SECTION 1
PRELIMINARY CONSIDERATIONS & INSTRUCTIONS

1.01 General

The Standard Specifications as contained herein are to be utilized as a minimum standard for all subdivision and utility construction projects within the jurisdiction of the Town of Apex.

The purpose of these Specifications is to present standards for typical conditions encountered. All subdivision roadway construction and utility extension projects require that the design services be performed by, or under the direct supervision of, a Professional Engineer licensed to practice in the State of North Carolina. The existence of these Standard Specifications and Construction Details does in no way relieve the Professional Engineer of the responsibility to correctly adapt these standards to the actual site conditions encountered on any project. The PROJECT ENGINEER preparing construction drawings for a specific project must review the applicable portions of these specifications and determine that these minimum standards will function correctly for the project. There may be circumstances whereby the engineer may wish to increase pipe strength classification, bedding requirements, reinforcing, etc. In such situations where changes or modifications

are proposed, the Town of Apex should be consulted prior to completion of final design and plan submittal. This will serve to help ensure that the plan review time is minimized. Such deviations from the TOWN'S minimum standards receiving such preliminary approval shall be clearly indicated at one location on the construction drawings, and labeled, **"Exceptions to the Standard Specifications of the Town of Apex."**

Each set of plans for subdivision construction and/or utility extension which is submitted to the Town of Apex for review shall have affixed to the cover sheet or first sheet, the following note and certification:

These improvements shall be constructed in accordance with the following drawings and with the Standard Specifications of the Town of Apex.

I, _____, PE, certify that the Standard Specifications of the Town of Apex have been thoroughly checked and found to be applicable to this project. All exceptions to the applicable Town Standards have been previously approved by the Town of Apex and said exceptions are shown on sheet(s) _____ of these drawings.

By: _____, PE

S E A L

Date: _____

Projects shall be constructed according to the Standard Specifications in effect at the time the project is submitted to the TOWN for initial review.

If construction of the project or phase of the project does not commence within 12 months after the date on which the final construction plans were approved, the approval shall be null and void. If a project approval is deemed null and void, all preliminary submittal procedures shall be repeated, and the resubmittal shall reflect any revisions in the Apex Standard Specifications and Construction Details in effect on the date of the resubmittal. Upon written request, the TOWN may extend the approval of any project 12 months if the request is made within 12 months of the original approval.

The project contractor shall have at least 1 complete set of approved plans signed by the Town of Apex and specifications (including Town of Apex Standard Specifications and Construction Details) at the job site at all times that work is being performed.

1.02 Submittal Requirements

Persons desiring to construct subdivisions or other utility extensions within the jurisdiction of the Town of Apex must submit **final** construction drawings **sealed** by a Professional Engineer licensed to practice in the State of North Carolina. The submittal shall be made to the office of the TOWN Engineer. Submittal of the construction drawings shall be made only after the project has received Site Plan approval from the Planning Board and the Town Council.

The submittal process shall be as described below:

a. Initial Submittal:

For the initial review, the following items shall be submitted:

1) *Final Construction Plans* – 12 sets. The plan size and content shall conform to the requirements outlined in Section 1.03 hereof.

2) *Storm Drainage Computations* - 2 copies of complete storm drainage calculations, maps, and other supporting material shall be submitted, addressing the following special issues as applicable:

   * Design calculations and proof of compliance with the TOWN'S Watershed Protection Overlay District.

   * Impact of concentrated run-off from upstream areas released onto the property being developed, and the measures selected to mitigate these impacts, i.e. either piping of this run-off into the storm water collection system, or the enhancement of existing drainage channels by enlargement, armoring, etc.

   * Impact of concentrated run-off from the property being developed onto downstream private property. In such cases, the discharge velocity must be reduced to non-eroding levels. Refer to Section 5.01.

3) *Wastewater Pump Station & Force Main Computations* - (if applicable) 2 copies. These calculations shall include the basis for sizing and any other calculations requested by the Town (i.e. flotation calculations, wet well sizing, drainage area, suction-lift calculations).

4) *Pavement Design Calculations* - Pavement design for all streets shall be based on subgrade soil conditions, a 20-year (minimum) design life and projected traffic loadings (ADT and percent trucks). For residential rural streets, cul-de-sac streets, and minor local streets, the subgrade soil classification used to estimate subgrade strength may be based upon field observation by a qualified soils engineer. A written copy of the soils engineer's findings shall be submitted with the pavement design.

For collector streets, thoroughfare streets and streets in commercial and industrial projects, the subgrade soil conditions must be substantiated by laboratory tests performed by a qualified geotechnical firm or soils laboratory. The laboratory tests shall include moisture content, plasticity indexes, Proctor density, and California Bearing Ratio (CBR - soaked values). Soil samples for laboratory analysis shall be obtained at intervals as necessary to represent any change in soil conditions (minimum of 3 samples) and the results shall be submitted along with the pavement design.

Pavement designs shall be performed by a qualified professional engineer using standard methods developed by the NCDOT, AASHTO, The Asphalt Institute, or other similar methods as may be approved by the Town.

The final pavement thickness shall be the calculated thickness, but in no case shall the thickness be less than that shown in the standard street typical section details, or that required by the NCDOT for streets to be maintained by the State. 2 copies of the pavement design calculations with accompanying laboratory test reports shall be submitted with the initial design documents.

5) The Town of Apex may require “utility easements” for the conveyance of water, sewer, electric power, and communications. All “utility easements” shall specifically allow for water, sewer, electric power, and communications utilities maintenance and conveyance.

6) *Erosion and Sedimentation Control Plan* - 2 copies of the Erosion and Sedimentation Control Plan and 1 copy of the “Request for Plan Approval Form” shall be submitted.

7) *Additional Design Data* - As may be requested.

b. Second Submittal:

The Town of Apex staff will review the initial items and will comment on any items needing correction or attention. The submitter shall then make the corrections, additions, or changes to the construction drawings, pursuant to the initial review comments. The second submittal shall then be made to include the following items:

1) *Final Construction Plans* - 12 sets.

2) *"Water Distribution Extension Permit Application"* - Form provided by the Town of Apex - 4 completed, typewritten duplicate originals for review by the Town Engineer. All Water Distribution Extension Permit Applications shall be accompanied by a Sealed Engineer’s Report per the Town of Apex Water System Management Plan. Refer to Appendix A of these Specifications.

3) *"Gravity Sanitary Sewer Extension Permit Application"* - Form provided by the Town of Apex - 4 completed, typewritten originals for review by the Town Engineer. All pump stations shall still require permitting by the North Carolina Department of Environment and Natural Resources (NCDENR). Refer to Appendix A of these Specifications.

4) *NC Department of Transportation (NCDOT) - Encroachment Forms, Driveway Permits, etc*. - Sufficient copies as required and prepared to conform to the NCDOT requirements.

5) *Storm Drainage Computations* - 2 copies of computations, if revised after initial review as per Section 5.01.

6) *Wastewater Pump Station & Force Main Computations* - 2 copies of computations, if revised after initial review.

7) *Grading and Erosion and Sedimentation Plan* - Erosion and Sedimentation Control Plan - 2 copies of the Erosion and Sedimentation Control Plan and 1 copy of the "Request for Plan Approval Form" shall be submitted.

The Town of Apex will review the revised plans and, if they are satisfactory, the submitter will be requested to bring the originals (tracings) to the Town Engineering Division for approval signatures. At that time, the executed forms will also be returned to the applicant or the design engineer so that the applications and proper number of plans may be submitted to the various state regulatory agencies.

Erosion and sedimentation control plans should be submitted directly by the owner to the Town of Apex Construction Management Department along with the "Request for Plan Approval" and permit fees. NPDES Storm Water Notice of Intent for all sites greater than 5 acres is also required.

1.03 Plan Requirements

a. Subdivisions:

All plan submittals for subdivision construction shall include the following elements:

1) Plans sealed and signed by a professional engineer registered to practice in North Carolina. Plan size shall be 24" x 36" at a scale of not less than:
1" = 50' horizontal, 1" = 5' vertical

2) Plan/profile drawings shall be provided for all street improvements, off-street sanitary sewers and storm sewers, water mains 6 inches and larger, sanitary sewer force mains, and for all utility extensions. Only plan-view drawings shall be required

for water mains 8 inches and smaller. All plan/profile drawings shall be prepared at a scale of not less than:
1" = 50' horizontal, 1" = 5' vertical

3) Boundary of the tract with all courses and distances indicated. 1 corner of the tract shall be tied to the NC Plane Coordinate System if within 2000 feet of a USGS or NCGS monument.

4) Vicinity Map, scale of drawings, and north arrow.

5) Master Plan(s) showing all improvements including: existing contour elevations (2-foot intervals) and USGS datum with benchmarks indicated.

6) 100-year flood plain as required by Section 6.2 of the Town's Unified Development Ordinance.

7) Owner and zoning of all properties adjoining the site.

8) Tract area and specific data required by the Apex Subdivision Ordinance or Unified Development Ordinance - number of lots, average and minimum lot size, etc.

9) *Public Streets*

- Street width (back-to-back of curbs).
- Right-of-way width.
- Horizontal curve data for each curve (centerline only).
- Vertical curve alignment.
- Sight Triangles.
- Entrance Islands with turn radii and turn paths.
- Distances to existing streets and intersections.
- Centerline linear footage (intersection to intersection, intersection to center of cul-de-sacs).
- Cross sections.

10) *Wastewater Facilities*

- Outfall lines drawings - stream location, ability to serve adjoining property.
- Pipe material, size, length, slope, invert elevations at all manholes, distance(s) from other utilities.
- 100-year flood elevations and manhole top elevations, vent elevations.

- Special construction details - piers, boring, encasement, drop manholes, etc.
- Easement widths.
- Pump station and force main calculations.
- Location of service laterals.
- Capacity of downstream facilities.
- Capacity of upstream facilities (existing and predicted future).

11) *Water Distribution Facilities*

- Pipe material (DIP), size, location and separation from other utilities.
- Valves, fittings, blow-offs, air release valves.
- Fire hydrant locations - conforming to maximum spacing.
- Service lateral locations.
- Special details - boring, etc.
- Easement widths.
- Test pressures and flow rates for any existing line to be tapped (upon request).

12) *Storm Drainage*

- Complete storm drainage calculations (Note special requirement to address impact of off-site drainage, per Section 1.02(a)(2).
- Invert elevations and top elevations at each structure - catch basin, curb inlet, yard inlet, etc.
- Invert elevation at each inlet and outlet point - flared end section, head walls, etc.
- Pipe material, length, slope, etc.
- Exit velocity and details of velocity reduction facilities at each open outlet.
- Complete hydraulic calculations.
- Storm water easements and widths.
- Special details - easement widths, open channels, etc.

13) *Miscellaneous Data*

- OWNER/DEVELOPER: name, address, and telephone number.
- PROJECT ENGINEER: name, address, and telephone number.

- Utility easements as required by the TOWN.

14) *Review Certification By Town Of Apex*

The design engineer shall affix the following certificates to the cover sheet of the construction drawings:

TOWN OF APEX CERTIFICATION

This drawing has been reviewed by the Town of Apex, and to the best of my knowledge and belief, conforms to the requirements established in the Standard Specifications of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By:_____ Date: _____

PLANNING/ZONING CERTIFICATION BY THE TOWN OF APEX

This construction drawing has been reviewed by the Town of Apex Planning Department, and to the best of my knowledge and belief, conforms to the Subdivision or Site Plan that was approved by the Town of Apex Council, and meets the Town of Apex Zoning, Subdivision, or Unified Development Ordinance. This signature does not constitute a variance from any requirements of the originally approved Subdivision or Site Plan cited above, or any federal, state, or local code, law, specification, rule, guideline, or ordinance. It is the sole responsibility of the owner/developer, or any of his agents or contract professionals to ensure that this construction plan meets all the aforementioned requirements.

By: _____ Date: _____

TRANSPORTATION ENGINEER CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex, and to the best of my knowledge and belief, provides an acceptable transportation system with consideration for the elements contained within the Transportation Plan conforming to the requirements established in the Standard Specifications of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

PARKS, RECREATION, AND CULTURAL RESOURCES CERTIFICATION BY THE TOWN OF APEX

These plans have reviewed by the Town of Apex, and to the best of my knowledge and belief, conform to representations made by the developer to myself and the Parks, Recreation, and Cultural Resource Advisory Commission consistent with the projects requirements for public Parks and Recreation, either in total or in part, as outlined in Section 7.3 of the Town's Unified Development Ordinance and Article IV, Section 19 of the Town Code. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By:_____Date:_____

ENVIRONMENTAL PROGRAMS CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex Public Works and Utilities Department (Environmental Programs) and to the best of my knowledge and belief, conforms to the requirements established in the Standard Specifications and Standard Details and the Unified Development Ordinance of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

FIRE DEPARTMENT CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex Fire Department, and to the best of my knowledge and belief, conforms to the requirements established within the Town's Standard Specifications, Fire Protection Ordinances, and the North Carolina Fire Code-Volume V. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

PUBLIC WORKS AND UTILITIES CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex Public Works and Utilities Department, and to the best of my knowledge and belief, conforms to the requirements established in the Standard Specifications and Standard Details of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

BUILDING INSPECTION DIVISION CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex Building Inspection Division, and to the best of my knowledge and belief, conforms to the requirements established within the Town's Code of Ordinances and the North Carolina State Building Codes. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

SOIL EROSION AND SEDIMENTATION CONTROL CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex, and to the best of my knowledge and belief, conforms to the requirements established in the Soil Erosion and Sedimentation Control Ordinance of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

THIS SIGNATURE DOES NOT CONSTITUTE PLAN APPROVAL, ONLY PLAN REQUIREMENTS. A SEPARATE LETTER OF PLAN APPROVAL WILL BE MAILED TO THE FINANCIALLY RESPONSIBLE PERSON AT A LATER DATE ACCORDING TO THE CONSTRUCTION SEQUENCE.

By: _____ Date: _____

ELECTRIC UTILITIES CERTIFICATION BY THE TOWN OF APEX

This drawing has been reviewed by the Town of Apex Electric Utilities Division, and to the best of my knowledge and belief, conforms to the requirements established in the Standard Specifications and Standard Details and the Unified Development Ordinance of the Town of Apex. However, this signature does not constitute a variance from any requirements contained in any federal, state, or local code, law, specification, rule or ordinance. The developer/engineer/contractor is solely responsible for meeting all applicable requirements.

By: _____ Date: _____

The design engineer shall affix the following signature block to the lower right hand corner of each sheet of the construction drawings, except the cover page.

The signatures affixed below certify that this sheet has been reviewed and approved solely per the certifications signed on the cover sheet of these construction plans.

_____ CM – Engineering	_____ Date	_____ Public Works – Env. Programs	_____ Date
_____ CM – Transportation	_____ Date	_____ Planning	_____ Date
_____ CM – Building Inspections	_____ Date	_____ Planning – Transportation	_____ Date
_____ Public Works – Water/Sewer	_____ Date	_____ Fire	_____ Date
_____ Public Works – Electric	_____ Date	_____ Parks, Recreation & Cultural Res.	_____ Date
_____ Public Works – S & E	_____ Date		

b. Site Plans:

All site plans submittals should include, but not limited to, the following elements: Reference the Unified Development Ordinance for additional Site Plan requirements.

1) Plans sealed and signed by an engineer registered to practice in North Carolina, where public utilities, streets and pavement designs are involved, or where otherwise required by North Carolina General Statutes. Plan sheet size shall be 24" x 36".

2) Boundary of the tract with all courses and distances indicated. One corner of the tract shall be tied to the NC Plane Coordinate System if tract is located within 2000 feet of a USGS or NCGS monument. Total gross area of tract shall be indicated.

3) Vicinity map, scale of drawing, and north arrow.

4) Existing and proposed contour elevations at a maximum interval of 2 feet. Elevations based on USGS Datum with benchmark indicated.

5) 100 year flood plain as required by Section 6.2 of the Town's Unified Development Ordinance.

6) Owner and zoning of all properties adjoining the site.

7) Benchmark elevation and location.

8) *Data on Adjoining Streets*

- Street name.
- Street width and right-of-way dimensions.
- Existing utilities and storm drainage (size, material type, location).
- Driveway entrances onto site and adjoining properties.

9) *Building Site Data*

- Landscape plan including tree protection buffers.
- Number of buildings and dwelling units in each.
- Building "footprint" dimensions and finished ground floor elevation.
- Front, side, and rear yard set backs.

10) *Parking Data*

- Number of parking spaces provided and required.
- Location and dimensions of parking areas - angle of parking, typical width, length, aisle width, etc.
- Number of handicap spaces provided and required.

11) *Storm Drainage*

- Pipe material, size, length, slope, etc.
- Drainage areas and run-off for each storm drain pipe.
- Invert elevation, and top elevation for each structure - catch basin, yard inlet. Invert elevations for each flared end section, head wall, etc.
- Exit velocity and details of velocity reduction facilities at each outlet.
- Complete hydraulic calculations.
- Complete Storm Drainage Calculations (Note special requirement to address impact of off-site drainage, per Section l.02(a)(2) and Section 5.
- Special details and storm drainage easements widths as required.

12) *Utilities*

- Waterline location, type of material, and size.
- Water meter location and size; size of service branch.

- Sewer line location, type of material, and size.
- Sewer service lateral - size and location.
- Water and sewer easements and required utility easements.
- Fire hydrant location.
- Valve vault for fire sprinkler line (if applicable).
- Suggested transformer location.
- Electric power easements (if required).
- Storm Water Drainage Structures - yard inlets, impoundments, catch basins, etc.

1.04 Approval of Materials

All materials to be used in the project shall conform to TOWN Specifications. Any variation from the pre-approved materials shall be submitted to the TOWN prior to beginning construction. The list shall include the manufacturer, model number and such other additional information as may be requested by the TOWN to determine compliance with these Specifications.

1.05 Permits

The owner shall be responsible for all applicable permits and associated fees.

1.06 Record Drawings

Record drawings which reflect "AS-BUILT" conditions must be submitted prior to final acceptance of roadways and/or public utilities to be maintained by the Town of Apex. The record drawings must be labeled "RECORD DRAWINGS" and signed by the Project Engineer of Record. The record drawings submitted to the Town of Apex shall consist of 2 blue line drawings and 1 permanent, reproducible drawing - on polyester film (Mylar) sepia, 2 mil minimum weight. An electronic file in AutoCAD format shall be submitted to the Town Engineer. All applicable information listed below shall be included on all "AS-BUILT" drawings:

NOTE: Record drawings of roadways and utilities are required prior to the beginning of the one-year warranty or acceptance by the TOWN.

a. *Site Data*

1. Boundary of tract with all courses and distances indicated. 1 corner of the tract shall be tied to the NC Plane Coordinate System if within 2000 feet of a USGS or NCGS monument.
2. Vicinity map, scale of drawings, and north arrow.

3. Master plan(s) showing all improvements and including existing contour elevations (2-foot intervals) and USGS datum with benchmarks indicated.
4. All easements identified and dimensioned.
5. Tract total acreage.
6. Total number of lots and average size.
7. Benchmark location and elevation.

b. *Public Roadway System*

1. Street widths (back-to-back of curb) and right-of-way dimensions.
2. Horizontal alignment with radii, PC's, and PT's of all curves and curve data.
3. Vertical alignment with centerline grades, vertical curve lengths, station numbers, and elevation of all PVC's and PVT's, and centerline profile and curve data.
4. Pavement sections and typical cross sections.
5. Geotextile fabric locations, type, and manufacturer.
6. Engineer's certification indicating construction of the pavement in accordance with the pavement design and specifications.

c. *Storm Water Drainage System*

1. 100-year flood limits and elevations.
2. Structure top and invert elevations.
3. Pipe size and type material.
4. Pipe grades and distances.
5. Structural BMP's (see Section 5.06 for detailed As-Built requirements).
6. Include all outlet structure details and invert elevations.
7. Include any applicable maintenance clauses from homeowner covenants.
8. Storm water easements.

d. *Water Distribution System*

1. Pipe size, location, and type material.
2. Separation from sanitary and storm sewer systems.
3. Location of valves, fire hydrants, meters, blow-off assemblies, bore and jack casings with distance locations.
4. Easement locations and widths.
5. Copy of PROJECT ENGINEER'S certification indicating construction of the water system in accordance with the approved plans and specifications.

e. *Sanitary Sewer System*

1. Pipe size, location, and type material.
2. Manhole top and invert (in & out) elevations.
3. Pipe grades and manhole to manhole distances.
4. Clean-out locations with distance references.
5. Horizontal control (at manholes).
6. Easement location and widths.
7. Separation from water distribution and storm water systems.
8. Pump station test results.
9. Force main location, size, material type, location of air release valves and check valves, etc.
10. Pump station and associated appurtenances operation and maintenance manuals per Section 8 of these specifications.
11. Copy of the PROJECT ENGINEER'S certification indicating construction in accordance with the approved plans and specifications.