## **Town of Southern Pines**

Public Works Department 140 Memorial Park Court Southern Pines, North Carolina 28387



## **Construction Project Plan Review Checklist**

Forms are available at: www.southernpines	<u>s.net</u>	
submissions with missing or incomplete info should be noted that not all items containe	ormation may be rejected and not ed within will necessarily be requi	ontain the requirements stated within. Any construction plan reviewed until all necessary information has been provided. It ired for every project. This list is intended to give general may change; website should be checked to insure most
The Engineer shall place a check mark in provided or (N/A) not applicable	n one of the boxes (as appropria	ate) on each item:
process. Compliance with the checklist in	n no way is meant to relieve the for review are to include a cop	in developing a complete plan set to expedite our review e design professional of his or her responsibility for project y of this checklist signed by a NC registered Professional set will not be reviewed.
PROJECT NAME:		
ENGINEER:		
ENGINEERING COMPANY:		
COMPANY ADDRESS:		
COMPANY PHONE:	FAX:	
EMAIL:		
PROJECT PROPERTY OWNER:		
PROJECT ADDRESS/LOCATION		
DATE SUBMITTED:/		
Office Use Only Reviewed By ESC	Date Reviewed	STAFF ONLY – STAMP PLAN RECEIPT DATE
WATER		
SEWER		
PLANNING		
STREET		
FIRESTM WTR		
ESC DUE DATE	(15, 30 DAY)	/ Revision: April 2010

## The Following Are the Minimum Sheet Requirements

	See specific sheet requirements as noted below	<u>Provided</u>	Applicant <u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	Title sheet\Overall Plan				
2	Existing Conditions\Demolition Plan (include any trees to be removed)				
	Grading, Erosion Control and Strom Drainage Plan(s). These plans may be submitted together or separately but all must show existing and proposed grades and all existing and proposed utilities as well as other existing and proposed structure, including buildings. Proposed items must be in bold or otherwise stand out from existing items				
4	Utility Plans				
	Water Plan & Profile (min. 1"=40' H 1" =4' V) All crossings must be shown in profile.				
	Sewer Plan & Profiles (min. 1"=40' H 1" =4' V) All crossings must be shown in profile				
7	Storm Drain Plan & Profiles w/ HGL shown				
	Landscaping (include buffer and setback information and irrigation if applicable) Include utilities on plan -shaded				
	Drainage Area map (Sub-basin area(s) delineated with area(s) in acres indicated). Analysis points clearly identified and labeled. Time of concentration flow paths showing each segment. Include all off-site areas draining to site. Scale 1"= 100' min				
0	Details				
1	Road Plan & Profile				
2	Tree Survey if applicable				
3	Other sheets as required for specific aspects of the project				

A. C	General Plan Requirements		Applicant		
		Provided	<u>Not</u> <u>Provided</u>	<u>N/A</u>	Town Use
1	Each page is signed, sealed and dated by a NC Registered Professional Engineer and/or Architect.				
2	A minimum of three (3) sets of construction plans are enclosed for review.				
3	All drawings in a set of construction plans are the same size sheet, 36 in. wide by 24 in. high. See folding instructions town stamp-final approval.dwg				
4	North arrow provided on each plan sheet.				
	Plans and Profiles contain sufficient vertical and horizontal references and information to allow stakeout and construction of proposed work by reference to the plans alone.				
	Plans have a horizontal scale not less than 1in. = 50ft. and a vertical scale of 1in. = 5ft. or to a scale clearly marked.				
	Profiles are located under the corresponding plans on the same sheet.				
8	Profiles for all water and sewer mains are shown. (include all utility crossings)				
	Stationing is shown on plans. Stationing on plans should increase from left to right across the drawing. (Road centerline stationing can be used when water/sewer lines are located in/along roads).				
	Call-out locations are provided for fire hydrants, meter settings, blow-offs, manholes, clean-outs, tees, bends, valves, reducers, connections, etc.				
	Existing and proposed grade over the mains are indicated on the profile.				
	Minimum of 10ft. of horizontal separation between sanitary sewer and water lines is maintained.				
	Minimum 10ft. horizontal separation from storm drain structures or other utility structures is maintained.				
	Minimum vertical clearance from all crossing utilities is maintained.				
	All details are provided.				
16	Proposed and existing water and sewer utilities are accurately and clearly shown on the plan and profiles using standard symbols and proposed utilities are accentuated by bold, heavy line weight to distinguish it from other utilities.				
	All public right-of-ways and easements are shown and dimensioned. Where water and/or sewer mains leave the public road right-of-way a minimum 20-foot Town utility easement is provided. (all weather access road may be necessary)				
	Easements may increase in size with increasing depth.				
19	All lot lines, setback and buffers are clearly shown.				
	All specifications, design data and calculations, are provided on an 8 $\frac{1}{2}$ x 11 in. sheet, bound in a folder suitable for filing, and labeled for identification by the title.				
	Woodpecker and Environmental Impact Study included, if applicable.				
	Turn around area provided for emergency and maintenance vehicles, where required.				
23	Grading in buffer and setbacks areas must be approved by Planning Department (692-4003)				
24	Plans shall be folded to approximately 8.5" x 11" in size with the project title showing in the lower right hand corner and the Town Approval Stamp in upper right corner. See detail town stamp-final approval.dwg.				

25	Upon approval of construction drawings (2) full size sets and one 1/2 size set of plans shall be				
	submitted to PW for signature. A pdf version of the signed plans shall also be submitted to PW prior	_	_	_	_
	to any permits being issued.				

В.	<u>Title Sheet/Overall Site plan</u>		Applicant		
		<u>Provided</u>	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	Prefer Vicinity Map minimum scale 1 in. = 2000 ft., with clearly labeled intersecting roadway names major streams, towns, north arrow, etc. and the site location. Shade site to be constructed.				
2	Site Plan shows overall subdivision/site layout to scale, section limits, phases, right-of-ways, adjacent				
	subdivisions, property owners, existing and proposed street names, and at least two (2) permanent bench				
_	mark locations and descriptions. The section to be constructed is clearly labeled				
3	Provide an Index map with match lines for multiple sheets for all plans as needed.				
4	Title Information – Development/site name, type of plan, section number, and phase is provided.				
5	A legend is provided of the specific graphic special symbols applicable to the project. Standard symbols are used to the fullest extent possible.				
6	List of abbreviations applicable to the project is provided.				
7	Horizontal and vertical control references are specified (State plane, U.S. Coast & Geodetic Surveys, etc.).				
8	Source of the topography used for the preparation of the plans is provided.				
9	Revision block includes the date and reference of each revision.				
10	Sheet index is provided.				
11	Provide: Project Address, LRK #, Deed book & page, current zoning and proposed				
12	Provide Lot Size, existing impervious area, proposed impervious area				
13	Down stream receiving stream & classification, water shed, river basin				
14	Disturbed area clearly defined and acreage labeled.				
	Table showing public and private improvement quantities for water, sewer, streets, sidewalk, curb & gutter. Contact PW to obtain .dwg format				
_	Show and label all buffers, overlay district, easements etc, as defined by planning and zoning				
	Proposed use				
18	Building type, size and construction material				
19	Parking required and provided				
20	Town standard notes.				
21	Adjacent property owner information				
	Town approval signature blocks (upper right corner)				
_	Indicate 100 yr flood plain (reference FEMA panel #, date) or make reference that site is not located w/in 100 yr flood plain				

**C** Existing Conditions/Demolition **Applicant** Provided Not N/A Town Provided Use 1 Provide note requiring contractor to contact the NC One-Call Center prior to any construction activity. П П 2 Trees to be removed shown and clearly labeled. Trees being removed within Town rights of way require approval from Appearance committee. 3 Appearance commission approval required? 4 Tree protection fence shown around trees to remain 5 Show and label all topography with a maximum of two-foot contour intervals for the development. 6 Show all water lines, sanitary sewer lines, services, cleanouts, valves, hydrants within 500', water meters П П vaults, backflow preventers, storm sewer systems, catch basins, headwall, junction boxes and other structures, ditches and swale, all other utilities, buildings, parking, mail boxes, etc. 7 Clearly label any structures, utilities etc to be removed 8 Flood plain boundaries (100 yr, 500 yr) 

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Ε	General Sewer Plan and Profile Requirements	Applicant			
		<u>Provided</u>	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	A minimum 20 ft. utility easement width centered over the main is clearly shown and identified.				
2	Add Note: Provide an all weather access road (see Town std. for detail) for sewer outfalls in areas where determined by the Town of Southern Pines.				
3	Direction of flow is shown on the plans.				
4	Manhole number, depth, inverts, pipe slope, length and material, flow angles between main lines and manholes				
5	The following sewer main data and calculations are enclosed: wastewater flow projections (average, peak and design flows); projected velocities and pressures within the force mains; pumping station and wet well design (if applicable).				
6	Maintain Minimum velocity as detailed by the NCDENR. Minimum velocities are based on the average flow, including infiltration for gravity sewer. Force main velocities are determined by pump performance and pipe sizes.				
7	All sewer main crossings with other utilities are properly shown and called-out (include material) with minimum clearance dimensioned. Minimum vertical clearance of 24-inches from other utilities and/or storm drains is shown.				
8	Sewer mains shall be a minimum of 24-inches below water main to prevent conflicts with service laterals and crossings.				
9	Manholes out of roadway, pavement or in low lying areas are a minimum of 18-inches above grade.				
10	Mains must be 100 feet from any private or public water supply source, including wells, WS-1 waters or Class I or II impounded reservoirs used as a source of drinking water				
11	Mains a minimum of 50 feet from any waters classified WS-II, WS-III, B,SA, ORW, HQW or SB (and meet any NCDENR requirements)				
12	Sewer mains are 25 feet from private wells				
13	Sewer line easements shall be graded smooth, free from rocks, boulders roots, stumps and other debris, and seeded and mulched upon completion of construction. Easements across sloped areas shall be graded uniformly across the slope to no steeper than a 5 to 1 ratio.				
14	Mains shall be deep enough to serve the adjoining property and allow for sufficient slope in lateral lines				
15	Application for new water-sewer Service submitted				
16	Add shading to all ductile iron pipe sewer lines in profiles to distinguish from PVC material				

F	Gravity Sewers	,	Applicant		
		<u>Provided</u>	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	Pipe sizes and material type is shown on plans (SDR 35 or D.I.P.) depth is greater than 10 feet requires DIP				
2	Collecting sewers are a minimum of 8 inches in diameter and are designed to carry present and projected future flows for natural drainage basin.				
	Gravity sewer is placed at a minimum of $0.5\%$ grade and a maximum of $10\%$ . (Grades greater than $10\%$ may be approved on a case-by-case basis only.)				
4	Backfill trench with wash stone to crown of pipe and full width of trench line.				
5	Minimum cover on gravity sewer is 3 ft from the top of pipe to finished grade.				
6	A 4 in. water tight clean-out is provided at the Right of Way or easement for each sewer service connection. A road bearing clean-out is provided in areas of vehicular traffic.				
	50 ft maximum clean-out spacing on 4 inch service line. 6 inch service lines may have clean outs spaced at 75 feet intervals.				
8	A terminal manhole is provided at the end of each line.				
9	Show flow deflection angle at all manholes (max deflection angle per manhole = 90 degrees for 8"-10" pipe diameter)				
10	Pipes greater than 6" must tie into a manhole.				
11	All terminal reaches of sewer shall have a minimum slope of $1\%$ .				
12	Maximum distance between manholes is 400 feet or less				
13	No service connections within the cone section of the manhole				
14	Pipe diameter and or material changes must occur at manholes.				
15	Pipe crowns matched with minimum drop of 0.20 feet between the inverts within the manhole.				
16	Meets all other design requirements as specified by NCDENR				
17	NCDENR fast track sewer application				
18	Flow acceptance letter from Moore County				
19	Analysis of receiving gravity sewer, lift station, force main etc.				
20	Provide SS Manhole Chart (Chart available in AutoCAD format from PW Dept.)				
21	Confirm proposed gravity laterals meet 15A NCAC 02T .0305 when crossing water mains				
22	Provide calculations showing sewer is designed to carry the total peak tributary flow at $1/2$ of full depth				
	(50% capacity) for 16" and smaller pipes. Include all calculations and assumptions used to show design meets NCDENR design standards for gravity sewer.	_	_	_	
23	Min. flow velocity under design conditions shall be at least 2.5 feet per second.				

Sewers, Force Main (Pressure Sewers) **Applicant** Provided Not N/A Town Provided Use 1 All force main sewer pipe is either PVC (DR-9, C-900), or Ductile Iron Pipe. П 2 Minimum cover above force mains is 3 ft. 3 An automatic air and vacuum relief valve is placed at each high point along the force main pipeline. 4 Force mains enter the gravity sewer system at a point not more than 2 ft. above the receiving manhole П П П П invert or approved on case-by-case basis. Must be aligned w/ downstream receiving sewer to minimize turbulence and sulfide generation 5 Pump station shall be designed with two (2) pumps of equal capacity, each of which is at a minimum П П П П capable to handle the design flow and any expected peak flow and 2.5 times the average daily flow. Must also meet all other DWQ requirements. Provide all calculations w/ a summary of design in a clear & orderly fashion that is easily followed and shows all assumptions, charts, manufacturer information etc used in the design. 6 Pump stations shall have on-site standby power (engine generator set) with automatic switching. 7 Minimum size for public force main is 4 inch. 8 Flow velocity within force main shall be between 2.5 and 5.0 fps П 9 Calculations showing complete system curves, showing one and two pump operation. Total dynamic head П П П П calculations for all applicable pumping situations. Pump station cycle and pump run times covering the high, low and average flows over the entire expected operating period of the pump station. Pump station flotation/buoyancy calculations. Minimum velocity calculations. Evaluation of the capability of receiving sewer to handle peak flow discharge from the facility in addition to receiving sewers existing or future peak flow. Calculations for the sizing of the backup power generator. 10 Summary of number of lots or units served, off-site drainage area, average daily flow, peak daily flow, and П П П the rated capacity of pumps at a specified total dynamic head.

11 Telemetry system/auto-dialer, audible and visual alarms are provided

Comments

Water main sizes are indicated.	н	Water Plan and Profile Requirements		Applicant		
Water main materials are indicated (C900 or DIP).			Provided		<u>N/A</u>	
No dead end mains allowed unless no practical alternative exist.  Water valves are spaced at determined location to be approved by Town.  Single water services are provided to each dwelling, business, waterbouse or proposed lots, buildings and parcels. Backflow devices shall be installed at approved to locations.  Fire hydrants spacing shall be approved by Town. The bury depth is provided on the profile.  Minimum of 3 feet clearance around all fire hydrants.  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines that serve hydrants shall be at least six inch lines  Water lines, beach shall near lines and design calculations are enclosed: average day, maximum day, and peak hour deamands, fire flow repair man data and design calculations, include junction/pipe note report and diagrant clearly indications. Such group repairs and papes hour deamands, shall near the same clearly indications.  Water lines hydrant is capable of providing required flow, and indicate all essumptions and methods used for design.  Mains sized to provide a minimum system pressure of 20 psi at all points of the system during fire flow conflicts with peak system demands and 40 psi at average daily demand conditions.  Water lines ship hydrant	_					
Water valves are spaced at determined location to be approved by Town.  5 Single water services are provided to each dwelling, business, warehouse or proposed lots, buildings and parcels. Backflow devices shall be installed at approved locations.  6 Fire hydrants spacing shall be approved by Town. The bury depth is provided on the profile.  7 Minimum of 3 feet clearance around all fire hydrants.  8 Water lines that serve hydrants shall be at least six inch lines.  9 Where a water main is in a casing under a roadway or crosses under a stream bed, valves are placed on each side.  10 All valves, tees, bends, fire hydrants, etc. are shown with a symbol and called-out with size, type and station.  11 Prefer no 90 degree bends shown on any water main.  12 The following water main data and design calculations are enclosed: average day, maximum day, and peak hour demands, fire flow requirements (ISO calculations, future requirements, probable pressures, losses, and computations for determining pipe sizes. Provide a written reprot summarizing the water design calculations, include junction/pipe node report and diagram clearly indicating each node and pipe, summary table showing each hydrant is capable of providing required flow, and indicate all assumptions and methods used for design.  13 Mains sized to provide a minimum system pressure of 20 psi at all points of the system during fire flow on the system.  14 System demand shall includer. Fire flow, peak domestic demand, sprinkler demand, and any other flow demand on the system.  15 Fire sprinkler design and calculation as required by the Fire Marshal.  16 Minimum cover of 3-ft. for water mains is maintained as measured from top of pipe to finished grade.  17 Public water supply systems located under streets must be DIP.  18 Profer threa (3) valves are provided at each water main tee and four (4) valves at each water main cross.  19 Location of FDC, within 50 feet of fire hydrant  20 Location make and model of Back flow preventer.  21 Irrigation system must have privat	2	Water main materials are indicated (C900 or DIP).				
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Irrigation system must have privately maintained reduced pressure principle backflow prevention installed in accordance with the NC Plumbing Code. RPZ must be installed above ground and within an insulated box.  BFP may be installed inside building as long as there are no unprotected taps between the street and building. Must provide positive drainage capable of handling discharge from RPZ.  No service connections are to be made on fire hydrant branches or fire lines.  Direct service connection shall be allowed on mains 16" and smaller.  Main line valves on straight runs between intersection shall be spaced at not less than 600' for 6" lines and 900' for 8" lines  Gate valves for water mains 12" and less and Butterfly valves or gate valves for 16" or larger.  Provices connections are perpendicular to main.  NCDENR - Public Water Supply Section water extension application  Engineers Report (Report shall include requirements listed in items 12,13,15 above)  Application for new water-sewer Service submitted  Add Note: Contractor responsible for providing testing data that proves fire flow meets initial design requirements  Provide an above ground heated enclosure for the RPZ for all commercial, industrial and institutional developments	19	Location of FDC, within 50 feet of fire hydrant				
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developments	31					
	32					
	33	RPZ for irrigation shall be in above ground insulated enclosures.				

I	Erosion Control	,	Applicant Provided <u>Not</u> <u>N/A</u>		
		Provided	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	General plan requirements as noted above.				
2	Financial Responsibility/Ownership Form				
3	Review fee				
4	Certificate of assumed named, if partnership				
5	Name of Registered Agent				
6	Copy of the most current Deed for the site				
7	Narrative describing the nature and purpose of the construction activity.				
8	Color copy of USGS Quadrangle map with site indicated				
9	Copy of County Soils map				
10	Construction sequence related erosion and sediment control (include critical measures prior to the initiation of the land-disturbing activity & removal of measures after areas they serve and permanently stabilized)				
11	Is there flood plain associated with project? State on plan if there is or is not and give elevation and location on plans. (if not state in narrative that it is not required)				
12	Required Army Corps 404 permit and Water Quality 401 certification (stream disturbances over 150 linear feet) (if not needed state in narrative that it is not required)				
13	General Site Features (plan elements)				
14	Existing and planned drainage patterns (include OFF-SITE areas that drain through project				
15	Limits of disturbed area (provide acreage total, delineate limits, and label)				
16	Existing contours and Existing conditions (buildings, roads etc) including any demo				
17	Proposed contours				
18	Proposed building and road locations and elevations				
19	Land use of surrounding areas.				
20	Rock outcrops				
21	Seeps or springs				
22	Wetland limits				
23	Easements				
24	Streams, lakes, ponds, drainage ways, dams				
25	Stockpiled topsoil or subsoil locations				
26	Property lines of total tract				
27	Erosion control legend				
28	Location of temporary and permanent measures				

	Provided	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
Construction drawings and details for temporary and permanent measure				
Maintenance requirements during construction				
Borrow Source or waste destination.				
Size and location of culverts and sewers				
Name and classification of receiving water course or name of municipal operator (only where storm water discharges are to occur.				
Soil info: type, special characteristics				
Design calculation and construction details for culverts and storm sewers				
Design calculations cross sections, and method of stabilization of existing and planned channels (including temporary linings)				
Discharge and velocity calculations for open channel and ditch flows				
Pre-construction runoff calculations for each outlet from the site (at peak discharge points)				
Design calculations for peak discharges of runoff (including the construction phase and final runoff coefficients of the site) for each outlet point on the site.				
Design calculations and construction details of energy dissipaters below culverts and storm sewer outlets (for riprap aprons, include stone sizes and apron dimensions)				
Design calculations and construction details to control groundwater, i.e. seeps, high water table, etc.				
Design calcs and dimension of sediment basins and traps. (include pre and post drainage area maps, surface area requirements and volume requirements)				
Design calcs for other erosion control measures.				
Vegetative Stabilization				
Area and acreage to be vegetatively stabilized				
Method of soil preparation				
Seed type and rates (temp. and permanent)				
Mulch and fertilizer type and rates				
Watering Requirements				
Plan should include provisions for groundcover on exposed slopes within 21 calendar days following completion of any phase of grading' permanent groundcover for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development. For HQW Zones, ground cover shall be provided within 15 working days or 60 calendar days following completion of construction or development, whichever is shorter.				
Storm Drainage schedule (include in tabular form: Structure ID, inverts, rim elevation, slope, length, pipe size, pipe material, pipe cover/depth, inlet type)				
Storm drain sizing calculations including HGL calculations included.				
Min pipe size with Public Right of Way is 15"				
All storm pipes within the Public Right of Way shall be RCP				

J	Streets	Applicant			
		<u>Provided</u>	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1	Define with details typical roadway cross-sections for all proposed public or private streets/alleys. Details should include typical pavement structure, size of curbing, shoulders, sidewalks, pavement widths and right of-way widths as applicable.	ш			
2	Driveway grades a maximum of 10%				
3	Sight distance triangles at intersections and driveways (include any landscaping, signs etc. that may interfere with sight triangles)				
4	Label proposed street classification as dictated per Planning Department				
5	Traffic study as required				
6	Dumpster location, size and access (show turning radii)				
7	Fire access to all units and/or fire lanes as required				
8	Sidewalk within public right of way				
9	Pavement marking and street signage included.				
10	NCDOT right of way encroachment (two party)				
11	NCDOT right of way encroachment (three party)- four (4) originals must be provided)				
12	NCDOT driveway permit				
13	Town of Southern Pines -encroachment agreement				
14	Street design meets NCDOT and Town minimum requirements for CL grades, cut/fill slopes sight distance etc. based on classification type				
15	Show CL road data				
16	Provide gutter spread calcs.				
17	Heavy Duty Pavement design minimum: 2" SF 9.5 (A or B), 3" I19, 8" Aggregate Base Course All depths compacted				
18	Light Duty Pavement design minimum: 2" SF 9.5 (A or B), 6" Aggregate Base Course All depths compacted				
19	Reference State road numbers and street names of connecting roads				

K Stormwater		Applicant		_
	<u>Provided</u>	<u>Not</u> <u>Provided</u>	<u>N/A</u>	<u>Town</u> <u>Use</u>
1 For areas up to 200 acres, the Rational Method shall be used and the Kirpich equation used to determine Tc. Show all calculations.				
The peak post development stormwater runoff discharge rate shall be controlled such that the rate is equal to or less than the peak pre-development stormwater runoff discharge rate for the 10 yr storm.				
3 Submittals shall include: full Analysis & Justification for determination of the following pre and post construction: composite C factors, TC, DA (on and off-site) & other date used in the development of the computations.				
4 Stormwater summary results table: Contact PW for AutoCAD table				
Pre and Post development drainage area maps provided (scale no smaller than 1"=100') (include flow paths, Analysis points and Drainage areas in acres)				
6 Provide a written narrative describing stormwater control method. Include summary of method used steps taken and results showing requirements are met.				
Note on plans: All stormwater management facilities shall be maintained by the property owner.				
7 Storm Drainage schedule (include in tabular form: Structure ID, inverts, rim elevation, slope, length, pipe size, pipe material, pipe cover/depth, inlet type Drainage area and flow in pipes) Contact PW for AutoCAD format				
Provide HGL calculations for the 10yr storm (25 yr for road crossings). HGL calculations shall follow methods as describe by NCDOT. Design storm may be increased by Town Engineer as necessary.				
9 The hydraulic grade line (HGL) shall not exceed the top of structures or gutter elevations as appropriate for the year storm event for any storm drain system	Ц			
HGL calculations shall take into account and show all head losses, friction factors and bypass flows. Tailwater conditions must identified.	Ш			
Provide culvert calculations. 25yr design storm for any road crossings. Size determined by the Bureau of public roads Headwater Depth for Concrete Culverts Charts. Check both inlet & outlet control.				
Min slope on Storm sewer is 0.50% or slope to obtain 2.5 fps. Max slope is 10% w/o special anchoring				
2 Min. drop in a MH is 0.1'				
Provide riprap or approved alternative outlet protection calculations for all storm drain outlets				
4 Provide inlet spread/capture computations				
Gutter spread is not to exceed ½ a travel lane for the 2-year storm event. Bypass shall be limited to less than 0.10-cubic feet per second (cfs) into an intersection for the 2-year storm event				
6 All flow rates shall be provided in cfs to the nearest hundredth of a cfs.				
7 All bypasses shall be noted. This note shall include the inlet that it will be directed to.				
8 All bypass flows shall be accounted for in gutter spread calculations				
For sump conditions, use a 50% clogging factor to determine the inlet capacity				
In no instance shall the load plane of a building or structure come within 5-feet of the outside edge of a storm pipe				
1 Storm drain outfalls shall released to the natural drainage ditch or stream.				
Provide channel design calculation for temporary and permanent conditions.				