

CHATHAM COUNTY DEPARTMENT OF ENGINEERING

ENGINEERING POLICY

All development in Chatham County shall conform to the minimum design requirements of this document, the Subdivision Regulations, Land Disturbance Activities Ordinance, Zoning Ordinance, Flood Damage Prevention Ordinance, Right-of-Way Encroachment Ordinance, Mapped Streets Ordinance, Stormwater Management Ordinance, Well Ordinance, Wetlands Protection Ordinance, and Groundwater Recharge Protection Ordinance.

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ARTICLE I: PURPOSE

It is the intent of this Policy to standardize guidelines for design and construction practices for public and private development. Furthermore, this Policy is dedicated to the following, among others,:

- a. Protect existing and future County infrastructure,
- b. Reduce Chatham County maintenance costs,
- c. Prevent substandard development of public and private property,
- d. Promote consistency within the County's internal plan review process,
- e. Provide clear guidance for standard design requirements,
- f. Promote safe pedestrian and vehicular traffic movement,
- g. Protect and help conserve the natural resources of the community, and,
- h. Generally help promote and protect the safety and welfare of the citizens of Chatham County.

ARTICLE II: PERMITS/ADMINISTRATION

Section A. SITE PLANS

1. Complete site plans shall be required for all development.
 - a. For development of single family residential lots or duplex residential lots, the minimum required information for site plans is:
 - (1) property boundaries, Parcel Identification Number (PIN), description of proposed development, owner's name, builder's name, street address, lot number, subdivision name and phase number (if any)
 - (2) existing features of the site, including location (footprint) of all existing structures, street location, driveways, ditches, wells, etc.
 - (3) proposed structures with dimensions and setbacks from all property lines, proposed driveway location and dimensions,
 - (4) other information as may be required in the Flood Damage Prevention Ordinance, in §24-119, Permit Procedures and §24-123, Specific Standards, Mapped Streets Ordinance, Stormwater Management Ordinance, Land Disturbing Activities Ordinance, Well Ordinance, Wetlands Protection Ordinance, and Groundwater Recharge Protection Ordinance.
 - (5) other information as appropriate or as may be required by the Department of Engineering or Department of Building Safety and Regulatory Services.
 - b. For development other than single family residential lots or duplex residential lots, the minimum required information for site plans is:
 - (1) property boundary survey by a licensed surveyor, Parcel Identification Number (PIN), vicinity map, reference benchmarks,
 - (2) existing and proposed contours of the site (based on mean sea level datum), along with location of all physical boundaries, such as wetlands, marsh lines, 100 year flood zone designations, specimen trees, etc.
 - (3) all existing and proposed water and/or sanitary sewer and other utilities on the site and in adjacent streets and easements,
 - (4) all existing and proposed storm drainage, paving, buildings, elevations for all floor levels, locations of driveways affected by the proposed project, etc.,

(5) other information as may be required in the Land Disturbing Activities Ordinance, such as tree protection and/or establishment, buffers, soil erosion control plan, etc.

(6) other information as may be required in Chatham County's Flood Damage Prevention Ordinance, Mapped Streets Ordinance, Stormwater Management Ordinance, Well Ordinance, Wetlands Protection Ordinance, and Groundwater Recharge Protection Ordinance.

(7) other information as appropriate or as may be required by the County Engineer or Department of Building Safety and Regulatory Services.

(8) Before final approval for the construction plans, the following is required:

(a) U.S. Army Corps of Engineer's approval for the wetland delineation if it is determined that wetlands are likely to be present on the site, and all wetlands permits as needed,

(b) Georgia Department of Natural Resources delineation of the marsh line, and all buffer encroachment permits as needed,

(c) Georgia Department of Transportation approval for access onto State right-of-way,

(d) USDA Natural Resources Conservation Service approval for the soil erosion control plan,

(e) Metropolitan Planning Commission approval if required, and

(f) For land disturbance of one acre or more, copy of Notice of Intent and receipt of NPDES fees paid to Georgia EPD .

c. For residential lots, the maximum site plan size is 11" by 17" to allow for efficient reproduction and record-keeping. For other developments, the site plan may range from 11" by 17" up to 30" by 42".

d. Site plans shall be prepared by a Professional Engineer registered in the State of Georgia.

e. A Federal Emergency Management Agency's (FEMA) Elevation Certificate is required for all building permits (residential and commercial) within the 100 year flood zone. A Homebuilder's Certification of Elevation is required for finish floor and garage elevations for all residential permits outside of the 100 year flood zone. Both types of certifications shall be furnished to the Department of Building Safety and Regulatory Services prior to construction of the building frame as per the Flood Damage Prevention Ordinance. The FEMA Elevation Certificate shall be signed and sealed by a land surveyor or professional engineer registered in the State of

Georgia. The Homebuilder's Certification of Elevation shall be signed by the builder. Blank forms are available from the Department of Building Safety and Regulatory Services. Finished floor elevations that are lower than those specified on the approved site plan, shall be handled in the same manner as prescribed in the Flood Damage Prevention Ordinance, §24-119, Permit Procedures.

Section B. BONDS

1. Subdivisions: The bonding requirements in the Subdivision Regulations shall be met, and supplemented as follows:

a. A subdivision plat can be recorded before the improvements have been approved and accepted. The performance bond shall have an expiration date of no less than 12 months from the date of Commission recording approval and a subsequent 12 month maintenance bond in order to cover warranty period. An alternative bonding arrangement is a 12 month bond with automatic renewal clause that extends the bond an additional 12 months unless written notice is given to the County at least 60 days prior to the expiration date.

b. The amount of bond shall be based upon a detailed estimate itemizing cost of all remaining construction that has not been approved by the Department of Engineering, furnished by the developer's engineer, who shall be a Professional Engineer registered in the State of Georgia. A copy of the bid schedule with unit prices shall be furnished to the County Engineer.

c. The County will accept an irrevocable letter of credit from a lending institution, cash, and a performance or maintenance surety bond as acceptable bonds.

d. The bond shall be subject to being called in the event:

(1) the required improvements are not completed within 12 months of the recording date of the subdivision plat; or

(2) any deficiencies that are not properly repaired within the specified time limit provided in notification.

e. A signed and sealed subdivision agreement shall be provided with the bond (Appendices "H" and "I").

2. Commercial/Industrial Sites: The bonding requirements in the Right-of-way Encroachment Ordinance, Land Disturbing Activities Ordinance, and Subdivision Regulations shall be met where applicable.

3. Temporary drainage ditches or other temporary devices are allowed provided a satisfactory maintenance agreement is reached and bond established. The agreement

shall require the developer to be fully responsible for maintenance, and shall provide for payment of actual costs plus 50% as penalty if County personnel have to take corrective measures if the developer fails to perform after due notice. The bond will not be released until all temporary construction is removed and all permanent facilities are completed and approved by the County Engineer and the County Commission.

Section C. INTERPRETATION. If a question concerning the interpretation of these regulations arises, the interpretation of the County Engineer shall govern.

ARTICLE III: IMPROVEMENTS WITHIN STREET RIGHT-OF-WAY

Section A. COUNTY ROADS

1. Chatham County will not accept unpaved streets and roads for ownership or maintenance.
2. Unopened platted streets, open streets not County maintained, and streets to be dedicated for County ownership and maintenance, must meet the requirements set forth in this policy to qualify for acceptance by the County for maintenance.
3. Roadside ditches shall have a front and back slopes of 3:1 (horizontal to vertical) or flatter.
4. Rights-of-way widths as specified in the Subdivision Regulations and Zoning Ordinance shall be increased if determined by the County Engineer to be needed to accommodate the proposed improvements.
5. Proposed roadside ditches over 3 feet deep shall be piped, and a parallel sub-drain system shall be provided as deemed appropriate by the County Engineer.
6. Road shoulders and roadside ditch banks shall have a permanent stand of grass.

Section B. PROPERTY ACCESS

1. Permits for all driveways, curb cuts and roadside culverts shall be obtained under the Right-of-way Encroachment Ordinance.
2. Installation of new driveways on curb and gutter streets must conform with the driveway curb cut detail in Appendix "A".
3. Access Restrictions - No new individual driveways or curb cuts shall be permitted on the following roads:
 - a. Abercorn St. Extension (Ga. 204), from the Forest River to I-95.
 - b. Diamond Causeway east of Ferguson Avenue.
 - c. President Street (Islands Expressway) from Capital St. east to U.S. 80.
 - d. Bryan Woods Road - south of U.S. 80.
 - e. Truman Parkway.
 - f. Veterans Parkway (Southwest Bypass).

4. Access plans adopted by the Metropolitan Planning Commission and/or Chatham County shall be complied with on the following roads:

- a. Chatham Parkway from U.S. 17 to Garrard Avenue.
- b. Dean Forest Road from I-16 north to the Garden City limits.
- c. King George Boulevard
- d. US Highway 80 (State Route 26) East from the eastern-most city limits of Thunderbolt to the Bull River Bridge.
- e. Johnny Mercer Boulevard - U.S. 80 east to Penn Waller Road.

5. The Street Classification Map of Chatham County as prepared by the Metropolitan Planning Commission and adopted by the County Commission is made part of this document by reference.

6. Curb-Cut Location/Design: In any district as described below where the lowering or cutting away of curbs, or the placement of driveway pipe and/or asphalt on non-curbed sections is required for the purposes of ingress and egress to the property, such work shall be subject to the following provisions (sub-paragraph c. takes precedence when there is a conflict with sub-paragraphs a. or b. The County Engineer may require submission and review of an access plan to the Curb Cut Committee for their recommendation prior to approval:

a. Residential curb cuts in single family and duplex zoning areas (excluding multi-family development): Residential driveway culverts shall be installed by the property owner according to plans approved by the Department of Public Works and Park Services. The property owner shall pave all driveways from the right-of-way line to the edge of paving at a minimum.

(1) No more than two combined entrances and exits shall be allowed for any parcel of property, having a frontage less than 200 feet on any one street. Additional entrances or exits for parcels having a frontage in excess of 200 feet may be permitted at the rate of one entrance/exit for each additional 100 feet of frontage.

(2) For local street intersections (corner lots), no curb cuts shall be located within 25 feet of the intersection of two curb lines or such lines extended, or within 15 feet of the intersection of two right-of-way lines or such lines extended, or within 15 feet of the end of curb radius, whichever is more restrictive. On collector or arterial streets, no driveway shall be within 70 feet of the intersection of two curb lines or curb lines extended or 55 feet of the intersection of the two right-of-way lines, or within 50 feet of the end of curb radius.

(3) The distance between any two curb cuts on the same side of the street shall be not less than 10 feet on local roads, 25 feet on collector, and 35 feet on arterial. Said distance shall be measured between the points of tangency of the curb return radii. See Appendix "A".

(4) All driveways shall be constructed at least five feet from any side property line (excluding right-of-way), except that a curb return may be tangent to a curb line at a point where such property line extends to the curb line.

(5) The width of any driveway shall not exceed 18 feet at the right-of-way line and 24 feet measured at the edge of pavement.

(6) The minimum paving thickness for the portion of the driveway within the right-of-way will be 4" of asphalt or concrete or an approved equivalent.

(7) Curb cuts for abandoned sites, or where access is obstructed due to parking lots, buildings or other permitted structures, the old driveway shall be removed, the sidewalk (if existing) shall be replaced, the curb and gutter shall be replaced, fill dirt backfilled to its natural state and grassed; where it is a piped driveway to a dirt or paved street, said pipe shall be removed, asphalt removed and the shoulders and ditch regraded to its previous state.

(8) Access to each parcel in a "Small lot" subdivision and "P-U-D" developments shall be reviewed during subdivision and construction plan review.

b. Commercial and Multi-Family Curb Cuts for all zones (including multi-family development within residential zones): Commercial driveways shall be installed by the property owner in accordance with plans approved by the County Engineer.

(1) No more than two combined entrances and exits shall be allowed for any parcel where the frontage is less than 300 feet on any one street. On parcels with less than 150 feet of frontage, only one combined entrance and exit shall be allowed (two one-way driveways shall be allowed in lieu of the one two-way). Additional entrances or exits for parcels of property having a frontage in excess of 300 feet may be permitted at the rate of one entrance-exit for each additional 150 feet of frontage.

(2) For local street intersections (corner lots), no curb cuts shall be located within 25 feet of the intersection of two curb lines or such lines extended, or within 15 feet of the intersection of two right-of-way lines or such lines extended, or within 15 feet of the end of curb radius, whichever is more restrictive. On collector or arterial streets, no driveway shall be within 70 feet of the intersection of two curb lines or curb lines extended or 55 feet of the intersection of the two right-of-way lines, or within 50 feet of the end of curb radius.

(3) The distance between any two curb cuts on the same side of the street shall be not less than 25 feet on local roads, 25 feet on collector, and 35 feet on arterial. Said distance shall be measured between the points of tangency of the curb return radii. See Appendix "A".

(4) All driveways shall be constructed so as to be at least 12.5 feet from any side property line except that a curb return may become tangent to a curb line at a point where the property line extended intersects such curb line.

(5) Maximum width of any driveway shall not exceed 35 feet measured at the end of the radii; minimum of 12.5 foot radius.

(6) The minimum paving thickness for the portion of the driveway within the right-of-way shall meet the commercial road paving standards in Article 3, Section C.2. of this policy.

(7) Curb cuts for abandoned sites, or where access is obstructed due to parking lots, buildings, or other permitted structures, the old driveway shall be removed, the sidewalk (if existing) shall be replaced, the curb and gutter shall be replaced, fill dirt backfilled to its natural state and grassed; where it is a piped driveway to a dirt or paved street, said pipe shall be removed, asphalt removed and the shoulders and ditch regraded to its previous state.

c. Access from property fronting on Arterial and Collector Roads:

(1) All roads classified as arterial shall be developed with frontage roads unless alternatives can be adequately justified to the satisfaction of the County Engineer.

(2) Access from frontage roads onto the arterial shall be spaced at 1200 foot intervals or greater.

(3) Divided highways may have median cuts at intervals of 1200 feet or greater. Public street intersections shall count as a median cut if U-turns are allowed at that intersection.

(4) New curb cuts on major arterial, minor arterial and collector streets shall be provided with deceleration lanes (minimum 100 feet length) and tapers (minimum 50 feet). A runaround or bypass lane, shall also be provided on two lane roads only if warranted by expected delays due to left turn traffic movements.

(5) The intersection of the frontage road with the connection road to the arterial shall be setback from the arterial a distance sufficient to provide adequate vehicular stacking and turning maneuvers.

Section C. Roadway Section

1. Residential:

- a. Street paving shall be constructed under the latest Georgia Department of Transportation Standards and Specifications for construction of Roads and Bridges, and all supplementary specifications.
- b. The approved base for all streets shall be a minimum of 8.0" graded aggregate (compacted to modified density.) Alternate base courses must be approved by the County Engineer. At no time will soil cement be approved as a base material.
- c. GDOT Type E or F asphalt wearing surface shall be a minimum of 1-1/2" thick, hot plant mix when an asphalt leveling course is not used, or a minimum of 1" thick when an asphalt leveling course is used.
- d. Minimum centerline street pavement grade shall be 0.25%. Minimum street elevation shall be 7.5 ft. M.S.L or 0.5 ft. above the local 50-year flood elevation (as determined by the Design Engineer), whichever is higher.
- e. The roadway pavement must have a cross slope between 1/4" per foot to 3/8" per foot to the gutter or pavement edge.

2. Commercial/Industrial:

- a. All other items from Article III, Section C, Paragraph 1 shall apply as appropriate, and supplemented as follows;
- b. The approved base shall be a minimum of 8.0" graded aggregate (compacted to modified density.) Alternate base courses must be approved by the County Engineer. Under no circumstance will soil cement be approved as a base material.
- c. Alternative designs can be submitted by a Professional Engineer registered in the State of Georgia.

3. Curb and Gutter

- a. Curb and gutter shall be constructed with Portland Cement Concrete having a 28 day strength of 3000 psi. Slip form or machine curb and gutter shall have expansion joint material minimum of 1/2" thick with a maximum spacing of 60 feet and where it abuts a solid structure and where one day's pour abuts a previous day's pour. Contraction joints 1/4 to 1/3 the depth of the gutter shall be sawed or tooled at a maximum spacing of 20 linear feet.
- b. Concrete gutters shall be 12", 18" or 24" wide. Combined curb and gutter

shall be 18", 24", or 30" wide respectively. "Roll-over" curb and gutter is allowed in residential developments only if sidewalk is designed at least 5 feet from the back of curb.

c. Concrete curb and gutter shall be provided unless the County Engineer determines that ditches are needed because of groundwater or topographic limitations.

Section D. SIDEWALKS

1. Sidewalks shall be required as stated in the Subdivision Regulations. Construction plans must indicate the location and provide a typical sidewalk detail.

a. Sidewalks constructed during construction of the subdivision improvements must be installed prior to County acceptance of those improvements. The warranty bond for the subdivision improvements must include the performance of the sidewalks. The developer will be required to maintain and repair all defective sidewalks during the warranty period of 12 months. After expiration of the 12 month warranty period, the property owner will be responsible for all repairs and defects of the sidewalk during construction of the home prior to issuance of the Certificate of Occupancy.

b. Sidewalks constructed by the homebuilder shall be installed adjacent to the applicant's lot and according to the approved subdivision construction plan prior to issuance of the Certificate of Occupancy. The developer of the subdivision shall post a bond to assure the completion of the installation of all required sidewalks within three (3) years of the plat recording date. The sidewalk bond will be in the amount of 20 percent of the total cost of the installation of the required sidewalks, however, shall be not less than the cost of the installation of sidewalks across one (1) lot.

2. The location of sidewalks shall be placed at least 1 foot inside the right of way or as otherwise approved by the County Engineer. All sidewalks shall end at a logical terminus with Americans with Disability Act (ADA) compliant wheelchair access.

3. Sidewalks shall be 4 feet wide, 4" thick, broom-finished, portland cement concrete with a minimum 28 day strength of 2500 psi. The sidewalk cross slope shall not be less than 1/4" per foot.

4. Sidewalks shall typically drain toward the roadway and shall not impede lot drainage. Sidewalks may slope away from the roadway provided adequate drainage is provided behind the sidewalk.

ARTICLE IV: SUBDIVISIONS SUPPLEMENTAL

Section A. CONSTRUCTION PLANS AND SPECIFICATIONS

1. No work or land disturbing activity in proposed subdivisions shall be initiated until all required plans are approved and all required permits are obtained. In addition to this policy, other applicable ordinances and regulations including the Land Disturbing Activities Ordinance, Soil Erosion and Sediment Control Ordinance, the Right-of-way Encroachment Ordinance, the Subdivision Regulations, the Stormwater Management Ordinance, the Well Ordinance, the Wetlands Protection Ordinance, and the Groundwater Recharge Protection Ordinance.
2. The requirements as to depth and location of all underground utilities will be in accordance with the current edition of the Georgia Department of Transportation Utility Accommodation Policy and Standards in the Right-of-way Encroachment Ordinance, American Water Works Association, and Ten-States Standard. For preferred horizontal location of underground utilities, refer to Appendix "B".
3. Rights-of-way and utility easements shall be cleared their full width, unless certain trees are identified and properly accommodated on the approved plans.
4. Approval of construction plans and specifications expire in twelve (12) months if construction is not actively pursued and must be resubmitted to the County Engineer for approval.
5. Construction Plan Layout:
 - a. Construction plans shall be submitted in the following format as appropriate:
 - (1) Title sheet
 - (2) Staking/layout plan and traffic control plan
 - (3) Grading, drainage and paving plan
 - (4) Utility plan
 - (5) Street and roadside drainage profiles
 - (6) Sanitary sewer profiles
 - (7) Neighborhood grading and drainage plan
 - (8) Soil erosion and sedimentation control plan
 - (9) Detail sheets as needed for paving drainage, water, sanitary sewer, soil erosion control, etc
 - (10) Greenspace/clearing plan
 - (11) Other plans as required by the County Engineer
 - b. Plan sheets for items 3 & 4 and 5 & 6 can be combined only if the density of the development and drawing scale allow.
 - c. A completed "Construction Plan Review Checklist, "Appendix "C", must be

included with initial plan submittals. Plans submitted that are unexplainably lacking or that disregard these requirements, will be denied and returned without review comments.

d. The Utility plan (Sheet 4) shall include water (or well), sanitary sewer (or septic), underground drainage structures, gas, electric, telephone and cable distribution systems for subdivisions and submitted as applicable along with the construction plans. Electric plans must include design of for streetlights for major subdivisions as per the requirements of the County Streetlighting Ordinance.

(1) The developer's engineer shall define the location of all utilities according to both the "typical section for utilities" (See Appendix "B") and the engineer's direct contact with the various utility owners.

(2) Anticipated conflicts with existing and proposed features in the right-of-way and adjacent easements shall be shown in detail with proposed solutions.

(3) The utility plan shall be signed as approved by each utility owner prior to submission of the construction plans to the County Engineer.

e. The drawing scale shall not be larger than 1" = 20 feet nor smaller than 1" = 50 feet.

f. The plan sheets shall not exceed 30" by 42" ("E" size) but 24" by 36" sheets are preferred.

g. Two complete sets of plans with accompanying exhibits shall be submitted for review. After plans are approved, three (3) complete sets will be provided. One set will be marked as approved and returned to the developer's engineer.

6. The County Engineer's written approval must be obtained for any significant change in the approved construction plans prior to implementing the change in the field.

a. Two full and complete sets of revised plans must be submitted to the County Department of Engineering for review.

b. Revised plans must be accompanied by a written narrative that completely explains all changes to the plans.

c. All changes must be clearly identified on the revised plans.

7. Before final approval of the construction plans the following are required:

a. The Engineering Inspection Services letter, as shown in the sample provided in Appendix "D", shall be provided before final approval is given on the construction plans as evidence that inspection services under the direction of a Professional

Engineer registered in the State of Georgia will be provided.

- b. U.S. Army Corps of Engineers approval for the wetland delineation if it is determined that wetlands are likely to be present on the site, and all wetlands permits as needed.
- c. Georgia Department of Natural Resources delineation of the marsh line, and all buffer encroachment permits as needed.
- d. Georgia Department of Transportation approval for access onto State right-of-way.
- e. USDA Natural Resources Conservation Service approval for the soil erosion control plan.
- f. Metropolitan Planning Commission approval, if required.
- g. Approval from either the Georgia DNR/EPD and/or the owner of the proposed water and sewer extensions.
- h. For land disturbance of one acre or more, copy of Notice of Intent and receipt of NPDES fees paid to Georgia EPD .

Section B. CONSTRUCTION INSPECTION

1. The Department of Engineering shall be given at least two business days notice prior to the need for all construction inspections. The owner of the water and sanitary sewer facilities shall be given at least two business days notice prior to pressure testing of the water systems, force main and start up operation of sanitary sewer pumping station. Furthermore, the owner of water and sanitary sewer facilities shall be given two business days notice to any final inspection of water, sewer, force main, and sanitary sewer pumping station.
2. Proof-rolling of the sub-grade and graded aggregate base course shall be performed in the presence of the Department of Engineering representative. Three passes with a loaded dump truck shall be made for each proof roll. Any unsatisfactory areas shall be corrected to the satisfaction of the Department of Engineering representative prior to proceeding with the next pavement course.
3. Criteria for requiring replacement of curb and gutter:
 - a. Improper contraction joints.
 - b. "Y" cracks.
 - c. Spalling cracks.
 - d. Off-grade or misaligned sections.
 - e. Any cracks within 2 feet of an expansion or contraction joint (remove half, with saw cut joint).

- f. Two or more cracks of any size within 10 feet.
 - g. Failure to meet strength or location specifications.
 - h. If any cracks exceed 1/8" in width.
4. Prior to backfill of any crossdrain pipe, the installation shall be inspected and approved by an Department of Engineering representative.
- a. Compaction testing is required for all cross drain pipe. The results must meet GDOT standards.
5. Pavement and base design reports prepared by an independent laboratory, which is in no way affiliated with construction contractors, shall be submitted for approval when requested by the County Engineer.
6. Roadway testing:
- a. Subgrade and base laboratory compaction testing is required. The results must meet GDOT standards.
 - b. Laboratory compaction, stability, and density testing is required for pavement. Compressive strength testing is required for concrete curb and gutter.
 - c. A preliminary plan showing core locations must be approved by the Department of Engineering prior to sampling. Core samples are required at 300 foot spacings to show the thickness of base and surface. At each sample location, two cores must be performed - one within one foot of the centerline, and another within one foot of the gutter. Each roadway must have a minimum of two sample locations (four core samples). Reports shall include a map showing core locations.
7. All tests results must be submitted to the Department of Engineering prior to proceeding with the next sequence of construction. Specifically, compaction results must be submitted and approved prior to placement of curb and gutter, all sub-grade tests results prior to placement of the base material, and base thickness and compaction results prior to asphalt pour.
8. If any of the above tests show substandard conditions, then additional tests may be required to reveal the extent and cause of the substandard condition. All tests shall be performed by a qualified independent testing laboratory.
9. A proposed plan to correct substandard conditions shall be submitted by a Professional Engineer registered in the State of Georgia and approved by the County Engineer prior to beginning work.
10. A final Department of Engineering inspection of all constructed improvements shall be scheduled after certification is received from the Professional Engineer confirming that the improvements including sanitary sewer have been built in accordance with the approved plans and specifications and that water service to the development is potable.

11. A letter requesting the initial bond reduction may be included in the correspondence requesting final inspection, if applicable.

Section C. CONSTRUCTION APPROVAL AND ACCEPTANCE

1. County approval of the constructed improvements shall not relieve the developer of responsibility for construction failures. The developer shall repair any faults or deficiencies that occur during the warranty period.

2. Written certification is required from the owner of the water and sanitary sewer facilities that the improvements to their system have been completed to their satisfaction.

3. Record drawings of the subdivision are required on reproducible mylar prior to acceptance of the improvements. In lieu of mylar, Autocad DXF File on 3 ½" diskette may be provided. The Record Drawings must contain the following information:

a. Sanitary Sewer Mains:

(1) As built manhole invert elevations (M.S.L.), inverts of all mains, and manhole top elevations.

(2) Lateral locations measured from the downstream manhole at the main, and at the property line if the lateral is not perpendicular to the main.

(3) As built length and slope of sanitary sewer between manholes.

(4) Location of manholes in relation to right-of-way lines, intersecting property lines and other permanent structures.

(5) As built locations of lines, grades, and diameters.

b. Sanitary Sewer Pumping Stations and Force Mains:

(1) As built location, material and size of all above and underground structures, pipes, valves, pumps, electrical equipment, mechanical equipment, and any other appurtenances inside the fence of proposed pumping station.

(2) As built wet well invert elevations (M.S.L.), inverts of all influent and effluent lines inside the wet well and wet well top elevation and horizontal dimensions.

(3) As built material, size, location, elevation, and length of the proposed force mains.

(4) As built size and location of proposed valves (air release,

combination, etc.). The location of valve manholes can be related to right-of-way lines, intersecting property lines, and other permanent structures.

c. Watermains:

(1) As built locations of lines and diameters.

(2) As built fire hydrants and valves locations in relation to property lines, street intersections and other permanent structures.

(3) Location of services in relationship to right-of-way lines, intersecting property lines, and other permanent structures.

d. Drainage:

(1) Same as sanitary sewers for pipe location length and changes in slope, or diameter.

(2) As built invert elevations (M.S.L.) for all storm lines and structures.

(3) Invert elevations at beginning, termini, change of grade and/or direction for drainage ditches.

d. Pavement:

(1) Edge of pavement where it differs more than 2 feet from approved plans.

(2) Pavement profile where grade of installed paving differ more than 0.1% from proposed grades.

(3) Areas where conditions required alternative base or subgrade material or treatments.

4. Prior to the six-month and twelve-month stages of the warranty period, the developer's engineer must submit a written request to inspect the improvements in order to schedule these inspections with County staff and to either obtain a reduction or release of the bond as appropriate.

5. The County Engineer will recommend to the Commission that the appropriate improvements be accepted for maintenance after satisfactory completion of the twelve-month warranty period.

6. The only service that the County Department of Public Works will provide during the twelve-month warranty period prior to acceptance is residential dry trash pickup in developments that are to be County maintained. The developer is responsible for all other maintenance needs.

7. Developer's Certificate of Non-Litigation: Prior to County acceptance of the various subdivision improvements for maintenance, the developer shall certify that there are no pending or threatened actions of law that involve the subdivision improvements, including any liens from contractors, subcontractors, suppliers of material and equipment, and all providers of labor or services associated with the subdivision improvements. If any such actions of law or liens remain unresolved, the County shall not accept the subdivision for maintenance until releases or waivers are provided. See sample form in Appendix "E".

Section D. SUBDIVISION ENTRANCE SIGNS

1. All subdivision entrance signs must be located outside the limits of public rights-of-way with the exception of median signs and will not be maintained by Chatham County under any circumstance. Signs are to be placed in a location that will not obstruct the vehicle sight distance. All proposed signs are to be reviewed by the County Engineer prior to installation.
2. Signs located in the median of subdivision streets must be located outside the limits of the intersecting right-of-way.
3. The proposed location of all subdivision entrance signs must be approved as part of the subdivision construction plans.
4. A Homeowners Association must be formed to be responsible for maintenance of the entrance sign. An entrance sign is not allowed unless there is a Homeowners Association to own and maintain the sign.

ARTICLE V: UTILITIES

Section A. UTILITY INSTALLATION

1. Utility installation requirements in the Right-of-way Encroachment Ordinance shall be met.
2. Electric, phone and cable television utility lines shall be underground in all new subdivisions, except where overhead service can be provided to adjoining properties without the addition of new poles.
3. For preferred locations of underground utilities and services, see Appendix "B".

Section B. WATER AND SEWER

1. Chatham County has adopted the City of Savannah's standard construction specifications and details for water and sanitary sewer. Therefore, all materials and specifications for water and sewer mains, tees, fire hydrants, valves, etc., shall be the same as the City of Savannah, except as noted below.
2. For all new water and sanitary sewer systems and all extensions of existing water systems shall be submitted to and approved by Georgia DNR/EPD and the owner of the system prior to final construction plan approval by the County. The County Engineer has been delegated plan review and approval from Georgia DNR/EPD for the extension of sanitary sewer systems owned by Chatham County. For the purposes of this requirement, an extension is defined as any project where additional water and/or sanitary sewer services will result.
3. In order to reduce paving impact in utility repairs, the following design criteria shall be used:
 - a. Water and sanitary sewer mains shall be designed to minimize pavement crossings.
 - b. Locate manholes to minimize the number of sanitary sewer laterals to main connections.
 - c. The horizontal separation between mains and the edge of pavement shall be no less than the depth of the main relative to the edge of pavement.
4. All water and sewer mains and laterals shall be installed over a minimum 6" layer of compacted Type I or II Foundation backfill as per Georgia DOT Specifications. Backfill shall be in 6" lifts compacted per Georgia DOT Specifications.
5. Water and Sanitary Sewer Systems owned by Chatham County:

- a. Testing of sewer mains shall be by the GO-NO-GO mandrel, with a maximum allowable 5% deflection. The Department of Engineering's representative must be present.
- b. Water meter boxes shall be installed at the end of each water service at the right-of-way line by the contractor. Curb stops shall be a minimum of 1" size.
- c. Water meters shall be provided by the County Water and Sewer Department when the building permit is issued. The owner's plumber shall install the meter in the box (as per b. above). The meter number shall be provided along with the definitive street address, to the water and sewer department. If the meter or box becomes damaged or not useable for any reason, the builder shall replace the box at no cost to the County.
- d. Water service laterals shall be maintained by the County from the main through the meter (located at the property line). The property owner shall be responsible for the lateral from the meter to the house.
- e. Sewer services shall be maintained by the property owner up to the sewer main; the property owner's plumber/contractor shall obtain a Right-of-way Encroachment permit prior to beginning work within the right-of-way.
- f. Water service laterals shall be 1", and will be polyethylene tubing.
- g. Sewer grades shall be as per Georgia Department of Natural Resources Environmental Protection Division & Water Environment Federation guidelines.
- h. The water and sanitary sewer service extension requirements of Chatham County are as follows:
 - (1) All water and sanitary sewerservice facilities(including pump stations, mains, etc.) installed to serve proposed developments shall be installed by the developer at no cost to the County. When in place and approved by the County Engineer, such facilities and the attendant easements and facility sites shall be dedicated to the County without cost or fee.
 - (2) When the County determines that the proposed facilities should be sized to provide a greater capacity than needed to serve the property in question, then the County may participate in the cost of installing such facilities in the amount of differences between the cost of installing a line needed to provide the design capacity to serve only the property in question and the increased capacity required for extending water and/or sewer service beyond the limits of the property for which service is sought. However, as per the Water Systems Ordinance, the County may participate only in water mains of 8" diameter or larger.

Section C. WELLS AND SEPTIC SYSTEMS. The Chatham County Health Department must approve the general location of all wells and septic systems prior to construction plan approval.

ARTICLE VI: DRAINAGE

Section A. DESIGN REQUIREMENTS FOR ALL NEW DEVELOPMENTS

1. The requirements of the Stormwater Management Ordinance shall be met and supplemented as follows:
2. Paving and drainage plans shall preferably be designed to reduce amount of rear lot drainage facilities by taking advantage of natural topography as much as possible. When rear lot drainage facilities cannot be avoided, they shall be designed to accommodate efficient maintenance.
3. Minimum lot slope grades shall be 0.3% and shall be directed away from structures.
4. Side lot drainage shall be piped. Ditches on side lot lines are not permitted. Swales less than one foot deep are permitted along side lot lines for adjacent lot drainage only.
5. Rear lot drainage ditches and canals greater than two (2) feet deep shall be piped or placed in a rights-of-way of sufficient width to be maintained by mechanical equipment.
 - a. If piped, drainage easements shall be provided with a width sufficient to allow full depth excavation and equipment access.
 - b. For ditches, the minimum drainage Right-of-Way shall be the design width plus 20 feet offset of ditch for maintenance equipment operation. Design width shall be measured from the top of bank to top of bank, based on maximum side slopes of 3:1 (3 feet horizontal to 1 foot vertical), with a 2 foot bottom. Ditches with a design width greater than 25 feet shall provide a maintenance access of 20 feet along both sides.
 - c. A permanent stand of grass shall be established on both slopes and equipment maintenance access area.
 - d. Rights-of-way lines shall be parallel and changed in increments of 5 feet.
6. Rear lot drainage less than 2 feet deep should be piped if sufficient cover is possible. All rear lot drainage under 2 feet deep shall be placed in a drainage easement of sufficient width to provide maintenance by mechanical equipment. Rear lot drainage ditches are not encouraged, however, swales are allowed provided they meet the following conditions:
 - a. Swales shall be paved a minimum of 2 feet wide and 0.3' deep. Unpaved rear yard swales may be allowed if the swale does not cross more than one lot to the outlet.
 - b. Swales shall have 5:1 side slopes or flatter. However, if swale traverses a

wooded site, use of a 3:1 side slope may be submitted for approval to reduce impact on trees.

c. A permanent stand of grass shall be established on both slopes.

d. Storm drainage pipe or gutter flow shall not discharge into a swale. A swale is a drainage feature less than one foot deep that receives storm water from sheet flow and/or overland flow.

7. All ditch bank side slopes shall be constructed in a manner that they will not erode and can be maintained with riding grass cutting equipment. The type of soil encountered will be considered in selecting the proper slope. Side slopes flatter than 3:1 may be required if soil conditions warrant.

8. For drainage areas less than 10 acres, the Rational method is acceptable. For areas over 10 acres, the USDA Natural Resources Conservation Service Method or similar method is required.

9. Drainage calculations shall be prepared by a Professional Engineer registered in the State of Georgia, and submitted to the Department of Engineering with construction plans for review. The calculations shall be based on the following basic criteria:

a. Internal subdivision drainage to be designed for a minimum of a 10 year storm.

b. Outfall structures including basins shall be designed based on 50 year storm rainfall data.

c. The rainfall intensity duration frequency chart for the Savannah area in Appendix "G" when using the Rational Method or the USDA Natural Resources Conservation Service method whichever is applicable.

10. The calculations shall clearly document how the time of concentration was determined.

11. Pipe sizing calculations must be checked for inlet and outlet control. Maximum headwater and tailwater conditions must be provided.

12. Flood plain elevation for the FEMA 100-year storm shall be shown on the drainage plan.

13. The 50 year storm elevations must be determined for each post-developed sub-basin and shown on the Neighborhood Grading and Drainage Plan. Finish Floor elevations must be set one (1) foot above the immediate drainage basin's maximum 50 year storm elevation or at the 100 year flood elevation as defined by FEMA and designated on the FIRM maps, whichever is higher.

14. New drainage outfalls into marshlands or tidal waters shall be approved by the U.S. Corps of Engineers and/or the Georgia Department of Natural Resources. Any modifications to existing outfalls that have inverts already below mean high tide (+3.6 M.S.L.), or any modifications that result in invert elevation below mean high tide, shall be approved by the various State and Federal agencies.

15. Temporary drainage ditches or other temporary devices are allowed provided a satisfactory maintenance agreement is reached and bond established (See Article II, Section B).

16. The maximum linear gutter line distance stormwater can traverse shall be 300 ft. unless the design engineer can substantiate that nor more than one half of one travel lane width will be inundated with stormwater during a 10 year rain event.

17. Tide control structures such as gates or automatic valves shall be installed where the invert elevation of the first structure upstream is below mean high tide.

Section B. STORMWATER DETENTION

1. Stormwater management practices shall be used to limit developed runoff to the pre-developed rate, using two-stage control based on 10 and 50 year storm. The 10 year storm is controlled by a separate outlet while the 50 year storm is controlled by a combination of both. This requirement may be waived provided the following:

a. On sites less than 1.1 acres, an increase in runoff of up to 20% may be allowed if it can be shown that site conditions make limiting runoff to the pre-developed rate impractical; however, in these cases, the County Engineer may require the developer to install or contribute to the cost of installing the downstream improvements to handle the increased runoff.

b. If the development directly discharges into tidal influence or when applicant provides a drainage system with adequate capacity to carry site flows to an ultimate downstream tidal discharge point.

2. Emergency overflow concrete flumes or alternate structures capable of safely handling the 100 year storm event shall be provided for all detention basins.

3. Outlet velocity shall be checked to prevent downstream scouring.

4. Maximum basin side slopes shall be 3:1 to a water depth of 7 feet, except where soil conditions require flatter slopes. Beyond the 7 foot depth, the slope shall not exceed 1:1.

5. Wet detention basins are preferred, and shall have a permanent pool depth of not less than 4 feet to reduce bottom vegetation growth. Dry basins must be designed with access to allow for efficient maintenance of the basin bottom and side slopes. A concrete swale or outlet structure to discharge the remnant stormwater is required. Allowances shall

be made in the depth of the wet detention basins for sedimentation.

6. The principal outlet must convey the design peak flow without emergency overflow.
7. Detention outfall structures shall be designed to allow for serviceable and continued maintenance. Pipes shall not be less than 15" in diameter. Use of concrete weirs or standpipes is preferred over undersized pipes and restrictor plates.

Section C. STORM PIPE

1. Any storm drain pipe under pavement shall be a minimum 18" diameter reinforced concrete pipe (Class III), with each joint wrapped in filter cloth, in addition to the standard rubber gasket. The filter cloth shall be at least 12" wide, shall overlap by 50%, and shall be secured prior to backfill. Cross drains shall be installed over a minimum 6" layer of compacted Type I or II Foundation backfill as per Georgia DOT Specifications. Backfill shall be in 6" lifts compacted per Georgia DOT Specifications.
2. Storm side-drain pipe under driveways and walkways shall be minimum 15" diameter reinforced concrete pipe (class III). HDPE pipe with a smooth interior wall and corrugated exterior wall is allowed where there will be a minimum of 1 foot of cover.
3. All storm pipe shall begin and end in either manholes, inlets or approved end sections. At no time should storm sewer extend for greater than 300 ft without either a manhole, inlet, or end treatment. Allowable end treatments include concrete flared end sections (for only pipes 36" diameter or less) and reinforced concrete headwalls.
4. Other storm pipe materials may be approved for installation provided there is sufficient cover and the pipe meets the minimum Georgia DOT specifications for storm drainage use.
5. Only concrete pipe shall be used when the following conditions are present:
 - a. When installation is below elevation +5.0 M.S.L.
 - b. When any part is in direct contact with organic soil.
 - c. When subject to routine salt spray.
 - d. When in regular intermittent contact with water or in soil having a conductance greater than 100 micro ohms or a pH out of the 4 to 8 range.
6. Temporary pipes shall be sized for the same capacity as the permanent pipe.
7. All storm pipe must be equipped with tracer wire/tape.

Section D. LAKES, PONDS, WATERWAYS

1. Artificial or natural waterways, lakes, or ponds for recreation shall not be accepted

for maintenance by the County.

2. Detention or Retention ponds shall be maintained by either an established Homeowners Association or individual property owner(s). In either case, the subdivision plat must indicate who will be responsible for pond maintenance. Chatham County will not accept maintenance of detention facilities including associated submerged pipes unless such pipes are fitted with a modified manhole structure at the pond to allow for blocking the system for ease of maintenance.

3. Private maintenance provisions must be made to the satisfaction of the County Engineer. The developer is not allowed to be designated as the responsible provider of maintenance. Placing responsibility on the owner(s) of the property where the feature is located is allowed if suitable notes and easements are provided on the subdivision plat or other legal instrument.

ARTICLE VII: TRAFFIC CONTROL

Section A. The developer shall furnish a traffic control plan for all developments involving public or private rights-of-way for review and approval. This plan shall indicate all traffic control/warning signs and devices required for the safe and orderly flow of traffic. This plan shall include, but not be limited to, signs such as STOP, DEAD END, SPEED LIMIT, SLOW - CHILDREN PLAYING, YIELD, street name and pavement striping.

Section B. The developer shall also be responsible for any changes or additions required in the roadway from which access to the development is authorized. The County Engineer may require additional information and traffic engineering studies to determine impact on the neighboring roadway system by the proposed development. The improvements to the neighboring roadway system that may be required include turn lanes, passing lanes, acceleration lanes, deceleration lanes, warning flashers, traffic signals, signs, pavement markings, etc.

Section C. The developer is responsible for installation of all traffic control.

Section D. All traffic control signs, devices and striping shall conform with the Manual for Uniform Traffic Control Devices (MUTCD) latest edition. All traffic control and warning signs shall be of engineering grade reflectorized quality, made on extruded aluminum sign blanks and mounted on galvanized U-channel post. All installations shall be compatible with the standards used by the Chatham County Public Works sign maintenance department. All incidental hardware for signage shall meet or exceed specifications on file in the Office of the County Engineer.

Section E. The County Engineer may waive the MUTCD conformity requirement for specific signs within a development. If such a waiver is granted, future temporary and permanent sign replacements by the County will be standard signs as described in Section D. If the developer or Homeowners Association desires replacement of the original signs, it will be at their expense. County approval must be obtained prior to the fabrication and erection of these signs.

Section F. The County Engineer established a Neighborhood Traffic Calming Policy that will be utilized to determine the feasibility of installing traffic calming features on residential streets in Unincorporated Chatham County. This Policy is attached as Appendix L of the Engineering Policy.

ARTICLE VIII: ENVIRONMENTAL SITE ASSESSMENT

Section A. An Environmental Site Assessment (ESA) shall be prepared for all subdivisions (as per the Subdivision Regulations) by a Professional Engineer or other licensed professional experienced in geotechnical investigations and the assessing of real property for environmental concerns. The environmental site assessment shall consist of an historical review of records, site reconnaissance, aerial photos, soil borings, and report. The following guidelines shall be used in the preparation of the assessment:

1. The Historical Review portion of the ESA shall at a minimum consist of the following:
 - a. Review available site plans, surveys, current and historical aerial photos. Consider adjacent property and its current use.
 - b. Review available real estate and topographic maps, geologic information, and hydrologic data for the site vicinity.
 - c. Review published surface and subsurface information for the site vicinity, including previous geotechnical boring logs, well logs, utility plans, and site zoning. Consider geologic data with regard to the potential for naturally occurring methane gas.
 - d. Review public documents to identify site ownership within the past 50 years, and to identify prior uses of the site and adjacent properties, where possible.
 - e. Identify and locate, within one mile of the proposed development, any National Priority List Superfund Cleanup sites; any underground storage tanks or leaking underground storage tanks; any facilities engaged in the treatment, storage, or disposal of hazardous wastes; and any disposal sites that have been identified by the County.
 - f. Access public records to obtain information about the site's regulatory history as revealed by permits issued; citations from local, state, or federal agencies.
 - g. Interview appropriate public officials with respect to waste disposal at or in the vicinity of the site; make inquiries to determine if there may be any records about underground tanks or abandoned wells.
 - h. When possible, interview parties who may be familiar with past uses of the site or adjacent sites.
2. The Site Reconnaissance portion of the ESA shall consist of the following:
 - a. Walk over the site and view it also from adjacent public rights-of-way.
 - b. Note and record information about the locations and sizes of structures, if any, evidence of any below-grade tanks, distressed vegetation, signs of chemical

production or storage, the nature of any trash or rubble on site, the types of businesses and activities operating in the area, evidence of any abandoned wells, and evidence of any illegal disposal practices.

c. Note and record appropriate information gained by observing adjacent sites, from conversations with site personnel, or from other sources.

3. The Soil Borings portion of the ESA shall comply with the following guidelines:

a. Soil borings shall be taken along the centerline of proposed roads at a spacing of 500 feet. In addition, borings shall be taken along the perimeter of the site at a spacing of 400 feet to 600 feet. If locations of proposed roads have not been determined, borings shall be spaced in uniform grid patterns of no more than 500 foot spacing to provide an overall coverage of the site. All other boring locations, as determined by the professional conducting the test, should be coordinated to provide an overall coverage of the site.

b. Estimations of the water table depth based on the soil borings shall be reported.

c. If the soil borings reveal a potential problem, then additional subsurface exploration and chemical testing will be required.

4. The Report portion of the ESA shall consist of the following:

a. After the completion of the historical review, site reconnaissance, and soil borings; the findings required in the previous subsections shall be prepared and included in the ESA document to the Chatham County Department of Engineering for their review and approval.

b. The report shall contain a statement of the professional's opinion as to the suitability of the site for the proposed development.

c. The ESA must be submitted to and approved by the County Engineer prior to approval to record the subdivision plat.

Section B. Waiver for minor subdivisions

1. The County Engineer is authorized to waive proposed minor subdivisions from the Subdivision Regulations Environmental Site Assessment requirement unless there is a reasonable suspicion that a landfill or other environmentally-dangerous situation exists.

2. The property owner shall request the waiver in writing, stating whether or not any information is known about former or existing landfills or other environmentally-dangerous situations in the vicinity of the proposed subdivision.

3. The Department of Engineering staff shall investigate the request. If no suspicious evidence or indications are found, then the waiver will be granted in writing.

ARTICLE IX: Digital Data Submission Standards

Section A. Background

Chatham County uses geographic information systems (GIS) technologies to store, manage, and maintain spatially-related (geographic) data. This data is used daily in planning and maintaining infrastructure improvements. The land development, engineering and surveying communities have embraced digital technologies in their respective professional communities. Because development plans are created using computer aided design and drafting (CADD), Chatham County leverages such techniques to expedite the design and plan review processes within the County. For such an effort to succeed, standards must be implemented to allow CADD data to be integrated into the County GIS while preserving the referential and positional accuracy of the original measurements.

These data submission standards will also provide for more efficient updating of the various components of the Savannah Area Geographic Information System (SAGIS), resulting in improved availability and usefulness to the development, engineering and regulatory communities. The County understands that these GIS layers are not accurate enough to be used for detailed design. The multiple layers of data, however, are expected to provide potential users with descriptive information that will be invaluable in planning and property valuation. The SAGIS geographic data elements are a representation of features that comprise our community and is not intended to convey legal boundaries of any kind.

Section B. Digital Submission Requirements

1. In addition to standard paper documents, each engineering document, plan or plat delivered to Chatham County that is required by ordinance or policy to be delivered digitally, will be accompanied by several digital files relating to that submission. Digital files to be submitted include:

a. A completed original CADD drawing in DWG or DXF (AutoCad V. 14) format. This file shall include all layers and graphic elements included in the submitted paper document (text, legend, scale, labels, etc.). This file will include features classified in the standard layers defined in Appendix J. If the drawing contains layers that are not included in Appendix J, then a list of these layers shall also be submitted (ASCII text file labeled: 'xlyrspec.txt'). All text in the completed CADD drawing file must be in standard fonts that can be read without third-party software.

b. A metadata text file containing information listed in Appendix K. This file includes submittal information as well as technical parameters that may be necessary to review if problems in data conversion occur. The ASCII text file will be labeled 'metadata.txt'.

c. An ASCII text file containing any elevation points. When submitting plans that include surveyed ground surfaces, a separate ASCII text file containing all elevation points shall be delivered.

2. To expedite the conversion of CADD data into the County GIS, the following requirements apply:

a. Standard transfer media will be accepted. Files will be stored on media approved by Chatham County. Such media include floppy disk and CD-ROM. The use of alternate media must be approved by the County. The submitted media shall be labeled with the title of the drawing (drawing file name), type of drawing (i.e. As-built, Preliminary, etc.), project contact information (name, affiliation, phone number, etc.), and a submittal and file creation date.

b. All drawing elements shall be submitted referencing the Georgia State Plane Coordinate System (GSPCS) in feet. Features in drawing files that are stored in drawing units must be translated to represent real world locations as referenced by GSPCS coordinates. Horizontal control will utilize the North American Datum of 1983 (NAD83). Vertical control will reference the North American Vertical Datum of 1988 (NAVD88) in feet. Chatham County is located the east zone of the GSPCS. The UTM Zone is 17 and the FIPS code is 051.

3. It is not Chatham County's intent to replicate legal surveys. With this in mind, control of plan features may be tied to the GSPCS using traditional surveying or sub-meter GPS methods. The methods employed to gain geodetic control shall be identified in the submitted 'metadata.txt' file.

4. Drawing features shall include layer names and definitions as indicated in Appendix J. Features other than those thematically defined by the individual layer name/description shall not be included in that layer. Systems using numbered levels, such as Microstation, include a conversion table in the DXF file creation process that can be used to specify named layers.

5. Only feature elements are to be included on individual layers. Annotation for each layer shall be placed in annotation layers as specified in Appendix J.

6. Closure is critical in converting CADD elements to GIS features. If appropriate (i.e. parcel boundaries), all polygonal features shall be 'snapped' closed.

7. Submitted CADD files shall contain only complete parcel polygon features. All partial polygons (parcel boundaries) shown for reference in drawings are not to be included in the PARCEL1 layer (Appendix J). Such features can be included in an unnamed layer in the submitted CADD file.

8. All elevation points shall be delivered in a single comma-delimited ASCII text file. Each line of the file shall contain values (in GSPCS coordinates) for a single point as follows:

Easting, Northing, Elevation
900374.63,953633.43,17.52
900375.73,953636.41,18.33
900378.31,953633.53,17.57

900376.23,953635.43,17.67

9. Additional layers (not identified in Appendix J) may utilize any open layer beyond the 60 reserved layers. As outlined above, a list of these layers shall also be submitted (ASCII text file labeled: xlyrspec.txt).