

DESIGN PRACTICE MANUAL
DISTRIBUTION SYSTEM

PLANNING AND ENGINEERING DIVISION
FAIRFAX COUNTY WATER AUTHORITY

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Design Practice Manual
DISTRIBUTION SYSTEM
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I. ADMINISTRATION

A. *Funding Mechanisms*

1. The basic philosophy behind the Authority's funding and design of the distribution system (local neighborhood water mains 12-inches and smaller in diameter) is based on the principles of financial fairness and design and construction efficiency. The goal has always been to develop the distribution system at the lowest possible overall cost, as well as in a logical manner so as not to create a future need to remove and replace existing facilities which were undersize when originally installed.

2. The design practice is to determine the appropriate size water main for present and anticipated system needs, then apply cost apportionment between the developer/applicant and the Authority. The term developer, as used herein, refers to a new homebuilder who submits a site plan (required for three homes or more). The term applicant applies to any party desiring water service, including new developments, existing homes or individual new homes.

3. The philosophy of "growth pays for growth" is the cornerstone for determining the Authority's Rates, Fees and Schedules as well as the fair apportionment of costs to extend the distribution system. For developers and individual homes alike, the requirement is that they fund the facilities necessary to serve their development (including fire flow). These requirements are spelled out in more detail in subsequent sections of this document. As part of the Authority's rates, the annual anticipated expenditures for "Distribution System Reinforcement" are included in the calculation of the Availability Charge. The Capital Improvement Program contains a line item for expenditures over the ten-year period for this category, which covers Authority extensions and "gap closures" as well as oversizing of water mains funded by others. This is consistent with the "growth pays for growth" concept, as the funds used by the Authority for these purposes come from the Availability charges paid by new customers as they connect to the system.

B. *Proposal Process*

1. When plans are processed for a new development where no water mains exist along the property frontage, or where an existing main does exist but is inadequate to serve the development (domestic and/or fire protection service), an off-site proposal is issued to the developer. Water main extension proposals are also issued to individual homeowners (existing or new construction) desiring water service. This document is

reviewed by the Authority Board Member in whose district the proposed development is located. The Fairfax County Supervisor from the district is also notified of the proposed water main extension, as required by the Facilities Planning Agreement between Fairfax County and the Authority. The proposal serves as a contract between the applicant and the Authority which spells out how the applicant will be reimbursed for a portion of the costs incurred to extend the distribution system to his property.

2. The applicant is given the option of performing the installation of the water main with his own contractor or paying the Authority to have the water main designed and installed by the Authority's Annual Contractor. The costs provided to the applicant are based on the unit prices in the Authority's Water Main Installation and Service Contract. The total cost of the proposal serves both as the cost to the applicant to have the work performed by the Authority and as the upper limit for his future reimbursement as new meter connections occur. All off-site water mains, as well as proposals to extend water mains to existing homes, become Authority projects for the purpose of tracking project expenditures.

C. *FCWA Reimbursement to Developers*

1. The Authority reimburses a portion of the cost of these water mains based on the number and size of connections within the proposed development. This reimbursement takes the form of a deduction from the payment to the Authority by the developer in those cases where the developer decides to pay the Authority to design and install the water main. Since the expenditures for a water main extension to a development precede the collection of connection charges, the Authority must limit its expenditure for each water main extension to an amount which it can expect to recover through added revenue within a reasonable period of time.

2. As meters are installed within the development, the Authority recovers its advance by not reimbursing the developer until a sufficient number of meters are in place to recover the amount of the advance. When the developer installs the main with his own forces, the reimbursement is simply forwarded to the developer as meters are connected in the new development. In all cases, the reimbursable portion of revenues generated from Availability Charges received from connections to water main extensions are credited first to the Authority, until its expenditure has been recovered, and thereafter to the applicant until his expenditure has been recovered, or until the 10-year period has expired, whichever occurs first.

3. The Authority's expenditure for off-site extensions is limited to the lesser of:

- (a) 50% of the total cost, or
- (b) \$300 times the number of equivalent 5/8-inch connections which are expected to be made within the development, or
- (c) \$10,000

4. The date that the off-site water main is placed in service becomes the anniversary date for the project. Each year thereafter on that date the developer will be reimbursed, based on the number and size of meter installations during the preceding year. Reimbursement is limited to the ten-year period following the date on which the water main was placed in service. An applicant for a water main extension must guarantee that there will be a sufficient number of connections made to the system during the 10-year period following its installation to reimburse the Authority at the rate of \$300 per equivalent 5/8-inch connection for the expenditures incurred in providing the water main extension. This is accomplished by assessing an annual deficiency payment against the applicant if the number of connections in any one year is less than 10% of the total number expected during the 10-year period.

5. In addition to the reimbursement provisions above, the Authority reimburses to the developer for the same 10-year period the Local Facility Charges collected from new connections by those other than the developer to the "on-site" water mains installed by and paid for exclusively by the developer. The Authority attempts to monitor this type of connection for reimbursement, but it is ultimately the developer's responsibility to inform the Authority of connections eligible for reimbursement. No reimbursement will be made beyond the 10-year period indicated above regardless of when the connections were installed.

6. The Schedule of Repayment of Advances-In-Aid of Construction (Appendix A) lists the reimbursement amount for new connections by meter size.

D. FCWA Reimbursement to Individual Homeowners

1. Individual homes, either existing or new, which extend a water main at their expense to obtain service, receive reimbursement from Local Facilities Charges collected from new connections to the main by those other than the party who paid for the extension. No reimbursement will be made beyond the 10-year period indicated above regardless of when the connections were installed.

E. Authorization Authority of the General Manager

1. The General Manager is authorized to approve projects where FCWA expenditures are less than \$20,000, and to periodically report such actions to the Board;

2. The General Manager is authorized to approve projects where all FCWA expenditures are fully reimbursable, and to periodically report such actions to the Board.

II. WATER MAIN EXTENSIONS

A. *Water Main Extensions for New Development - Developer Responsibilities*

1. In the case of a new development -- residential, commercial, industrial and commercial -- the applicant is responsible for all the facilities necessary to provide adequate domestic and fire protection service in accordance with FCWA and Fairfax County standards and recognized water works practices. For single family houses, new development is defined as three or more lots, which requires a site plan to be submitted through Fairfax County. New homes built on individual lots are treated as existing homes, which is discussed in another section. The developer is responsible for installing mains adequate to provide the fire flow specified by the Fairfax County Office of the Fire Marshal. The design and specifications for all water main extensions are either prepared by the Authority or, if prepared by others, are reviewed and approved by the Authority. All water mains installed by others are subject to inspection and approval by the Authority. All water main extensions, regardless of the source of funding, become the property of the Authority upon completion of installation and acceptance.
2. Generally, the minimum size water main is 12-inch when located in a primary or other major roadway, and 8-inch elsewhere. The minimum size is 4-inch in a dead end or cul-de-sac beyond the last fire hydrant, when only domestic service is required.
3. Developers are required when deemed necessary to install on-site water mains for existing or possible future system looping and/or additional supply sources for the development. The maximum length of such mains that can be required is 10 feet multiplied by the number of dwelling units or equivalent 5/8-inch meters.
4. The developer is required to install on-site mains and appurtenances required by improvements to existing Virginia Department of Highways and Transportation facilities, in order that the improvements will not be damaged by future extension of the mains. This typically occurs when a developer constructs a deceleration or turn lane. The Authority requires water mains to be installed under and just beyond the limits of this new pavement so that they may be extended in the future without damage to the roadway.

B. Water Main Extensions for New Development - FCWA Responsibilities

1. In the event that the Authority desires to install a larger size water main or other facilities - whether off-site or on-site - which are not required for the provision of adequate service to the applicant, the Authority is responsible for funding these expenditures.
2. The Authority bears the cost of installation of fire hydrants on all off-site water main extensions, as fire hydrants on these extensions do not benefit the new development, but rather existing or future homes along the route of the off-site water main.
3. In the case where a developer needs to connect to an existing water main which does not have adequate capacity to serve the proposed development, the developer funds the connection and extension from the nearest water main which does have adequate capacity. The Authority, in order to avoid having the new main in parallel with the existing, smaller main, funds the abandonment of the smaller main and provides the funds for reconnecting existing customers served by the smaller main to the new main.

C. Design Considerations

1. SUBMISSION PROCEDURES
 - (a) Preliminary Plans/First Submittals - The standard submission process for preliminary plans or first submissions consists of the engineer submitting his plans to Fairfax County Plan Control. Three sets are routed to the Office of the Fire Marshal. Upon completion of the Fire Marshal's review, one set is returned to Fairfax County Plan Control, and two sets are forwarded to the Water Authority. The FCWA Planning Department returns one set of reviewed plans to the Department of Public Works and Environmental Services (DPW&ES) at Fairfax County.
 - (b) Final Submittals - Final submissions (those which are submitted with the expectation they will be approved) are submitted directly to the Fire Marshal's Office for approval. The Engineer transmits the approved plans to the Authority. After approval by FCWA, the plans may be submitted to DPW&ES for their approval.
 - (c) Rough Grading Plans - Rough grading plans (RGP) are treated in the same manner as any other normal plan submission. However, after Fairfax County approval, at the request of the

developer, the Planning Department will “forward” them to the Authority’s Construction Department. Two extra sets of plans (four total) are needed if the plans are to be submitted to FCWA Construction. RGP plan approval by FCWA allows the contractor to install his water mains, but he cannot fill, flush, test, tap, or sample the mains until Fairfax County approval of the formal site plan is obtained and approved plans transmitted to FCWA. The plans and RGP permits must contain language that specifies that water main construction is included in the RGP.

(d) Modified Processing Plans - Modified processing plans are treated the same as RGPs, except that they receive priority treatment and are reviewed or distributed as expeditiously as possible.

(e) Planning Department Approval - When the Planning Department approves a set of plans, one set is retained in the FCWA files for comparison, at a later date, with the drawings approved by Fairfax County (DPW&ES).

2. WATER MAIN LOCATION - PLAN VIEW

(a) 50-Foot right-of-way - In a standard fifty (50)-foot subdivision right-of-way (ROW), the normal water main location is eight (8) feet to the north or east of the predominant centerline of the street. The water main should continue on the same side of the centerline for the entire length of the street. Crossing from one side of the street to the other is generally not permitted.

(b) Forty (40)-Foot right-of-way - In a forty (40)-foot right-of-way, as sometimes utilized in Reston, the normal water main location is four and a half (4.5) feet to the north or east of the predominant centerline of the street.

(c) Four-Lane Streets - In four-lane streets, the normal water main location is ten (10) feet off the face of curb on the north or east side of the street. Where a deceleration lane exists, the water main generally should not bend to remain 10 feet off the curb, but should continue on so that when the street section returns to four lanes, the water main will remain 10 feet from the face of curb

(d) Townhouse or Commercial Development - In townhouse or commercial developments, the normal water main location is centered in a fifteen (15)-foot easement. The ends of the easement should be contiguous with the edge of the gutter pan. Water mains should not be located in the center of the travel area. Once the

water main is located on one side of the travel area it should not cross over to the other side.

(e) Miscellaneous

(i) Stationing for all proposed water mains must be provided.

(ii) Fire hydrants should be placed in a ten (10)-foot easement.

(iii) Other utilities are not allowed in FCWA easements with the exception of utility crossings, which should be as close to ninety (90) degrees as possible. However, where space constraints dictate, utility easements may overlap.

(iv) The minimum horizontal separation between a water main and a sanitary sewer shall comply with the Virginia Department of Health Waterworks Regulations, Section 12 VAC 5-590-1150. Under normal conditions water mains shall be laid at least ten (10) feet horizontally from a sanitary sewer or sewer manhole. The distance shall be measured edge to edge.

(v) Public water mains should be twenty (20) feet from any building.

(vi) Fittings and valves need not be called out in plan view in order to cut down on excessive clutter on plans. All fittings and valves must be called out on the profile sheet.

(f) Fire Lines - Where fire lines are installed there is to be a restrained valve installed at the point where the fire line connects to the public water main. This valve, to be owned and operated by FCWA, denotes the end of FCWA maintenance. Fire lines are owned and maintained by the owner of the building, and therefore should not be shown in FCWA easements.

3. WATER MAIN LOCATION - PROFILE VIEW

(a) Profile

(i) Profiles are to be provided for all proposed water mains.

(ii) All water mains are to have four (4) feet of cover, not four (4) feet minimum cover as specified in the Public Facilities Manual, unless a utility crossing necessitates varying from the normal cover.

(iii) All fittings and valves are to be called out on the profile sheet. Examples: 1 - 12" x 6" Tee, 1 - 6" Valve (Restrained), 1 - F.H.; 1 - 12" x 8" Tee, 1 - 12" Valve, 1 - 8" Valve. Bends 22-1/2° or larger are to be called out as well.

(iv) When valves are called for on the plan view, the water main must be level (parallel to proposed grade) at the corresponding station on the profile. If the water main is sloping up or down when a valve is needed, the profile must be adjusted to make it parallel to the proposed grade.

(b) Water Main Crossings - Storm Sewer - Where a water main crosses above a storm sewer, a minimum clearance of six (6) inches is required. Where the water main crosses below the sewer, twelve (12) inches of clearance is required. These clearances are to be called out on the water main profile. The water main crossings are to be shown on the storm sewer profile.

(c) Water Main Crossings - Sanitary Sewer - When a water main crosses a sanitary sewer, a minimum vertical clearance of eighteen (18) inches is required between the bottom of the water line and the top of the sewer. All water line and sanitary sewer line crossings must conform with the Virginia Department of Health Waterworks Regulations, Section 12 VAC 5-590-1150.

(d) Water Main Crossing - Gas Mains - Gas main crossings generally require twelve (12) inches clearance above or below. The large petroleum product pipeline companies (i.e., Colonial, Columbia, Transco) may impose a vertical separation greater than twelve (12) inches, along with concrete pads above their pipelines. In those cases where a proposed water main would be placed under a concrete pad required by the pipeline company, the Authority

prefers to go around the concrete pads, using four (4) 45° horizontal bends.

(e) Water Main Cover

(i) In order to cross above a sewer rather than below, the normal requirement of four (4) feet of cover can be reduced to three (3) feet for any size water main. Twelve (12) inch water main can use 2.5 feet or 2.75 feet of cover if class 53 D.I.P. is installed. Water mains less than twelve (12) inch may also be treated similarly except that it is not necessary to change pipe classification from the normal class 52.

(ii) The maximum cover normally allowed is 7.5 feet. In situations where the cover exceeds 7.5 feet, alternate water main routes must be investigated in an attempt to avoid excessive cover.

(iii) Where a site plan alters the cover on an existing water main, a minimum of three (3) feet and a maximum of 7.5 feet is allowable. If the proposed cover falls outside these limits, water main relocation will normally be required. Test holes will be required prior to FCWA approval to verify final cover over the existing water main.

(f) Hydrants - Air release hydrants or two (2) inch air releases are utilized at the high elevation point of a water main twelve (12) inches in diameter, or larger. Blow-off hydrants are utilized at the low elevation point of a water main twelve (12) inches in diameter, or larger. Such hydrants are the same as standard hydrants except that the tee is offset to the bottom (blow-off) or top (air release) of the water main. Where possible, such hydrants are used to provide fire protection to avoid unnecessary duplication of fire hydrant installations.

(g) Fire Lines - If the engineer chooses to show a profile of the fire line, this should be done separately from the public water main and should be labeled “fire line” or “private line,” not just “D.I.P. water main.”

4. WATER MAIN DESIGNATION SPECIFICATIONS

(a) Introduction - This section covers miscellaneous FCWA design criteria which do not fall into one of the categories covered in other chapters. They are included primarily because our experience indicates these items often cause questions from design engineers.

(b) All water mains, four (4) inch through twelve (12) inch, shall be CLASS 52 ductile iron pipe unless otherwise specified. All water mains sixteen (16) inch and larger shall be CLASS 51 ductile iron pipe.

(c) FCWA does not normally utilize 10-inch or 14-inch diameter water mains. An exception to this guideline is when a correction to or relocation of an existing 10- or 14-inch water main is required. Six-inch water main is only utilized for hydrant branches, short dead-end lines to fire hydrants (less than 350 feet), or on a subdivision street where the 6-inch water main is a loop on the main feed.

(d) All fire hydrant, fire line, and stub-out valves shall be restrained. Swivel fittings are optional in place of restraining for fire hydrant installations.

(e) Water mains stubbed for future use are normally required to be at least forty (40) feet in length. Hydrants which are on a dead-end line with a ninety degree bend instead of a tee shall have a restrained valve located prior to the bend. The profile callout should read, "1 - 6" valve (restrained), 1 - 90° bend, 1 - F.H."

(f) If at all possible, it is desirable not to place any horizontal bends above a storm or sanitary sewer, or in such a manner as to cause the blocking for the bend (or tee) to be in disturbed earth.

(g) When a water main crosses below another utility, water main valves shall be placed so as not to be in conflict with the other utility. In general, this means not locating any valves in the other utility's easement.

5. METER LOCATIONS

(a) Detached Single Family Development - Water meter locations are not to be shown for single family detached developments, except for water meters which are not in the right-of-way (pipestem lots) which require easements. Pipestem meter easements are normally ten (10) feet square.

(b) Townhouse Development - For townhouse developments, water meters normally are installed in the utility strip. Where no utility strip is shown, meters should generally go behind the sidewalk or in an appropriate grassy area. Meters that are not located in a utility strip require an easement at least five (5) feet square. Meters should be located on the property line in pairs where possible. The symbol Ø is used to designate water meters. Water meters are to be located at least five (5) feet from sanitary sewer laterals and storm sewer inlets. A water meter may be located above a storm sewer only if the sewer has a minimum of three (3) feet of cover. Do not show service lines from the meter to the property being served unless it is not clear which unit is served by a given meter.

(c) Inside Meter Installations - All water meters three (3) inch and larger are to be installed inside with a remote readout on the building's outside wall. In the case of a sprinkled building, all meters 2 inches and smaller may be installed inside, utilizing the fire line (this configuration is reviewed on a case by case basis). Domestic service shall be provided with a connection to the fire line outside the building, with a separate valve on the domestic line at the point of connection to the fire line. If a water meter is installed outside the building, the service connection will always be made to the public water main rather than to the fire line.

6. FIRE FLOWS

(a) General - Fire flow requirements are determined by the Office of the Fire Marshal. When preparing plans as a first submission, there is no benefit to obtaining hydrant information and putting it on the cover sheet. Planning Department personnel will determine the available fire flow during their review and provide it with their comments. It is acceptable to utilize hydrant information when preparing a "first and final" submission in order to obtain Fire Marshal approval. In some cases this information may indicate adequate fire flow when, in fact, adequate flow is not available. The Planning Department will inform the engineer as to

what measures are needed to obtain adequate fire flow in such cases.

(b) Fire Hydrant Flow Information - While hydrant information obtained from the Authority's Technical Resources Group is useful, it is often invalid in determining on-site fire flow availability at proposed hydrants.

(c) Sprinkled Structures - For sprinkled structures, the Fire Marshal's office requires flow information from an existing hydrant and the minimum hydraulic grade line (HGL) for the area where the development is located. This information is not required for site plan approval, but is required as part of the building's mechanical plan submission.

(d) Hydraulic Data - Minimum HGL information may be obtained from the Planning Department by calling 289-6343.

7. CORROSION CONTROL

(a) General - Corrosion control, sometimes referred to as cathodic protection, is designed to protect water mains where they are subjected to electrical currents which may corrode the main. Such measures are required where a water main crosses a pipeline which has an impressed electrical current. Impressed electrical currents are typically found on petroleum product pipelines to inhibit corrosion. Examples of cathodically protected pipelines are those owned by Colonial, Transco and Columbia in western Fairfax. However, there are also cathodically protected pipelines owned by Washington Gas Light Company (WGL). WGL and the FCWA Planning Department have maps showing the locations of these facilities. Necessary cathodic protection measures are determined on a case by case basis.

8. EASEMENTS

(a) Easement Dimensions - FCWA easements are normally fifteen (15) feet wide. For water mains sixteen (16) inches in diameter or larger, a twenty-four (24) foot easement is required. Fire hydrants are normally located in a ten (10) foot square easement, as are water meters which require easements.

(b) Easement Plat Review - For developments where easements are proposed the Planning Department staff will normally note on the transmittal that two advance prints of the easement plat should be submitted along with the final submission.

The advance prints allow Planning Department personnel to ensure that the easement plat is correct. If advance prints are not submitted during the plan review process, and plats are submitted at the last minute (prior to construction), construction delays may occur due to plat corrections. The Authority does not require easement plats to be submitted at the time of approval, but they must be submitted, reviewed, approved and recorded before water mains can be filled.

(c) Recordation of Easements

(i) If easements are not recorded at the time of FCWA plan distribution (following Fairfax County approval), then the engineer is again notified that plats are needed. If requested to do so, the plans will be distributed to the Construction Department so that installation of the proposed water mains may proceed. A letter stating that the developer understands he may not “fill, flush, test, tap or sample” the water mains until the easements are recorded is required by the Construction Department. This letter must be on the developer’s letterhead.

(ii) The Authority generally records water main easements for non-residential development. Four prints of the plat must be submitted to the Planning Department for approval before the easement can be recorded. For residential developments, the developer may record the easements or have the Authority record them. Even when the developer records the easements, four prints of the plat must be submitted to the Planning Department for approval prior to recordation. These prints will be used to verify the accuracy of the plat compared to the approved plans. If plat prints are not submitted, the Construction Department will not allow the mains to be filled, even if the easement is recorded, until the plat has been reviewed and approved by the Planning Department.

(d) Plat Dimensions - Easement plats are to be drawn on sheets between 8-1/2” x 11” and 18” x 24” in size with a 1” minimum margin top, left and bottom and right side 1/2” minimum margin.

(e) Common Easements - FCWA easements are not to be combined with “ingress/egress” or “utility” easements. They are exclusive easements for FCWA water mains only.

9. REVISIONS

(a) General

- (i) When revisions are made to a site plan, the revised sheets must be submitted to the Planning Department by the engineer. All revisions are to be identified by circling them in red on the appropriate plan sheets.
- (ii) At times there is confusion as to when it is appropriate to bypass the Authority and submit a revision directly to DPW&ES. The Planning Department must approve any revision to the water main design. Other revisions which must be submitted include: changes to storm or sanitary sewer design where they cross water mains; revisions to the proposed grade over water mains; and changes to street or parking lot alignments.
- (iii) If a revision affecting the water main design is not reviewed by the Planning Department, a situation can arise where field delays will occur. When in doubt about the need to submit a revision for FCWA approval, please call and ask for clarification.

10. STANDARD NOTES

(a) Cover Sheet - The standard cover sheet notes are as follows:

- (i) All water main construction shall comply with the requirements of the standard specifications and plans of FCWA and with the requirements of the Fairfax County Public Facilities Manual.
- (ii) No water main valves are to be closed prior to notification of FCWA, phone 289-6388 or 289-6389.
- (iii) The developers shall request inspection by the Public Water Supply Agency three days prior to commencing construction of any water mains.
- (iv) Working pressure shall be _____ P.S.I.
(Note: The working pressure is supplied by the Planning

Department. It need not be obtained in advance of plan submittal. Plans will not be disapproved for lack of working pressure information. The plan reviewer will fill in the blank space on the note. Working pressure is the maximum expected pressure, and may not be typical of the actual pressure in a given area.)

- (b) Working Pressure 80 P.S.I. or Greater - When the working pressure is 80 P.S.I. or greater, PRVs (pressure reducing valves) are required. In such cases, the following note should appear on the cover sheet along with the standard notes discussed above:

“The property described on this plan is located in an area where the water pressure will exceed 80 P.S.I. In accordance with FCWA rules and regulations and the Fairfax County Plumbing Code, a pressure regulation valve must be installed by the property owner in the building plumbing system in order to eliminate water hammer and unnecessary wastage of water.”

- (c) Working Pressure 35 P.S.I. or Less - When the plan reviewer determines that the domestic pressure is going to be 35 P.S.I. or less, then the following note will be necessary:

“In order to maintain adequate domestic pressure, booster pumps are required to serve elevations above elevation _____ feet”

- (d) Offsite Water Main Note - When an offsite water main extension is required, a note such as below is needed:

“FCWA approval is contingent upon installation of Offsite water main and connection thereto.”

- (e) Contingency Note - When installation of water mains in another development, or another section of the same development, is needed to supply water to a given project, then the following note is needed:

“FCWA approval is contingent on the installation of water mains in (name of development) and connection thereto.”

11. OFFSITE WATER MAIN EXTENSIONS

- (a) General - Offsite water mains are defined as those beyond the limits of the property being developed. The Authority has

special procedures for offsite water mains in order to reimburse the developer for at least part of his water main installation costs.

(b) Request for Proposal - When the Planning Department reviews a plan which requires an offsite water main, the reviewer will put this note on the cover sheet:

“Developer shall request a formal offsite proposal.”

Either the engineer or the developer may submit the written request. This note is not to be reproduced on the cover sheet as part of the plan’s next submission.

(c) Offsite Water Main Plans - The plans for the installation of an offsite water main may be included with the site plan, on a separate plan for the water only, or as part of a Public Improvement Plan. FCWA prefers that the water main be included as part of the site plan.

(d) Offsite Proposal - The Engineering Department will prepare the proposal, which includes the price for the Authority to design and install the offsite water main. The developer has the option to install the facilities himself. If the developer chooses the option to install the offsite water main, the developer’s contractor unit prices must be submitted to the Authority in order to establish the limit on the Authority’s reimbursement.

(e) Anniversary Date - The date that the offsite water main is placed in service becomes the anniversary date for the project. Each year thereafter on that date the developer will be reimbursed, based on the number and size of meter installations during the preceding year. The FCWA reimbursement schedule is included in Appendix A.

(f) Approval by Board of Supervisors - Requests for offsite water mains should be made before Authority approval of the site plan in order to allow for the forty-five (45) days needed to obtain the required approval of the Fairfax County Board of Supervisors. The Engineering Department is responsible for obtaining the necessary approvals.

12. PLAN DISTRIBUTION

(a) Distribution - After Fairfax County has approved a set of plans, three (3) sets are transmitted to FCWA. These County-approved plans are compared to the set previously approved and retained by the Planning Department. Any revisions made after FCWA approval which the Planning Department did not approve may delay construction of the water mains. Once this review is complete, the Planning Department “distributes” four (4) sets of plans as follows:

1. Construction Department
2. Field Inspector
3. New Services
4. Meter Installation

At this point the Construction Department has primary responsibility for the development.

13. CONSTRUCTION

(a) Construction - Prior to beginning construction of water mains, the Construction Department requires the following:

1. Approved plans
2. Cut sheets
3. 72-Hour notice prior to beginning work.

In a case where the FCWA easements are not recorded, the Construction Department requires an “easement letter” which allows the developer’s contractor to install water mains but prohibits the filling, testing, tapping, flushing, or sampling of the mains. A similar “fast track letter” is required for County approved rough grading or modified processing plans which are FCWA approved but not yet approved by Fairfax County.

D. Pipestem Lots

1. A pipestem lot is defined in the Fairfax County Public Facilities Manual as a lot that does not have frontage on the street to which it is addressed. In new developments, pipestem lots are served by long services when there are one or two lots on the pipestem driveway. When three or more lots are proposed on the same pipestem, or when a service line longer than 300 feet would be required to serve a house, the developer generally is required to extend a 4-inch water main to at least the

beginning of the first pipestem lot (the property line between the house fronting the street and the first pipestem lot).

III. WATER MAIN EXTENSIONS FOR EXISTING DEVELOPMENT

A. *Applicant's Responsibilities*

1. Applicants for service to existing development fall into two categories. Applicants desire public water service for many reasons. All are considered in the same manner with the exception of those that fall under the Bad Well Policy, which is discussed in a subsequent section. In the case of one or two homes being built on existing lots, the same criteria are applied as to existing homes and businesses, since only developments of three lots or more require a site plan. The design and specifications for all water main extensions are either prepared by the Authority or, if prepared by others, are reviewed and approved by the Authority. All water mains installed by others are subject to inspection and approval by the Authority. All water main extensions, regardless of the source of funding, become the property of the Authority upon completion of installation and acceptance.
2. Generally, the minimum size water main extension to serve an individual house is 6-inch in a through street and 4-inch in a dead end street. A 6-inch main will provide a minimum acceptable fire flow, based on older Fairfax County fire flow requirements for single family homes in new development, which have since been upgraded.
3. The applicant is generally required to extend the water main to the center of the property's frontage along the street. An exception to this is the case where the water main already extends into the property, allowing the applicant a service connection without extending the main, even if the existing main falls short of the center of the property. In addition, homeowners served by an existing well are generally permitted to connect to the Authority's nearest existing main to which residential connections are permitted, in lieu of extending the Authority's system, where (1) the service line from the existing main would not be significantly longer, as measured from the homeowner's front door, than would any service line from the main extension the Authority would otherwise require; and (2) connections to the existing main would not adversely affect service to the Authority's other customers served from that main.

B. FCWA Responsibilities

1. In the event that the Authority desires to install a larger size water main or other facilities that are not required for the provision of adequate service to the applicant, the Authority is responsible for funding these expenditures.
2. The Authority funds the installation of fire hydrants on all water main extensions for individual houses when existing hydrants do not provide adequate coverage.
3. In the case where an individual home needs to extend or connect to an existing water main which does not have adequate capacity to serve it, the applicant funds a system improvement to provide an adequately sized water main to replace the existing main. The Authority funds the abandonment of the existing water main and the cost of reconnecting any existing customers.
4. When it is in the Authority's interest not to extend a water main to provide service to an individual home, a long service, funded by the applicant and installed and maintained by the Authority up to the meter box or curb stop may be utilized. When it is judged that there is no potential for future extensions, a long service in the state right-of-way or in an easement through private property is sometimes the most economical means to serve the applicant without jeopardizing the orderly development of the Authority's distribution system, or unfairly penalizing potential future applicants.

C. Bad Well Policy

1. The Authority's Bad Well Policy provides limited assistance to homeowners with individual well supplies that were in existence and use as of January 7, 1993, and which meet one of the following conditions:
 - (a) the well is documented by the Fairfax County Health department to be contaminated (positive test for fecal coliform), or
 - (b) the well has an unacceptable yield, defined as less than two gallons per minute at any time, or a total flow of less than 500 gallons in two hours, as defined by the Fairfax County Health Department, or
 - (c) the well does not provide a flow of water on a reliable basis.

2. In order for a water main extension to be partially funded by the Authority, at least 50 percent of the homes which will front the proposed water main must connect to the main and become active customers. This commitment requires that the minimum number of homeowners pay the Availability and Service Connection Charges prior to the Authority designing the water main extension. The Authority's financial participation for qualifying projects is limited to the lesser of:

(a) \$3,000 per participating home (ten times the refund of reimbursement money paid by the Authority to developers who install "off-site" water mains for each equivalent 5/8-inch connection made by the developer)

(b) The total cost of the water main less the homeowners' total contribution. Each homeowner shall contribute a minimum of \$5,000 (the approximate cost to drill a new well) towards the cost of the water main, unless a lesser contribution by each participating homeowner will pay for the full cost of the extension. In no case shall a homeowner's contribution be less than the Local Facilities Charge (currently \$2,300).

3. Total Authority participation for all projects during the calendar year will not exceed \$100,000. The Authority's participation for any one project shall not exceed \$50,000. For projects where a third party other than an agency of Fairfax County pays for the homeowners' share of the water main costs, Authority contributions shall be limited to \$2,000 per home and shall not exceed \$25,000 for any one project.

4. Fire hydrants and any oversize water mains desired by the Authority shall be installed at the Authority's expense, with these costs not counted towards expenditures approved under this policy.

4. The applicants' participation, less the amount of the Local Facilities Charges, shall be reimbursed to the extent possible, without interest, for a period of ten years to the original applicants. This is accomplished by the collection of Local Facilities Charges from future customers connecting to the water main extension.

MISCELLANEOUS DESIGN CONSIDERATIONS

D. VDOT & Fairfax County Relocation Projects

1. VDOT road improvement projects and Fairfax County neighborhood improvement projects often necessitate relocation of existing water mains. In some cases the existing main is a size that is smaller than the Authority's current standards (8-inch for water mains providing fire protection, 4-inch for mains providing only domestic service). In these situations, while VDOT and Fairfax County pay for the replacement of the existing facilities in kind, the Authority will take advantage of the opportunity to upgrade its distribution system at minimal cost. By funding an appropriate oversizing of the replacement mains, the Authority avoids the cost of labor and restoration (paying only for the higher material cost) and the adverse public relations of reconstruction activity.
2. In cases where the cost of replacing those mains in conflict with proposed improvements is of sufficient magnitude, it is cost effective to replace all the water mains in a given portion of the project. This avoids having pipe of alternating materials and allows for upgrading to a larger diameter main where desirable.
3. The Authority has asbestos cement pipe (ACP) in the older parts of the system. When ACP is present in a street where improvements are being proposed, it is evaluated for replacement even when the improvements do not require its replacement. ACP has a documented history of accelerated failure after construction activity in the vicinity. The depth of cover, traffic loads and volumes and repair history are analyzed to determine if the integrity of the ACP pipe will be compromised by the construction activity. In some instances, replacement is warranted to prevent future pipe failures or service connection leaks.

B. Distribution System

1. A thoroughly looped system provides improved system reliability, water quality and system flows. When either a water main extension or a relocation project provides an opportunity to connect dead end mains, or close a system "gap," the situation is analyzed as to whether the Authority should fund the improvement. The potential for future development to close the gap, the existence of any pressure or flow deficiencies, existing water quality problems and the potential for future connections are all factors which are evaluated in determining whether a system improvement is appropriate as part of a proposed project.

