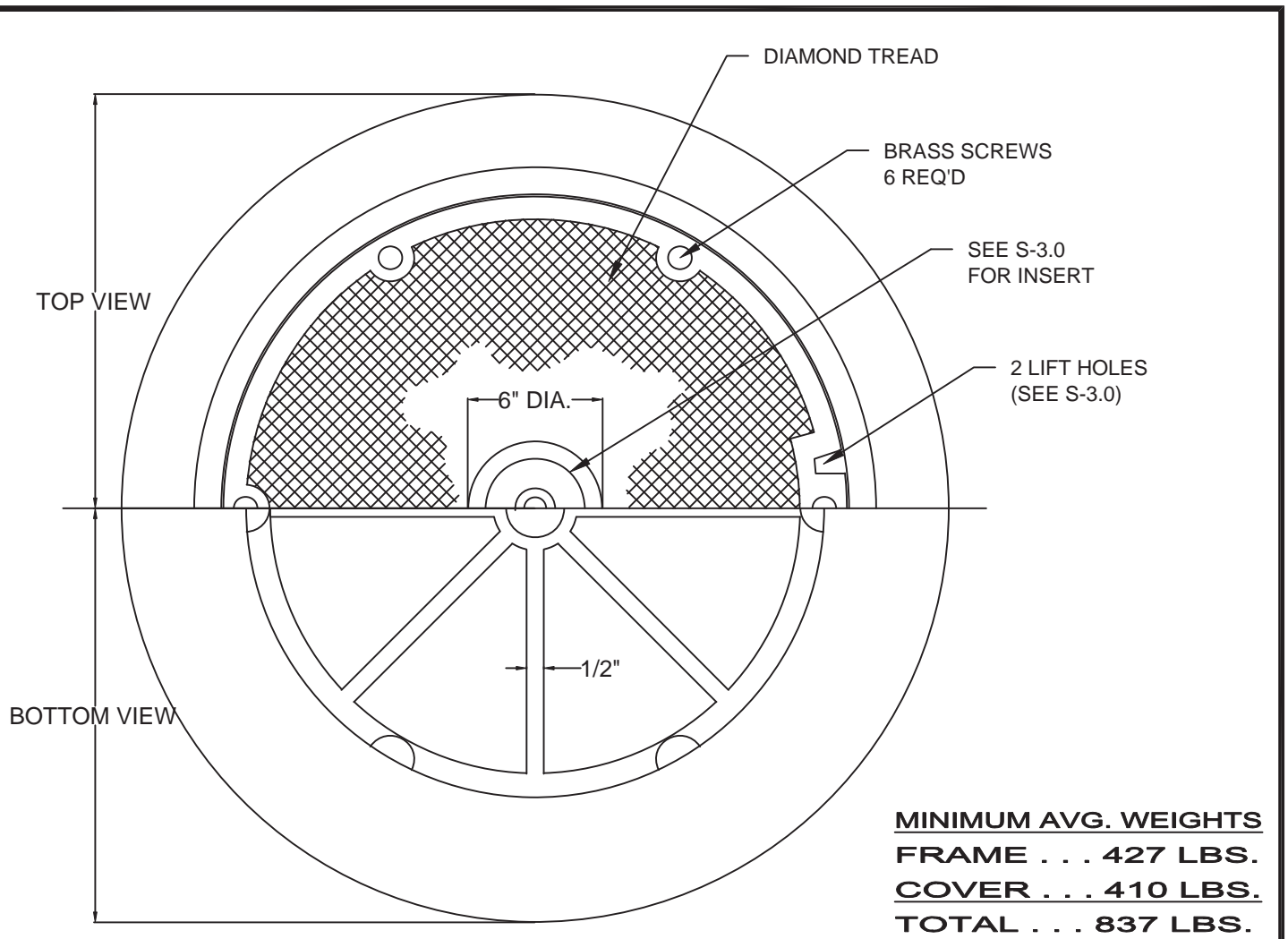
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
S-3.0

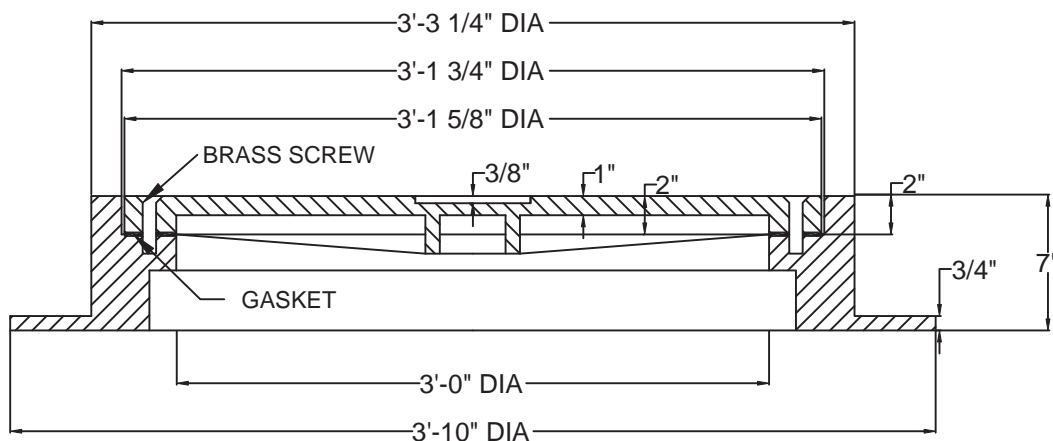


NOTE:
 1. FURNISH 4-3/8" x 2 1/2" BRASS COUNTERSUNK CAP SCREWS
 AND FLEXIBLE PLASTIC GASKET BETWEEN COVER AND FRAME SEAT.

MANHOLE FRAME AND COVER 24-INCH BOLTED (MHC-2)			
 ARLINGTON <small>VIRGINIA</small>		ARLINGTON COUNTY, VIRGINIA DEPARTMENT OF ENVIRONMENTAL SERVICES	
		DRAWING NO. S-3.1	



PLAN



SECTION

NOTE:

1. FURNISH 6-3/8" x 3" BRASS COUNTERSUNK CAP SCREWS AND FLEXIBLE PLASTIC GASKET BETWEEN COVER AND FRAME SEAT.

MANHOLE FRAME AND COVER
36-INCH BOLTED (MHC-3)

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
S-3.2

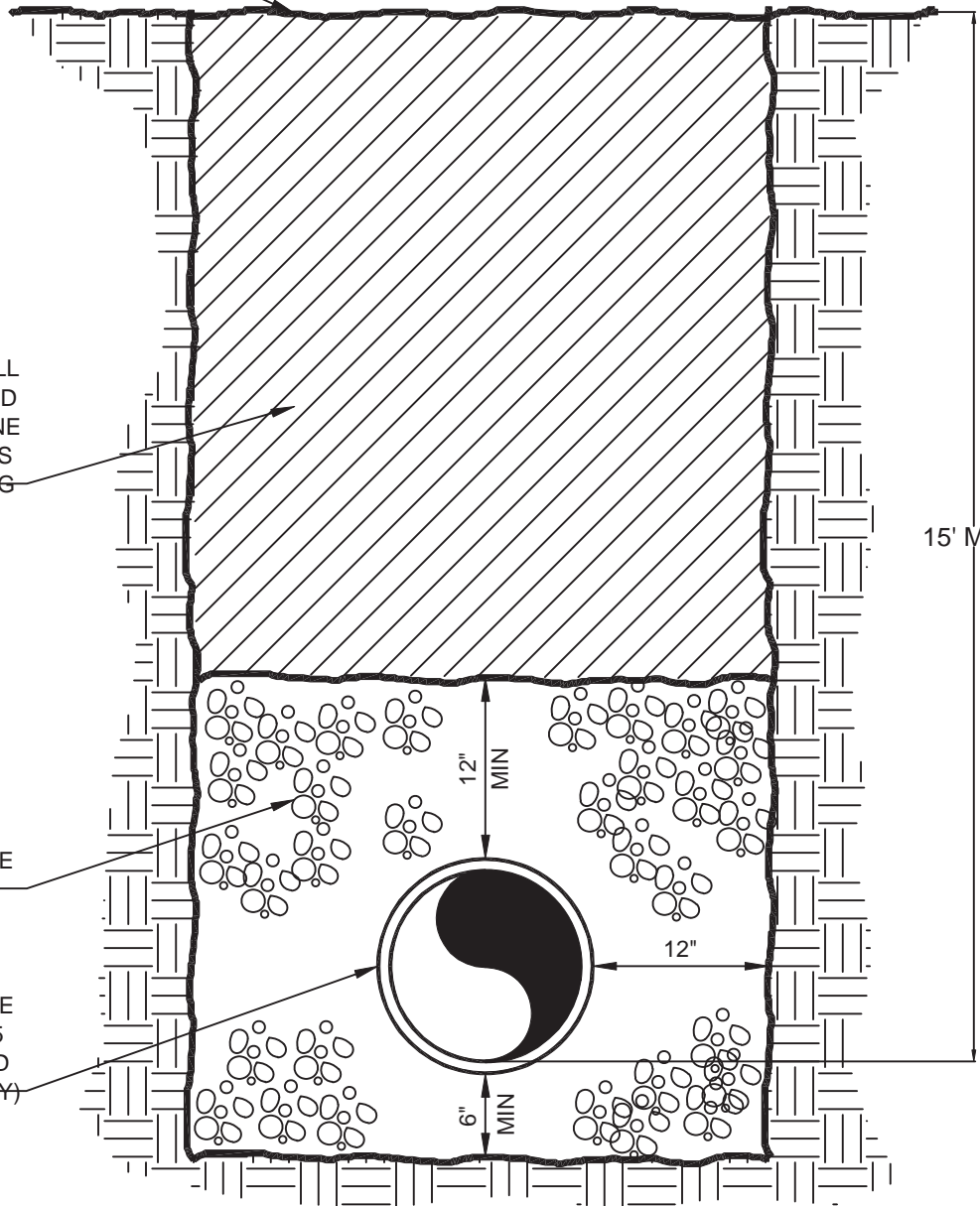
PROPOSED GRADE

COMPACTED BACKFILL SHALL NOT BE PLACED OVER CRUSHED STONE UNTIL INSPECTOR HAS APPROVED BEDDING

CRUSHED STONE (VDOT #57)

PVC SEWER PIPE ASTM D-3034 SDR-35 (BY APPROVED MANUFACTURERS ONLY)

15' MAX



NOTES:

1. PVC PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D-2321-83A AND AS DESCRIBED IN THE SPECIFICATIONS.
2. CONTRACTOR SHALL PERFORM DEFLECTION TESTS UTILIZING AN APPROVED GO/NO-GO MULTIARM MANDREL WHICH MEETS ASTM D-3034 DIMENSIONS FOR 7 1/2% DEFLECTION LIMIT.
3. CONTRACTOR SHALL SCHEDULE WORK AND PROVIDE SAFE ACCESS TO THE SEWER TO ALLOW TIMELY INSPECTION BY THE COUNTY.

PVC SEWER PIPE INSTALLATION DETAIL		
	REVISION & DATE	



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
S-4.0**

MAXIMUM ALLOWABLE DEPTH OF BACKFILL TO INVERT OF PIPE			
PIPE DIAMETER	DUCTILE IRON CLASS 52	REINFORCED CONCRETE	
		CLASS IV	CLASS V
8"	NO LIMIT	NA	NA
12"	30'	17'	24'
15" 16"	25'	21'	30'
18"	22'	21'	36'
20" 21"	20'	24'	40'
24" 27"	17'	26'	40'
30" AND UP	18'	24'	33'

NOTES:

1. NA = NOT AVAILABLE IN THIS SIZE.
2. THIS TABLE IS BASED ON A STANDARD BEDDING (SEE PIPE BEDDING DETAIL DWG M-3.0) AND BACKFILL W = 120 POUNDS PER CUBIC FOOT.
3. FOR OTHER SIZES OF PIPE AND OTHER CONDITIONS NOT COVERED BY THIS TABLE, DESIGN CALCULATIONS FOR ALLOWABLE DEPTH OF BACKFILL SHALL BE SUBMITTED TO THE COUNTY FOR APPROVAL.
4. FOR PVC PIPE (SDR 35) MAXIMUM ALLOWABLE DEPTH OF BACKFILL SHALL BE 15 FEET FOR ALL SIZES. SEE DWG S-4.0.

**MAXIMUM ALLOWABLE BACKFILL
FOR SANITARY SEWERS**

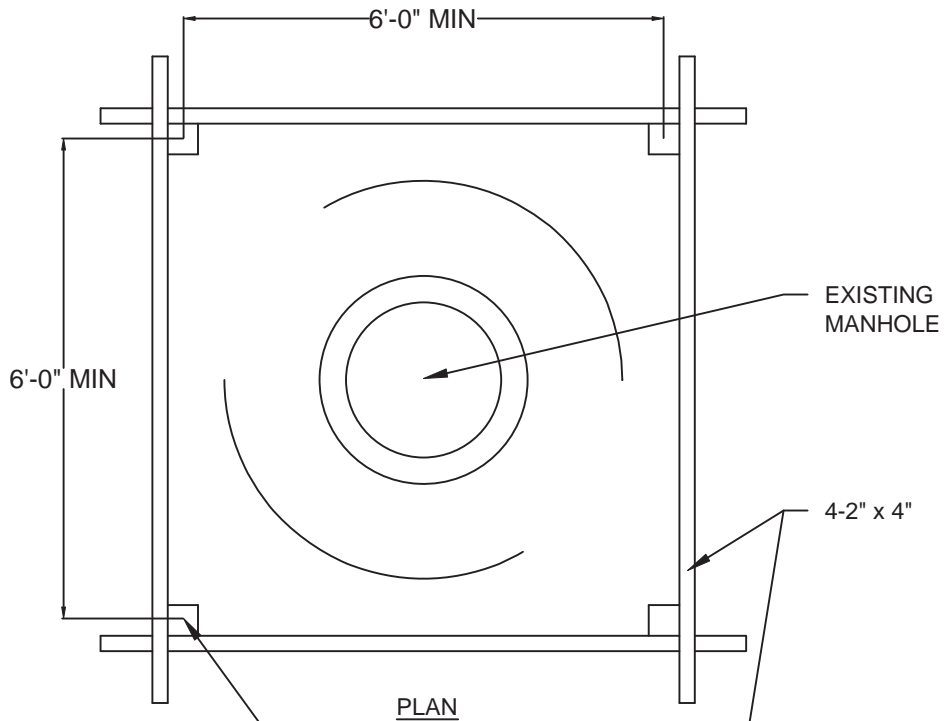
12" & 15" 9/30/2013

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

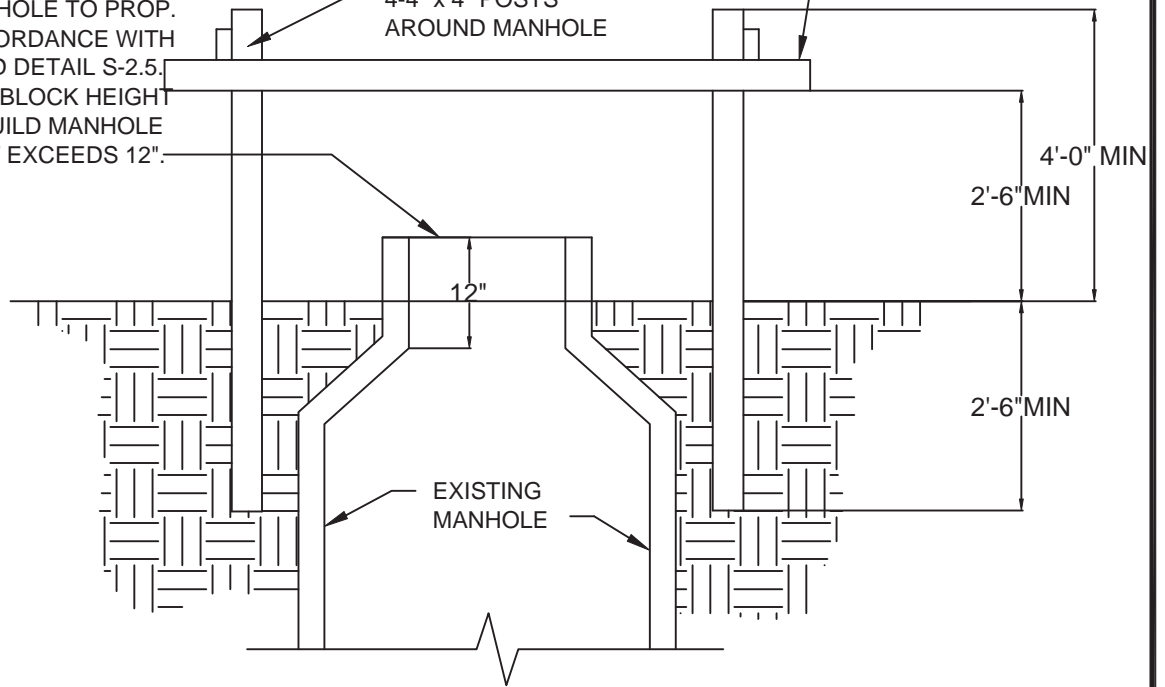
DRAWING NO.
S-5.0



PLAN

ADJUST MANHOLE TO PROP. GRADE IN ACCORDANCE WITH STANDARD DETAIL S-2.5. MAX. NECK BLOCK HEIGHT IS 12". REBUILD MANHOLE IF HEIGHT EXCEEDS 12".

4-4" x 4" POSTS AROUND MANHOLE



SECTION

NOTES:

1. ALL SANITARY MANHOLES ARE TO REMAIN ACCESSIBLE AND PROTECTED DURING CONSTRUCTION PHASE.
2. THIS DETAIL IS TO BE USED ON ALL EXISTING AND NEW SANITARY MANHOLES PRIOR TO STARTING EXCAVATION OR GRADING.

**MANHOLE PROTECTION
DETAIL**

REVISION & DATE



**ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES**

**DRAWING NO.
S-6.0**

EXHIBIT C

ITB 19-200 - ATTACHMENT A - BID FORM

PRICING SHEET

**FURNISH ALL LABOR, MATERIALS AND EQUIPMENT FOR THE STORM SEWER
LINES, STREAMS, CHANNELS AND APPURTENANCES**

The contract will be awarded to the lowest responsive and responsible bidder.

* THE QUANTITIES SPECIFIED BELOW ARE ESTIMATES ONLY AND DO NOT GUARANTEE A SPECIFIC VOLUME OR DOLLAR AMOUNT. PAYMENTS WILL BE
MADE BASED ON FIELD MEASUREMENTS DURING CONSTRUCTION.*

SECTION I - STORM SEWER WORK

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	STORM SEWER - 15" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 125.00	\$ 12,500.00
2	STORM SEWER - 15" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 150.00	\$ 15,000.00
3	STORM SEWER - 15" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 175.00	\$ 17,500.00
4	STORM SEWER - 18" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 140.00	\$ 14,000.00
5	STORM SEWER - 18" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 165.00	\$ 16,500.00
5	STORM SEWER - 18" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 190.00	\$ 19,000.00
7	STORM SEWER - 21" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 150.00	\$ 15,000.00
8	STORM SEWER - 21" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 175.00	\$ 17,500.00
9	STORM SEWER - 21" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 200.00	\$ 20,000.00
10	STORM SEWER - 24" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 175.00	\$ 17,500.00
11	STORM SEWER - 24" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 200.00	\$ 20,000.00
12	STORM SEWER - 24" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 225.00	\$ 22,500.00
13	STORM SEWER - 27" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 180.00	\$ 18,000.00
14	STORM SEWER - 27" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 205.00	\$ 20,500.00
15	STORM SEWER - 27" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 230.00	\$ 23,000.00
16	STORM SEWER - 30" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 190.00	\$ 19,000.00
17	STORM SEWER - 30" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 215.00	\$ 21,500.00
18	STORM SEWER - 30" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 240.00	\$ 24,000.00
19	STORM SEWER - 36" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 225.00	\$ 22,500.00
20	STORM SEWER - 36" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 250.00	\$ 25,000.00
21	STORM SEWER - 36" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 275.00	\$ 27,500.00
22	STORM SEWER - 42" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 250.00	\$ 25,000.00
23	STORM SEWER - 42" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 265.00	\$ 26,500.00
24	STORM SEWER - 42" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 280.00	\$ 28,000.00
25	STORM SEWER - 48" RCP CLIII (0'-6' DEPTH)	L.F.	100	\$ 260.00	\$ 26,000.00
26	STORM SEWER - 48" RCP CLIII (6'-10' DEPTH)	L.F.	100	\$ 275.00	\$ 27,500.00
27	STORM SEWER - 48" RCP CLIII (DEPTH > 10')	L.F.	100	\$ 290.00	\$ 29,000.00
28	STORM SEWER - 15" HDPE PIPE (0'-6' DEPTH)	L.F.	100	\$ 115.00	\$ 11,500.00
29	STORM SEWER - 15" HDPE PIPE (6'-10' DEPTH)	L.F.	100	\$ 140.00	\$ 14,000.00
30	STORM SEWER - 15" HDPE PIPE (DEPTH > 10')	L.F.	100	\$ 165.00	\$ 16,500.00
31	STORM SEWER - 18" HDPE PIPE (0'-6' DEPTH)	L.F.	100	\$ 130.00	\$ 13,000.00
32	STORM SEWER - 18" HDPE PIPE (6'-10' DEPTH)	L.F.	100	\$ 155.00	\$ 15,500.00
33	STORM SEWER - 18" HDPE PIPE (DEPTH > 10')	L.F.	100	\$ 180.00	\$ 18,000.00
34	STORM SEWER - 24" HDPE PIPE (0'-6' DEPTH)	L.F.	100	\$ 150.00	\$ 15,000.00
35	STORM SEWER - 24" HDPE PIPE (6'-10' DEPTH)	L.F.	100	\$ 175.00	\$ 17,500.00
36	STORM SEWER - 24" HDPE PIPE (DEPTH > 10')	L.F.	100	\$ 200.00	\$ 20,000.00
37	STORM SEWER - 30" HDPE PIPE (0'-6' DEPTH)	L.F.	100	\$ 170.00	\$ 17,000.00
38	STORM SEWER - 30" HDPE PIPE (6'-10' DEPTH)	L.F.	100	\$ 195.00	\$ 19,500.00
39	STORM SEWER - 30" HDPE PIPE (DEPTH > 10')	L.F.	100	\$ 220.00	\$ 22,000.00
40	STORM SEWER - 36" HDPE PIPE (0'-6' DEPTH)	L.F.	100	\$ 190.00	\$ 19,000.00
41	STORM SEWER - 36" HDPE PIPE (6'-10' DEPTH)	L.F.	100	\$ 215.00	\$ 21,500.00
42	STORM SEWER - 36" HDPE PIPE (DEPTH > 10')	L.F.	100	\$ 240.00	\$ 24,000.00
43	STORM SEWER - 15" HP PIPE (0'-6' DEPTH)	L.F.	100	\$ 115.00	\$ 11,500.00
44	STORM SEWER - 15" HP PIPE (6'-10' DEPTH)	L.F.	100	\$ 140.00	\$ 14,000.00
45	STORM SEWER - 15" HP PIPE (DEPTH > 10')	L.F.	100	\$ 165.00	\$ 16,500.00
46	STORM SEWER - 18" HP PIPE (0'-6' DEPTH)	L.F.	100	\$ 135.00	\$ 13,500.00
47	STORM SEWER - 18" HP PIPE (6'-10' DEPTH)	L.F.	100	\$ 160.00	\$ 16,000.00
48	STORM SEWER - 18" HP PIPE (DEPTH > 10')	L.F.	100	\$ 185.00	\$ 18,500.00
49	STORM SEWER - 24" HP PIPE (0'-6' DEPTH)	L.F.	100	\$ 160.00	\$ 16,000.00
50	STORM SEWER - 24" HP PIPE (6'-10' DEPTH)	L.F.	100	\$ 185.00	\$ 18,500.00
51	STORM SEWER - 24" HP PIPE (DEPTH > 10')	L.F.	100	\$ 210.00	\$ 21,000.00
52	STORM SEWER - 30" HP PIPE (0'-6' DEPTH)	L.F.	100	\$ 180.00	\$ 18,000.00
53	STORM SEWER - 30" HP PIPE (6'-10' DEPTH)	L.F.	100	\$ 200.00	\$ 20,000.00

54	STORM SEWER - 30" HP PIPE (DEPTH > 10')	L.F.	100	\$	225.00	\$	22,500.00
55	STORM SEWER - 36" HP PIPE (0'-6' DEPTH)	L.F.	100	\$	195.00	\$	19,500.00
56	STORM SEWER - 36" HP PIPE (6'-10' DEPTH)	L.F.	100	\$	220.00	\$	22,000.00
57	STORM SEWER - 36" HP PIPE (DEPTH > 10')	L.F.	100	\$	245.00	\$	24,500.00
58	STORM SEWER - 42" HP PIPE (0'-6' DEPTH)	L.F.	100	\$	200.00	\$	20,000.00
59	STORM SEWER - 42" HP PIPE (6'-10' DEPTH)	L.F.	100	\$	210.00	\$	21,000.00
60	STORM SEWER - 42" HP PIPE (DEPTH > 10')	L.F.	100	\$	225.00	\$	22,500.00
61	STORM SEWER - 48" HP PIPE (0'-6' DEPTH)	L.F.	100	\$	225.00	\$	22,500.00
62	STORM SEWER - 48" HP PIPE (6'-10' DEPTH)	L.F.	100	\$	240.00	\$	24,000.00
63	STORM SEWER - 48" HP PIPE (DEPTH > 10')	L.F.	100	\$	250.00	\$	25,000.00
64	STORM SEWER - 54" HP PIPE (0'-6' DEPTH)	L.F.	100	\$	245.00	\$	24,500.00
65	STORM SEWER - 54" HP PIPE (6'-10' DEPTH)	L.F.	100	\$	260.00	\$	26,000.00
66	STORM SEWER - 54" HP PIPE (DEPTH > 10')	L.F.	100	\$	275.00	\$	27,500.00
67	STORM SEWER - 60" HP PIPE (0'-6' DEPTH)	L.F.	100	\$	265.00	\$	26,500.00
68	STORM SEWER - 60" HP PIPE (6'-10' DEPTH)	L.F.	100	\$	280.00	\$	28,000.00
69	STORM SEWER - 60" HP PIPE (DEPTH > 10')	L.F.	100	\$	300.00	\$	30,000.00
70	BEDDING (IMPROVED) - #57 STONE	TON	150	\$	125.00	\$	18,750.00
	6" DIA. PVC - PERFORATED PIPE UNDERDRAIN w/#57 STONE & FILTER						
71	FABRIC (0'-6' DEPTH)	L.F.	100	\$	75.00	\$	7,500.00
	8" DIA. PVC - PERFORATED PIPE UNDERDRAIN w/#57 STONE & FILTER FABRIC						
72	(0'-6' DEPTH)		100	\$	75.00	\$	7,500.00
73	8" DIA. PVC - SOLID DRAIN PIPE (0'-6' DEPTH)	L.F.	100	\$	45.00	\$	4,500.00
74	8" X 4" STREET CLEAN OUT w/FRAME & COVER	EA.	5	\$	1,250.00	\$	6,250.00
75	4" DIA. PVC SOLID DRAIN PIPE	L.F.	100	\$	40.00	\$	4,000.00
76	6" DIA. PVC SOLID DRAIN PIPE	L.F.	100	\$	50.00	\$	5,000.00
77	REMOVE & DISPOSAL OF EXISTING 12" PIPE	L.F.	50	\$	20.00	\$	1,000.00
78	REMOVE & DISPOSAL OF EXISTING 15" PIPE	L.F.	50	\$	20.00	\$	1,000.00
79	REMOVE & DISPOSAL OF EXISTING 18" PIPE	L.F.	50	\$	25.00	\$	1,250.00
80	REMOVE & DISPOSAL OF EXISTING 21" PIPE	L.F.	50	\$	25.00	\$	1,250.00
81	REMOVE & DISPOSAL OF EXISTING 24" PIPE	L.F.	50	\$	25.00	\$	1,250.00
82	REMOVE & DISPOSAL OF EXISTING 30" PIPE	L.F.	50	\$	30.00	\$	1,500.00
83	REMOVE & DISPOSAL OF EXISTING 36" PIPE	L.F.	50	\$	30.00	\$	1,500.00
84	REMOVE & DISPOSAL OF EXISTING 42" PIPE	L.F.	50	\$	35.00	\$	1,750.00
85	REMOVE & DISPOSAL OF EXISTING 48" PIPE	L.F.	50	\$	35.00	\$	1,750.00
86	STANDARD CATCH BASIN, CB-2 (0'-6' DEPTH)	EA.	5	\$	7,950.00	\$	39,750.00
87	STANDARD CATCH BASIN, CB-2 (OVER 6' DEPTH)	V.F.	2	\$	1,450.00	\$	2,900.00
88	STANDARD CATCH BASIN, CB-3 (0'-6' DEPTH)	EA.	2	\$	8,250.00	\$	16,500.00
89	STANDARD CATCH BASIN, CB-3 (OVER 6' DEPTH)	V.F.	2	\$	1,450.00	\$	2,900.00
90	STANDARD CATCH BASIN, CB-4 (0'-6' DEPTH)	EA.	2	\$	8,250.00	\$	16,500.00
91	STANDARD CATCH BASIN, CB-4 (OVER 6' DEPTH)	V.F.	2	\$	1,450.00	\$	2,900.00
92	STANDARD CATCH BASIN, PCB-2 (0'-6' DEPTH)	EA.	2	\$	8,500.00	\$	17,000.00
93	STANDARD CATCH BASIN, PCB-2 (OVER 6' DEPTH)	V.F.	2	\$	1,450.00	\$	2,900.00
94	NONROADWAY SHALLOW GRATE INLET 15" TO 24" PIPE MAXIMUM	EA.	2	\$	7,500.00	\$	15,000.00
95	YARD INLET (0'-6' DEPTH)	EA.	2	\$	6,250.00	\$	12,500.00
96	YARD INLET (OVER 6' DEPTH)	V.F.	2	\$	1,250.00	\$	2,500.00
97	PRECAST YARD INLET (0'-6' DEPTH)	EA.	2	\$	6,250.00	\$	12,500.00
98	PRECAST YARD INLET (OVER 6' DEPTH)	V.F.	2	\$	1,250.00	\$	2,500.00
99	DRIVEWAY GRATE	EA.	2	\$	1,750.00	\$	3,500.00
100	MANHOLE, MH-1 (0'-6' DEPTH)	EA.	2	\$	5,500.00	\$	11,000.00
101	MANHOLE, MH-1 (OVER 6' DEPTH)	V.F.	2	\$	950.00	\$	1,900.00
102	PRECAST MANHOLE, PMH-1 (0'-6' DEPTH)	EA.	2	\$	5,500.00	\$	11,000.00
103	PRECAST MANHOLE, PMH-1 (OVER 6' DEPTH)	V.F.	2	\$	950.00	\$	1,900.00
104	MANHOLE, MH-2 (0'-6' DEPTH)	EA.	2	\$	7,950.00	\$	15,900.00
105	MANHOLE, MH-2 (OVER 6' DEPTH)	V.F.	2	\$	1,250.00	\$	2,500.00
106	MANHOLE, MH-3 (0'-6' DEPTH)	EA.	2	\$	12,500.00	\$	25,000.00
107	MANHOLE, MH-3 (OVER 6' DEPTH)	V.F.	2	\$	2,100.00	\$	4,200.00
108	DEMOLISH & DISPOSE OF EXISTING STRUCTURE (0' TO 6' DEPTH)	EA.	2	\$	950.00	\$	1,900.00
109	DEMOLISH & DISPOSE OF EXISTING STRUCTURE (OVER 6' DEPTH)	V.F.	2	\$	175.00	\$	350.00
110	CONNECT TO EX. STRUCTURE (8" - 12" PIPE)	EA.	10	\$	750.00	\$	7,500.00
111	CONNECT TO EX. STRUCTURE (15" - 21" PIPE)	EA.	10	\$	950.00	\$	9,500.00
112	CONNECT TO EX. STRUCTURE (24" - 36" PIPE)	EA.	2	\$	1,500.00	\$	3,000.00
113	CONNECT TO EX. STRUCTURE (42" - 48" PIPE)	EA.	2	\$	1,950.00	\$	3,900.00
114	CONCRETE	CY	10	\$	750.00	\$	7,500.00
115	GABON BASKET W/ GABION STONE	CY	10	\$	225.00	\$	2,250.00
116	DRY RIP RAP CL I	SY	50	\$	95.00	\$	4,750.00
117	DRY RIP RAP CL II	SY	50	\$	110.00	\$	5,500.00
118	DRY RIP RAP CL III	SY	50	\$	125.00	\$	6,250.00

	GRouted RIPRAP CLASS I, II OR III. ADDITIONAL PRICE PER SY ABOVE DRY					
119	RIPRAP CLASS I, II AND III.	SY	50	\$	25.00	\$ 1,250.00
120	IMBRICATED RIP RAP	TON	50	\$	250.00	\$ 12,500.00
121	DUMPED RIP RAP CL I	TON	50	\$	70.00	\$ 3,500.00
122	DUMPED RIP RAP CL II	TON	50	\$	75.00	\$ 3,750.00
123	DUMPED RIP RAP CL III	TON	50	\$	75.00	\$ 3,750.00
124	FLOWABLE FILL	C.Y.	10	\$	295.00	\$ 2,950.00
125	CONCRETE-PIER, CRADLE OR ENCASEMENT	C.Y.	5	\$	500.00	\$ 2,500.00
126	ROCK EXCAVATION	C.Y.	10	\$	150.00	\$ 1,500.00
127	TEST HOLES	EA.	25	\$	750.00	\$ 18,750.00
128	CLEAN FILL MATERIAL	C.Y.	10	\$	45.00	\$ 450.00
129	OVER EXCAVATION	C.Y.	20	\$	50.00	\$ 1,000.00
130	REMOVE & REPLACE 8" TO 10" REINFORCED CONCRETE PAVING	S.Y.	50	\$	125.00	\$ 6,250.00
131	REMOVE 8" TO 10" REINFORCED CONCRETE PAVING	S.Y.	50	\$	15.00	\$ 750.00
132	REMOVE & REPLACE 6" CONCRETE DRIVEWAY ENTRANCE	S.Y.	50	\$	90.00	\$ 4,500.00
133	REMOVE & REPLACE 9" CONCRETE DRIVEWAY ENTRANCE	S.Y.	50	\$	100.00	\$ 5,000.00
134	COLD MIX ASPHALT	TON	20	\$	175.00	\$ 3,500.00
135	AGGREGATE 21-A	TON	100	\$	125.00	\$ 12,500.00
136	ASPHALT CONCRETE BASE COURSE, BM-3	TON	100	\$	175.00	\$ 17,500.00
137	ASPHALT CONCRETE SURFACE COURSE, SM-2 (PLACED BY PAVER)	TON	100	\$	190.00	\$ 19,000.00
138	ASPHALT PATCH IN - PLACE (50 SY OR LESS)	TON	100	\$	225.00	\$ 22,500.00
139	REMOVE & REPLACE 4" CONCRETE SIDEWALK	S.Y.	50	\$	75.00	\$ 3,750.00
140	REMOVE & REPLACE 6" CONCRETE SIDEWALK	S.Y.	50	\$	75.00	\$ 3,750.00
141	REMOVE & REPLACE PAVER SIDEWALK	S.Y.	50	\$	150.00	\$ 7,500.00
142	REMOVE & REPLACE CONCRETE CURB & GUTTER	L.F.	100	\$	90.00	\$ 9,000.00
143	REMOVE & REPLACE CONCRETE HEADER CURB	L.F.	50	\$	80.00	\$ 4,000.00
	REMOVE & REPLACE DETECTABLE WARNING SURFACE FOR CURB RAMPS IN ACCORD WITH LATEST VDOT SPEC. (RAMPS WILL NOT BE PAID IN 3 PARTS PER VDOT SPECS.)	S.F.	10	\$	25.00	\$ 250.00
145	SAW CUT	L.F.	500	\$	7.50	\$ 3,750.00
146	TOPSOIL, SEED, FERTILIZER W/ EROSION BLANKET	S.Y.	100	\$	10.00	\$ 1,000.00
147	SOD	S.Y.	100	\$	10.00	\$ 1,000.00
148	ADJUST EX. MANHOLE TOP TO GRADE	EA.	2	\$	1,475.00	\$ 2,950.00
149	SILT FENCE	L.F.	50	\$	5.00	\$ 250.00
150	INLET PROTECTION	E.A.	10	\$	250.00	\$ 2,500.00
151	HOUSE LATERAL CLEANOUT	E.A.	10	\$	650.00	\$ 6,500.00
152	6 INCH STREET CLEANOUT W/CAP	E.A.	10	\$	750.00	\$ 7,500.00
SUBTOTAL (SECTION I)						\$ 1,942,000.00
SECTION II - EMERGENCY WORK						
ALL WORK UNDER THIS SECTION SHALL INCLUDE RATES FOR EQUIPMENT AND LABOR. ALL LABOR RATES MUST BE FULLY LOADED HOURLY RATES.						
ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	
153	FOREMAN W/PICK-UP TRUCK	HOURLY	70	\$ 140.00	\$ 9,800.00	
154	BACKHOE W/OPERATOR	HOURLY	60	\$ 155.00	\$ 9,300.00	
155	TANDEM/TRI-AXLE DUMP TRUCK W/DRIVER	HOURLY	40	\$ 145.00	\$ 5,800.00	
156	SINGLE AXLE DUMP TRUCK W/DRIVER	HOURLY	30	\$ 95.00	\$ 2,850.00	
157	LABOR - PIPE LAYER	HOURLY	10	\$ 75.00	\$ 750.00	
158	LABOR - SKILLED	HOURLY	10	\$ 65.00	\$ 650.00	
159	LABOR - UNSKILLED	HOURLY	8	\$ 60.00	\$ 480.00	
160	FLAGMAN	HOURLY	8	\$ 60.00	\$ 480.00	
161	MISC. EQUIPMENT OPERATOR	HOURLY	16	\$ 95.00	\$ 1,520.00	
162	BACKHOE	HOURLY	12	\$ 60.00	\$ 720.00	
163	RUBBER TIRE LOADER	HOURLY	15	\$ 65.00	\$ 975.00	
164	SKID STEER LOADER	HOURLY	40	\$ 60.00	\$ 2,400.00	
165	TRACK EXCAVATOR	HOURLY	60	\$ 75.00	\$ 4,500.00	
166	AIR COMPRESSOR WITH TOOLS	HOURLY	50	\$ 35.00	\$ 1,750.00	
167	TOOL TRUCK OR TRAILER	HOURLY	15	\$ 50.00	\$ 750.00	
168	TRENCH COMPACTOR	HOURLY	45	\$ 40.00	\$ 1,800.00	
169	PAVEMENT BREAKER	HOURLY	45	\$ 45.00	\$ 2,025.00	
170	WELDING (INCLUDES ALL LABOR AND EQUIPMENT)	HOURLY	10	\$ 120.00	\$ 1,200.00	
171	LIGHTING WITH GENERATOR	HOURLY	30	\$ 40.00	\$ 1,200.00	
172	ROADWAY STEEL PLATES—EA	DAILY	15		\$	
173	EXCAVATION TRENCH BOX—EA	DAILY	15		\$	
174	ELECTRONIC ARROW BOARD	HOURLY	20	\$ 15.00	\$ 300.00	
175	WORK ZONE SET-UP - INCLUDES SIGNS, CHANNELIZERS AND CONES	DAILY	30	\$ 1,500.00	\$ 45,000.00	
176	2" DIAMETER UTILITY PUMP	HOURLY	25	\$ 30.00	\$ 750.00	
177	Cut-Off Saw / Chain Saw	Hourly	25	\$ 15.00	\$ 375.00	
178	Boomtruck W/Operator (Any Size)	Hourly	60	\$ 200.00	\$ 12,000.00	

179	Hydraulic Shoring Jack	Daily	25	\$ 50.00	\$ 1,250.00
180	Portable Generator	Hourly	25	\$ 30.00	\$ 750.00
181	4 Inch Diameter Utility Pump /W Hoses	Hourly	25	\$ 40.00	\$ 1,000.00
182	Mini / Compact Excavator With Operator < 6 Tons	Hourly	60	\$ 140.00	\$ 8,400.00
183	Mid Size Excavator With Operator 6 - 10 Tons	Hourly	60	\$ 175.00	\$ 10,500.00
184	Standard / Full Size Excavator With Operator 10 - 90 Tons	Hourly	60	\$ 225.00	\$ 13,500.00
185	Arrow Board	Hourly	30		\$
186	Skid Steer With Sweeper Attachment	Hourly	60	\$ 90.00	\$ 5,400.00
187	Trench Box 6'X10'	Daily	25	\$ 95.00	\$ 2,375.00
188	Trench Box 8'X8'	Daily	25	\$ 100.00	\$ 2,500.00
189	Trench Box 8'X12'	Daily	25	\$ 110.00	\$ 2,750.00
190	Trench Box 8'X16'	Daily	25	\$ 120.00	\$ 3,000.00
191	Trench Box 8'X20'	Daily	25	\$ 130.00	\$ 3,250.00
192	Steel Plate 5'x5'	Daily	25	\$ 25.00	\$ 625.00
193	Steel Plate 5'x10'	Daily	10	\$ 50.00	\$ 500.00
SUBTOTAL (SECTION II)					\$ 163,175.00
SECTION III - UNLISTED WORK					
WORK REQUIRED UNDER THIS CONTRACT THAT IS NOT ON AN EMERGENCY BASIS AND IS NOT LISTED UNDER SECTIONS I AND II OF THIS CONTRACT, SHALL BE COVERED UNDER THIS SECTION. ALL WORK UNDER THIS SECTION SHALL REQUIRE A WRITTEN ESTIMATE FROM THE CONTRACTOR USING THE BID HOURLY RATES. MATERIAL WILL BE FURNISHED BY THE COUNTY WHEN AVAILABLE. WHEN THE CONTRACTOR SUPPLIES MATERIALS, THE COUNTY SHALL REIMBURSE THE CONTRACTOR FOR ACTUAL COST.					
ITEM NO.	ITEM DESCRIPTION	UNIT		UNIT PRICE	TOTAL
194	FOREMAN W/PICK-UP TRUCK	HOURLY	70	\$ 140.00	\$ 9,800.00
195	BACKHOE W/OPERATOR	HOURLY	60	\$ 155.00	\$ 9,300.00
196	TANDEM/TRI-AXLE DUMP TRUCK W/DRIVER	HOURLY	40	\$ 145.00	\$ 5,800.00
197	SINGLE AXLE DUMP TRUCK W/DRIVER	HOURLY	30	\$ 95.00	\$ 2,850.00
198	LABOR - PIPE LAYER	HOURLY	10	\$ 75.00	\$ 750.00
199	LABOR - SKILLED	HOURLY	10	\$ 65.00	\$ 650.00
200	LABOR - UNSKILLED	HOURLY	8	\$ 60.00	\$ 480.00
201	FLAGMAN	HOURLY	8	\$ 60.00	\$ 480.00
202	MISC. EQUIPMENT OPERATOR	HOURLY	16	\$ 95.00	\$ 1,520.00
203	BACKHOE	HOURLY	12	\$ 60.00	\$ 720.00
204	RUBBER TIRE LOADER	HOURLY	15	\$ 65.00	\$ 975.00
205	SKID STEER LOADER	HOURLY	40	\$ 60.00	\$ 2,400.00
206	TRACK EXCAVATOR	HOURLY	60	\$ 75.00	\$ 4,500.00
207	AIR COMPRESSOR WITH TOOLS	HOURLY	50	\$ 35.00	\$ 1,750.00
208	TOOL TRUCK OR TRAILER	HOURLY	15	\$ 50.00	\$ 750.00
209	TRENCH COMPACTOR	HOURLY	45	\$ 40.00	\$ 1,800.00
210	PAVEMENT BREAKER	HOURLY	45	\$ 45.00	\$ 2,025.00
211	WELDING (INCLUDES ALL LABOR AND EQUIPMENT)	HOURLY	10	\$ 120.00	\$ 1,200.00
212	LIGHTING WITH GENERATOR	HOURLY	10	\$ 40.00	\$ 400.00
213	ROADWAY STEEL PLATES—EA	DAILY	15		\$
214	EXCAVATION TRENCH BOX—EA	DAILY	15		\$
215	ELECTRONIC ARROW BOARD	HOURLY	20	\$ 15.00	\$ 300.00
216	WORK ZONE SET-UP - INCLUDES SIGNS, CHANNELIZERS AND CONES	DAILY	30	\$ 1,500.00	\$ 45,000.00
217	2" DIAMETER UTILITY PUMP	HOURLY	25	\$ 30.00	\$ 750.00
218	Cut-Off Saw / Chain Saw	Hourly	25	\$ 15.00	\$ 375.00
219	Boomtruck W/Operator (Any Size)	Hourly	60	\$ 200.00	\$ 12,000.00
220	Hydraulic Shoring Jack	Daily	25	\$ 50.00	\$ 1,250.00
221	Portable Generator	Hourly	25	\$ 30.00	\$ 750.00
222	4 Inch Diameter Utility Pump /W Hoses	Hourly	25	\$ 40.00	\$ 1,000.00
223	Mini / Compact Excavator With Operator < 6 Tons	Hourly	60	\$ 140.00	\$ 8,400.00
224	Mid Size Excavator With Operator 6 - 10 Tons	Hourly	60	\$ 175.00	\$ 10,500.00
225	Standard / Full Size Excavator With Operator 10 - 90 Tons	Hourly	60	\$ 225.00	\$ 13,500.00
226	Arrow Board	Hourly	30		\$
227	Skid Steer With Sweeper Attachment	Hourly	60	\$ 90.00	\$ 5,400.00
228	Trench Box 6'X10'	Daily	25	\$ 95.00	\$ 2,375.00
229	Trench Box 8'X8'	Daily	25	\$ 100.00	\$ 2,500.00
230	Trench Box 8'X12'	Daily	25	\$ 110.00	\$ 2,750.00
231	Trench Box 8'X16'	Daily	25	\$ 120.00	\$ 3,000.00
232	Trench Box 8'X20'	Daily	25	\$ 130.00	\$ 3,250.00
233	Steel Plate 5'x5'	Daily	10	\$ 25.00	\$ 250.00
234	Steel Plate 5'x10'	Daily	10	\$ 50.00	\$ 500.00
235	Skid Steer Loader	Hourly	60	\$ 60.00	\$ 3,600.00

SUBTOTAL (SECTION III)	\$ 165,600.00
GRAND TOTAL(SECTION I+II+III)	\$ 2,270,775.00