

SECTION 1 - GENERAL DESIGN STANDARDS

1.1. General Requirements

1.1.01 General

- A. The design of all utility systems and extensions or modifications thereto shall be performed under the direction of a registered professional engineer with a current registration in the Commonwealth of Virginia in accordance with Title 54.1, Chapter 3 of the Code of Virginia, 1950, as amended. Where applicable, design may be performed under the direction of a certified land surveyor in accordance with Sec. 54.1-408 of the above cited code.
- B. All design shall conform to the Virginia Department of Environmental Quality Sewerage Regulations [12VAC5-580], the Virginia Department of Health Waterworks Regulations [12VAC5-590] and to the requirements of other State and Federal Agencies having jurisdiction.
- C. All design shall conform to the requirements of the Department. Where the requirements of the State and County are in conflict, the more restrictive requirements shall govern.
- D. The engineer shall be responsible for obtaining the review and necessary approvals of all drawings and specifications by applicable County, State, and Federal agencies having jurisdiction. Copies of such approvals shall be submitted to the Department at the time of final review by the Department.
- E. Sanitary sewer lines and water lines are to be designed to serve the entire sewer shed or service area of which the subdivision or development is a part. This necessitates consideration of property beyond the development or subdivision in question.

The developer is required to design and construct his system, properly sized and at an appropriate location, to permit future extensions to be made at the limits of the subdivision or development in question. Elevation of the sewer system must be designed such that future extensions can serve the entire area which naturally drains towards the system.

1.1.02 Department Review

A. Plan of Development

- (1). Water and sewer plans shall be included as part of the Plan of Development (POD) application. Separate submittal of water and sewer plans to the Department of Public Utilities for a POD will not be required.
- (2). The POD application shall include a DPU Design Folder. This Design Folder shall contain any of the following documents not shown on the plans:
 - (a). Engineering Report with supporting calculations
 - (b). Sewer Design Form

- (c). Public Utilities Plan Review Checklist
- (d). Water System Flow Request
- (e). Domestic Meter Sizing Form
- (f). Fire Flow Estimate Form
- (g). Local Review Program Form (if applicable)
- (h). Notice of Intent to Discharge Non-domestic Wastewater.

(3). The requirements of Public Utilities shall be included in the approved POD.

(4). The Information Sheet for Water and Sewer Agreements shall be submitted directly to the Department of Public Utilities.

(5). Upon receipt of the Information Sheet for Preparation of Water and Sewer Agreements, the water and sewer agreements will be prepared by the Department for signature by the Owner. Since the agreements must be executed by the Owner and County prior to approval of the utility plans or building permits, it is recommended that the Information Sheet be submitted as soon as possible to avoid delays in approval of plans or building permits. Conflicts between the completed Information Sheet and the plans may generate additional review comments.

(6). For phased development, overall water and sewer plans shall be submitted to Public Utilities and shall be approved prior to approval of any construction plans for the first phase of the development.

(7). When all of Public Utilities technical requirements are satisfied, the Department will notify Planning and Public Works. Public Works may then proceed with signature of the POD construction plans. This signature DOES NOT include approval for construction of water and sewer. Ten (10) sets of signature plans will be sent to Public Utilities for approval of construction for water and sewer.

(8). When agreements have been executed, applicable Federal, State and Local approvals received, off-site easements recorded, and Department requirements satisfactorily addressed, the plans shall be marked "Approved" by the Director of Public Utilities or his representative.

(9). The ten sets of approved water and sewer plans will be distributed as follows:

- Engineering Division.....1 set
- Construction Division.....4 sets
- Engineer.....1 set
- Backflow Technician.....1 set
- Fire.....1 set
- Eastern Government Center..1 set
- Permit Center.....1 set

(10). The owner's contractor will contact the Public Utilities Construction Division to schedule a pre-construction meeting. The approved water and sewer construction plans will be delivered to the contractor at this meeting and authorization to proceed with construction of water and sewer facilities will be issued.

(11). Proposed revisions to the approved water and sewer construction plans shall be submitted directly to the Engineering Division. The Engineer shall:

- (a). provide a transmittal letter which clearly states those changes submitted for approval
- (b). submit the appropriate number of copies for approval
- (c). clearly indicate, by highlighting in yellow on each copy of the plans submitted, those changes being made.

B. Subdivision Plan Review

(1). The Engineer shall make application to the Department for sanitary sewer and/or water service. The Department will accept for review only those applications that are complete. A complete application includes the Water and Sewer Plans and the DPU Design Folder. This Design Folder shall contain any of the following documents not shown on the plans:

- (a). Engineering Report with supporting calculations
- (b). Sewer Design Form
- (c). Public Utilities Plan Review Checklist
- (d). Water System Flow Request
- (e). Local Review Program Form (if applicable)

(2). The Engineer shall submit nine (9) sets of plans for approval. When an irrigation meter is proposed, a backflow preventer will be required because irrigation systems are considered as a potential source of contamination of the public water supply. Three additional sets of plans will be required for the Backflow Technician and Building Official.

(3). The Information Sheet for Water and Sewer Agreements shall be submitted directly to the Department of Public Utilities.

(4). Upon receipt of the Information Sheet for Preparation of Water and Sewer Agreements, the water and sewer agreements will be prepared by the Department for signature by the Owner. Since the agreements must be executed by the Owner and County prior to approval of the utility plans or building permits, it is recommended that the Information Sheet be submitted as soon as possible to avoid delays in approval of plans or building permits. Conflicts between the completed Information Sheet and the plans may generate additional review comments.

(5). When all of Public Utilities technical requirements are satisfied, the Department will send the plans to Public Works. Public Works shall sign the plans to indicate that all environmental and erosion and sediment control requirements have been satisfied.

(6). When agreements have been executed, applicable Federal, State and Local approvals received, off-site easements recorded, and Department requirements satisfactorily addressed, the plans shall be marked "Approved" by the Director of Public Utilities or his representative.

(7). For phased development, overall water and sewer plans shall be approved prior to the first phase of the development.

(8). The nine sets of approved water and sewer plans will be distributed as follows:

- Engineering Division.....1 set
- Construction Division.....4 sets
- Engineer.....1 set
- Eastern Government Center.1 set
- Public Works.....1 set
- Permit Center.....1 set

(9). The owner's contractor will contact the Public Utilities Construction Division to schedule a pre-construction meeting. The approved water and sewer construction plans will be delivered to the contractor at this meeting and authorization to proceed with construction will be issued.

(10). When revisions to the approved water and sewer plans are submitted for approval, the Engineer shall:

- (a) provide a transmittal letter that clearly states those changes submitted for approval.
- (b) submit the appropriate number of copies for approval.
- (c) clearly indicate, by highlighting in yellow on each copy of the plans submitted, those changes being made.
- (d) include the Subdivision Certification per Section 1.1.02F to certify that all changes have been coordinated with the Subdivision Construction Plans and that all changes conform to the approved Subdivision Construction Plans.
- (e) without certification of conformance to the Subdivision Construction Plans, approval by the Director of Planning will be required prior to authorization to proceed with the proposed revisions.

C. Off-site Improvements

(1). Plans for major off-site improvements shall be submitted to the Department. Copies of the plan will be sent to Public Works and Planning for their comments. A complete application includes the Water and Sewer Plans, Engineering Report and any supporting calculations. The Engineer shall schedule a meeting with the Department as needed to define the scope of the project and the extent of the off-site improvements required.

(2). The Engineer shall submit nine (9) sets of plans for approval. For sewage pumping stations or other major facilities additional copies may be required.

(3). The Information Sheet for Water and Sewer Agreements shall be submitted directly to the Department of Public Utilities.

(4). Upon receipt of the Information Sheet for Preparation of Water and Sewer Agreements, the water and sewer agreements will be prepared by the Department for signature by the Owner. Agreements must be executed before plans are approved.

(5). When all of Public Utilities technical requirements are satisfied, the Department will send the plans to Public Works. Public Works shall sign the plans to indicate that all environmental

and erosion and sediment control requirements have been satisfied.

(6). When agreements have been executed, applicable Federal, State and Local approvals received, off-site easements recorded, and Department requirements satisfactorily addressed, the plans shall be marked "Approved" by the Director of Public Utilities or his representative.

(7). For phased development, overall water and sewer plans shall be approved prior to the first phase of the development.

(8). The nine sets of approved water and sewer plans will be distributed as follows:

- Engineering Division.....1 set
- Construction Division.....4 sets
- Engineer.....1 set
- Eastern Government Center..1 set
- Public Works.....1 set
- Permit Center.....1 set

(9). The owner's contractor will contact the Public Utilities Construction Division to schedule a pre-construction meeting. The approved water and sewer construction plans will be delivered to the contractor at this meeting and authorization to proceed with construction will be issued.

(10). When revisions to the approved water and sewer plans are submitted for approval, the Engineer shall:

- (a) provide a transmittal letter that clearly states those changes submitted for approval.
- (b) submit the appropriate number of copies for approval.
- (c) clearly indicate, by highlighting in yellow on each copy of the plans submitted, those changes being made.

D. The Engineering Report which is included in the Design Folder shall be approved by the Department before approval of drawings and specifications, except for minor sewer or water extensions. A sewer extension shall be considered minor where less than 15 lots are served, no off-site area is served, and the line diameter does not exceed 8 inches. A water extension is considered minor where less than 15 lots are served and the line diameter is 8 inches or less. The Engineering Report shall include water requirements for and sewer flow generated by the project. The report shall contain an Overall (System Layout) Plan, which shall incorporate all of the proposed construction together with a sufficient amount of the surrounding area in order to clearly outline the interrelationship of the two. The Report shall demonstrate that the sewer lines and water lines are designed to serve the entire sewer shed or service area. Existing and proposed development shall be shown, as well as existing and proposed utilities. Where phased development is contemplated, the extent of each phase shall be clearly delineated. Additional requirements for the Engineering Report are as described in other divisions of these standards (including Paragraphs 1.1.03, 2.2.02, 2.2.03, and 4.2.02) and as required by the County.

E. The System Layout Plan shall delineate sewer shed area boundaries or pressure zone boundaries for sewer projects and water projects respectively. The map shall clearly define the areas pertinent to interim and ultimate development of the area proposed to be served. The System Layout Plan shall show present and future development and proposed interim and future utilities,

as well as those existing utilities that will be affected by or have an effect on the proposed utilities. Existing and proposed ground elevations shall be shown at contour intervals not exceeding 5 feet unless otherwise approved. Proposed utilities necessary to serve adjacent properties and associated easements shall be shown.

1.1.02 F. Easements

- (1) Off-site easements shall be recorded and the Deed Book and Page Numbers of the recordation included on the utilities plans before approval of the plans for construction.
- (2) On-site easement plats shall be submitted to the Engineering Division with the Engineer's certification that the plats conform to the approved plans and any approved revisions and are as shown on the approved POD construction plans. The on-site easement plats with the Engineer's certification will be forwarded to the Real Property Department and the DPU Construction Division. Any revisions to the approved plans shall be accompanied by the necessary revisions to the easement plats and the Engineer's certification that the revised plats conform to the plan revisions.
 - (a) The Construction Division will notify the Engineer if any proposed field change requires revised plans and easement plats.
 - (b) The Engineer shall submit all revised easement plats with his certification that the revised plats conform to the approved plans and revisions prior to Tentative Acceptance.
 - (c) The Engineer shall address any comments from the Department's Construction Division prior to Final Acceptance.
- (3) Where easements are required on property owned by the County of Henrico, plans shall be submitted for preliminary review. After the DPU agrees to the proposed alignment, the Engineer shall submit plans and easement plats to the County Department (Agency) controlling the property. When the Agency recommends approval of the installation, the Engineer shall forward the recommendation and plats to DPU and the Real Property Department. The Real Property Department will prepare a license agreement for approval by the County Board of Supervisors. Utility Plans will be approved after the County Board of Supervisors grants permission to install the utility lines.
- (4) Installation of trees, structures, buildings, stormwater BMP's, wetlands, berms or other obstruction which prevents the proper installation, maintenance, rehabilitation, operation, inspection or removal of water or sewer facilities shall not be allowed within any permanent water or sewer easement unless approved by the Director.

1.1.02 G. Federal, State and Local Approvals

- (1) Permit conditions for construction and maintenance shall be shown on the plans where any Nationwide or Individual Permit, Virginia Water Protection Permit, VDH or DEQ Construction Permit, Plan of Development, Virginia Power Right-of-Way Crossing Permit, Railroad Crossing Permit, etc. is required.
- (2) The Department of Public Works (DPW) shall approve all plans for erosion and sediment control before construction of water and sewer facilities may commence. DPW may require a preconstruction meeting at the project site prior to beginning such construction.
- (3) To assure compliance with the applicable requirements of the Subdivision Construction Plans:
 - (a) The Engineer shall certify that Water and Sewer Plans conform to the Subdivision Construction Plans approved by the Planning Department.
 - (b) The Engineer shall include this certification on the title sheet of the Water and Sewer Plans and show on the plans all requirements and conditions of the Subdivision which affect the construction or maintenance of the proposed water and sewer facilities.
 - (c) In the event that the required certification is not received or if the Engineer indicates that the Water and Sewer Plans do not conform to the Subdivision Plans, those water and sewer plans shall be approved by the Director of Planning prior to authorization for construction by Public Utilities.

1.1.03 System Design

- A. An analysis shall be prepared that will tabulate the numbers of people served or proposed to be served as determined from the County Land Use Map or existing Zoning. The tabulation shall be by incremental areas for evaluation purposes.
- B. Average and maximum flows shall be developed for areas and sub-areas and tabulated in the report as deemed necessary or appropriate.
 - (1) Where development is existing or proposed, average sewer flows within the sewer shed shall be calculated using actual (existing) or proposed population densities in accordance with flow rates cited in the DEQ Sewerage Regulations or other published data as appropriate.
 - (2) For undeveloped acreage where no specific development has been proposed, the following average flow rates may be used:

Single Family Residential	800 gpd/ac
Multi-Family Residential	3000 gpd/ac
Commercial	1400 gpd/ac
Industrial	2300 gpd/ac
Public/ Government	600 gpd/ac

- C. The design shall address overall present and future flows and system capacities of existing

and proposed utilities as they may be affected by or may affect the facilities involved and shall develop proposed water main and sewer line sizes.

- D. The design shall be based on ultimate development and shall present such factors as deemed necessary for a sound evaluation of the several factors used in development of the report.
- E. Where an alternate design is proposed that would incorporate interim or staged construction, the report shall develop the alternate design and shall present a thorough investigation and justification for consideration of the alternate.

1.1.04 System Design - Miscellaneous. For detailed requirements of procedures addressed below, contact the Department at 501-4517.

- A. A commercial or industrial establishment that utilizes an individual private well and requests connection to the County's sanitary sewer system is required to have a water meter installed, at their expense, on the well for the purpose of billing sewer charges. The water meter must be installed on the well and the sewer connection fees paid before a plan for construction of the sewer connection is approved.
- B. Requests for temporary water and/or sewer service for construction trailers shall be directed to 501-4517.
- C. All existing water and sewer services to the property shall be shown on the utility plan. If the services will not be utilized, they shall be abandoned as follows:
 - (1) Water services shall be abandoned at the corporation stop or tee (i.e. at the main line).
 - (2) Sewer laterals shall be properly plugged at the main unless approved otherwise.
- D. Construction meters are available for Construction Purposes and Wash Downs only.

1.1.05 Separation of Water Lines and Sanitary and/or Combined Sewers

- A. Follow Virginia Department of Health Waterworks Regulations for separation of water mains and sewer lines.
- B. Parallel Installation.
 - (1) Normal Conditions - Water lines shall be constructed at least 10 feet horizontally from a sanitary sewer or sewer manhole whenever possible. The distance shall be measured edge-to-edge.
 - (2) Unusual Conditions - When local conditions prevent a horizontal separation of at least 10 feet, the water line may be laid closer to a sewer or sewer manhole provided that:

- (a) The bottom of the water line is at least 18 inches above the top of the sewer.
- (b) Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe, pressure-tested in place without leakage prior to backfilling.
- (c) The sewer manhole shall be of watertight construction and tested in place.

C. Crossing.

(1) Normal Conditions - Water lines crossing over sewers shall be laid to provide a separation as described in Paragraph 1.1.05 B(2) above. The following construction shall be used.

- (a) Sewer passing over or under water lines shall be constructed of the materials described in parallel installation, unusual conditions - Paragraph 1.1.05B.(2).
- (b) Water lines passing under sewers shall, in addition, be protected by providing:
 - (1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line.
 - (2) Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line.
 - (3) That the length of the water line be centered at the point of the crossings so that joints shall be equidistant and as far as possible from the sewer.

D. Sanitary sewers or sewer manholes - no water pipes shall pass through or come in contact with any part of a sewer or sewer manhole.

1.1.06 Sewer in Relation to Streams, Estuaries, Lakes, or Reservoirs

A. Location of Sewer in Relation to Streams, Estuaries, Lakes, or Reservoirs.

The tops of all sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line. In general, one foot of suitable cover shall be provided where the stream is located in rock, and three feet of suitable cover shall be provided in other material. Less cover will be considered if the proposed sewer crossing is encased in concrete and will not interfere with future improvements to stream channel. Reasons for requesting less cover shall be given in the application. In paved channels, the top of the sewer lines should be placed below the bottom of channel pavement. Sewers shall remain fully operational during 25-year flood/wave action. Sewers and their appurtenances located along streams shall be protected against the normal range of high and low water conditions, including the 100-year flood/wave action. Sewers located along streams shall be located outside the stream bed wherever possible and sufficiently removed therefrom to provide for future possible channel widening. Reasons for

requesting sewer lines to be located within stream beds shall be given in the application.

B. Sewer Crossing Streams, Estuaries, Lakes, or Reservoirs.

Sewers entering or crossing the streams shall be constructed of watertight pipe. The pipe and joints shall be tested in place; shall exhibit zero infiltration; and shall be designed, constructed, and protected against anticipated hydraulic and physical, longitudinal, vertical and horizontal loads and erosion and impact. Sewers laid on piers across ravines or streams shall be allowed only when it can be demonstrated that no other practical alternative exists.

Such sewers on piers shall be constructed in accordance with the requirements for sewers entering or crossing under streams. Construction methods and materials of construction shall be such that sewers will remain watertight and free from change in alignment or grade.

1.1.07 Protection of Water Supplies

A. Water Supply Interconnections.

There shall be no physical connection between a drinking water supply and a sewer, sewage pumping station, or appurtenances thereto.

B. Relation to Water Works Structures.

No general statement can be made to cover all conditions; however, for public wells or other public water supply sources and structures, sewers shall meet the requirements of the Virginia Department of Health Waterworks Regulations with respect to minimum distances from water supply wells or other water supply sources and structures. For all other potable water supply wells or potable water supply sources and structures, sewers should meet the requirements of the Virginia Department of Health Waterworks Regulations with respect to minimum distances from water supply sources and structures. No sewer line shall pass within 50 feet of a potable water supply well or other potable water supply source or structure unless special construction and/or pipe materials are used to obtain adequate protection. The designer is referred to current editions of the Virginia Department of Health Waterworks Regulations, Sewerage Regulations, and Sewage Handling and Disposal Regulations [Waterworks Regulations and the requirements contained in "Rules and Regulations of the Board of Health, Commonwealth of Virginia, Governing the Disposal of Sewage"] as basic design references. The proposed sewer design shall identify and adequately address the protection of all potable water supply structures within 100 feet of the proposed project.

1.1.08 Backfill and Compaction

A. The Engineer shall include compaction requirements on the plans:

- (1) Minimum compaction will be specified.
 - (2) Compaction requirements for roads and paved areas will be specified.
 - (3) Compaction requirements adjacent to structures will be specified.
- B. The Engineer shall indicate on the plans those areas where greater than minimum compaction requirements are specified.
- C. Where compaction greater than 90% is required, test reports must be submitted to the Construction Division before Tentative Acceptance will be made.
- (1) Where stone backfill is used, test reports are not required.

1.2. Drawing Organization and Format

1.2.01 Drawing Organization

- A. Drawings shall consist of the following types of sheets arranged in the order listed:
- (1) Cover Sheet.
 - (2) Index Sheet (if necessary).
 - (3) Plan Sheets.
 - (4) Plan and Profile Sheets.
 - (5) Standard Sheets and Special Details.
 - (6) Erosion and Sediment Control Details/Environmental Site Assessment.
- B. Projects consisting of only structures may not require plan and profile sheets, and projects for construction of gravity sewers, force mains, or water lines may not require the use of plan sheets except for special details.

1.2.02 Sheet Format

- A. All construction drawings shall be on sheets 24 inch x 36 inch.
- B. The cover sheet shall contain the Owner's name and project description in large, distinctive letters, a vicinity map drawn on a scale of 1 inch equals 2,000 feet to indicate the general vicinity of the contemplated construction, an index to the plan sheets and the signed stamp of the design engineer or principal of the engineering firm. The vicinity map shall include the north arrow and scale.
- C. An index map shall be prepared for sewer line, sewage force main and water line projects. The index map shall be to a scale of not less than 1 inch equals 600 feet and shall show all proposed utility construction with ties to existing utilities. The lines of proposed construction, together with proposed utility structures, shall be indexed to the drawings to indicate the extent of coverage on each drawing, or, in the case of structures, to the group of drawings involved.

- D. Where proposed sewer facilities tie to existing sewer facilities, the plans shall show an equality in elevations whenever elevations do not match those shown in the County Sewer Book. County Sewer Book elevations shall be designated as "C.S.B." and shall be for County information only.
- E. Plan sheets, as well as Plan and Profile Sheets, shall show horizontal, vertical, and topographical data as outlined in Section 1.2 of these Standards.
- F. All plans shall bear a suitable title showing the name of the municipality, sewer district, and institution or other Owner and shall show the scale in feet, a graphical scale, the north arrow, the date, and the name of the appropriate licensed professional. Also, each plan sheet shall bear the same general title identifying the overall project, and each shall be numbered.
- G. Drafting Conventions.
- (1) Standard Symbols to be used for drawings are as shown on Drawing No. D-50. When Standard Symbols are not used, a Symbol Key will be included on the Cover Sheet.
- Line weight for existing facilities shall be no heavier than 0.020 inch (#1 pen).
- (2) Standard Symbols - Proposed Facilities
- Symbols shall be as shown above except that solid lines shall be used for pipes, line weight shall be no lighter than .024 inches (#2 pen) and no heavier than 0.031 inches (#3 pen).
- (3) Text, Dimensions and Notes
- Lettering shall be consistent and clear with a minimum height of .12 inches (1/8 inch) using a #00 pen. The larger type shall have proportionately wider line widths.
- When drawings are prepared using computer aided drafting (CAD), the minimum text height shall be .10 inches.
- H. Drawing Standards
- (1) All plans submitted for review shall comply with the minimum format and quality control requirements of the DPU Standards. Plans which do not substantially meet these criteria will not be accepted for review.
- (2) Plans submitted for review shall be direct blue-line or black-line prints. Photocopies or telefacsimile reproductions will only be accepted for information or preliminary review purposes.

- (3) Drawings shall be clear and legible. Text shall be open so that it is readable when drawings are reduced to half size. All drawings must be capable of producing legible second generation prints after being reduced to half size.
- (4) The contrast of the printed material shall be high, with blank areas being as white as possible, and all information being as dark as practicable, while remaining clear and distinct.
- (5) Shading, such as on plan views for paving, shall not be used on the drawings where it will hide any information when the drawing is photocopied or scanned. Shading with a pencil or using dark film will not be accepted. For areas that need to be identified or highlighted, stippling or cross hatching (#00 pen maximum) may be used provided no other information is hidden.
 - (a) Screening, if needed, shall only be used for computer aided drafting (CAD) and the equivalent of AUTOCAD "ANSI31" hatch at 1 x drawing scale.
- (6) It is the intent of these Standards that all submitted plans will be scanned for archiving. If there is any question regarding plan legibility, the plan will be scanned and acceptability determined upon printing of the scanned image at 1/2 size.

I. Additional Information.

- (1) Drawings shall include estimated materials quantities and current Henrico County Standard Water and Sewer Notes.
- (2) Horizontal scale in Plan and Profile Sheets shall be no smaller than 1 inch equals 100 feet.
- (3) A bar scale shall be included on each sheet.
- (4) Vertical profile scale shall be no smaller than 1 inch equals 10 feet.
- (5) All known existing structures and utilities, both above and below ground, which might interfere with the proposed construction, particularly water mains, sewer mains, gas mains, storm drains, utility service lines, etc. shall be shown in plan and profile.
- (6) Bench Marks shall be set no more than 500 feet apart along the lines of construction but outside the limits of construction. Datum for elevations shown shall be USGS (Mean Sea Level).

1.3. Easement Requirements

1.3.01 Easement surveys shall be made and easement plats prepared in all cases where proposed construction limits exceed the limits of public rights-of-way or properties under the ownership of

the developer. These surveys shall tie the lines of proposed construction to existing property lines and property corners, where the property may be identified by corners. Where readily identifiable corners are not found, fence lines and corners and other indications of property lines may be used. In the absence of any such identifications, the surveyor shall exert maximum effort to tie the survey to boundaries as set forth on existing plats and in descriptions.

- 1.3.02** Permanent easements shall be a minimum of 20 feet in width with consideration for wider easements where more than one facility may occupy an easement, or where, because of line size or access requirements, wider easements are desirable. Where lines have cover in excess of 10 feet, the minimum easement width may be increased between manholes. Buildings or other structures, and trees shall not be placed in easements.
- 1.3.03** Construction easements shall be acquired for all County contracts. Developers constructing facilities are not required to have construction easements where work is on the developer's property. Construction easements shall provide a minimum working width of 50 feet, including the 20 foot permanent easement, unless otherwise approved. Generally it is desirable to provide more construction easement on one side than on the other. This allows room for construction traffic and material storage.
- 1.3.04** The standard size of easement plats shall be on sheets 8-1/2 inch x 13 inch or 8-1/2 inch x 26 inch. Where longer easements are required, multiple sheets may be utilized. A sample plat sheet is shown on Form No. F-3.

Easement plats of different sizes may be used if the overall size of the sheet does not exceed 18 inches x 24 inches and meets all requirements of Department of Real Property. The easement centerline shall be shown together with the limits of both the proposed permanent and construction easement widths referenced to the centerline of the easement. Bearings and distances shall be shown on the centerline of the easement and on the right-of-way or property lines where they intersect the centerline. Distances shall be shown from fixed points on both the centerline and the property lines to the intersection of the two. Bearings, distances, and closures shall be to the degree of accuracy of 1 in 8,000 except that approximations will be permitted where it is considered impractical to delineate existing property lines. The body of the plat shall show the name of the property owner and the Deed or Will Book reference for the source of title. The names of all adjacent property owners and a north arrow shall also be shown. Street names or highway route numbers shall also be shown where applicable.